



ACI NSW Agency
for Clinical
Innovation

MUSCULOSKELETAL NETWORK

Osteoarthritis Chronic Care Program
Model of Care



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FOREWORD

Healthcare provided by the NSW health system is first-class by Australian and international standards but there will always be areas where we can and must improve. One of those is the management of chronic conditions.

The NSW Model of Care for the Osteoarthritis Chronic Care Program developed by the ACI Musculoskeletal Network offers a pathway to improved care for people who have one of the most common, debilitating, costly and rapidly growing chronic conditions – osteoarthritis.

The most compelling reason for improvement in any clinical service is the welfare of the person requiring healthcare interventions. The NSW Osteoarthritis Chronic Care Program aims to reduce pain, increase mobility and improve quality of life for NSW residents with this often crippling disease.

Nearly one in five Australians has arthritis and most of them have osteoarthritis, which affects more than a quarter of all people over 65. In 2007, Australian health system expenditure for osteoarthritis was \$2 billion. As the population ages and the prevalence of obesity and joint injury increases, osteoarthritis will place an increasing burden on individuals, health systems and the community.

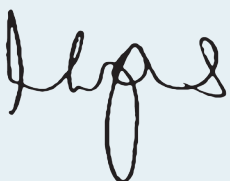
This Model of Care has been developed through the combined efforts of consumers, Arthritis NSW, clinicians and managers who have come together under the umbrella of the ACI Musculoskeletal Network to compile the evidence and lead the way forward.

Getting the model right is just the beginning. It won't help people with OA until it is put into everyday practice across NSW. The new model is being piloted at seven coordinating sites. These are Fairfield/Macarthur/Bowral, Gosford/Wyong, Nepean/Blue Mountains, Newcastle, Port Macquarie, Sutherland/St George and Wollongong. Because initial work has shown much improvement in the overall health of people participating and a potential to reduce health service utilisation, some other sites in NSW have linked with ACI to provide this model of osteoarthritis care for their local residents. Working together, the participating teams are helping to make a difference to healthcare in NSW.

ACI is working with the Ministry of Health, participating Local Health Districts, clinicians, managers and people with osteoarthritis to demonstrate the benefits in practice, which in turn will inform a state-wide rollout.

On behalf of the ACI, I would like to thank the Musculoskeletal Network and in particular the members of the OACCP Working Group for the huge amount of collaborative work they have invested in developing this best practice Model of Care.

We need to honour that commitment by ensuring that it does result in better care of this chronic condition for people across NSW.



Dr Nigel Lyons

Chief Executive, ACI

PREFACE

Nearly one in five Australians has arthritis, and most of those have osteoarthritis, a chronic condition where degeneration of hips, knees and other joints cause pain and disability for those affected. Osteoarthritis is recognised as a national health priority under the National Chronic Disease Strategy.

Health expenditure in general on arthritis exceeds spending on coronary heart disease, diabetes, depression, stroke or asthma. The total cost of arthritis to the Australian community, including lost productivity, is almost \$24 billion annually.

Arthritis can affect people at any age including childhood but osteoarthritis is more common in adults. As the population ages and becomes increasingly overweight, the incidence of osteoarthritis is rising. Some predictions suggest the number of people with osteoarthritis will double by 2020.

Despite the impending wave of this disabling chronic condition, the current management of osteoarthritis is largely episodic and often limited to prescribing of medication while waiting for total joint replacement.

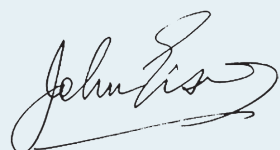
Yet the evidence shows that progression of the disease can be slowed, pain can be relieved, disability can be minimised and the need for surgery may even be postponed or avoided with appropriate multi-disciplinary treatment including exercise, weight loss and other chronic care interventions that address the needs of these people holistically.

The NSW Osteoarthritis Chronic Care Program (OACCP) provides a clinically relevant, locally applicable model of care to reduce pain, stiffness and loss of function and improve quality of life for people with this disabling condition. The Program includes exercise, weight loss, education about the disease process and its evidence-based management and support for people with osteoarthritis to manage their own health.

Implementation of this Model of Care is based on multi-disciplinary care teams who work closely with General Practitioners. The team is led by a Musculoskeletal Coordinator with contributions as needed from a range of other clinicians including specialist doctors, nurses, occupational therapists, dietitians, psychologists, social workers, pharmacists, exercise physiologists and podiatrists.

It has been developed through a truly collaborative effort by consumer members of the ACI Musculoskeletal Network, clinicians, and in particular through the efforts of Professor David Hunter and his team in the Osteoarthritis Working Group. We also would like to acknowledge the funding assistance from the Health Service Performance Improvement Branch of the NSW Ministry of Health to support the OACCP pilot program.

The development of this Program puts NSW at the forefront of osteoarthritis clinical practice in Australia. We thank all members of the ACI Musculoskeletal Network for their commitment and so willingly sharing their expertise to help make it happen.



John Eisman AO
Co-Chair
ACI Musculoskeletal Network



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Co-Chair
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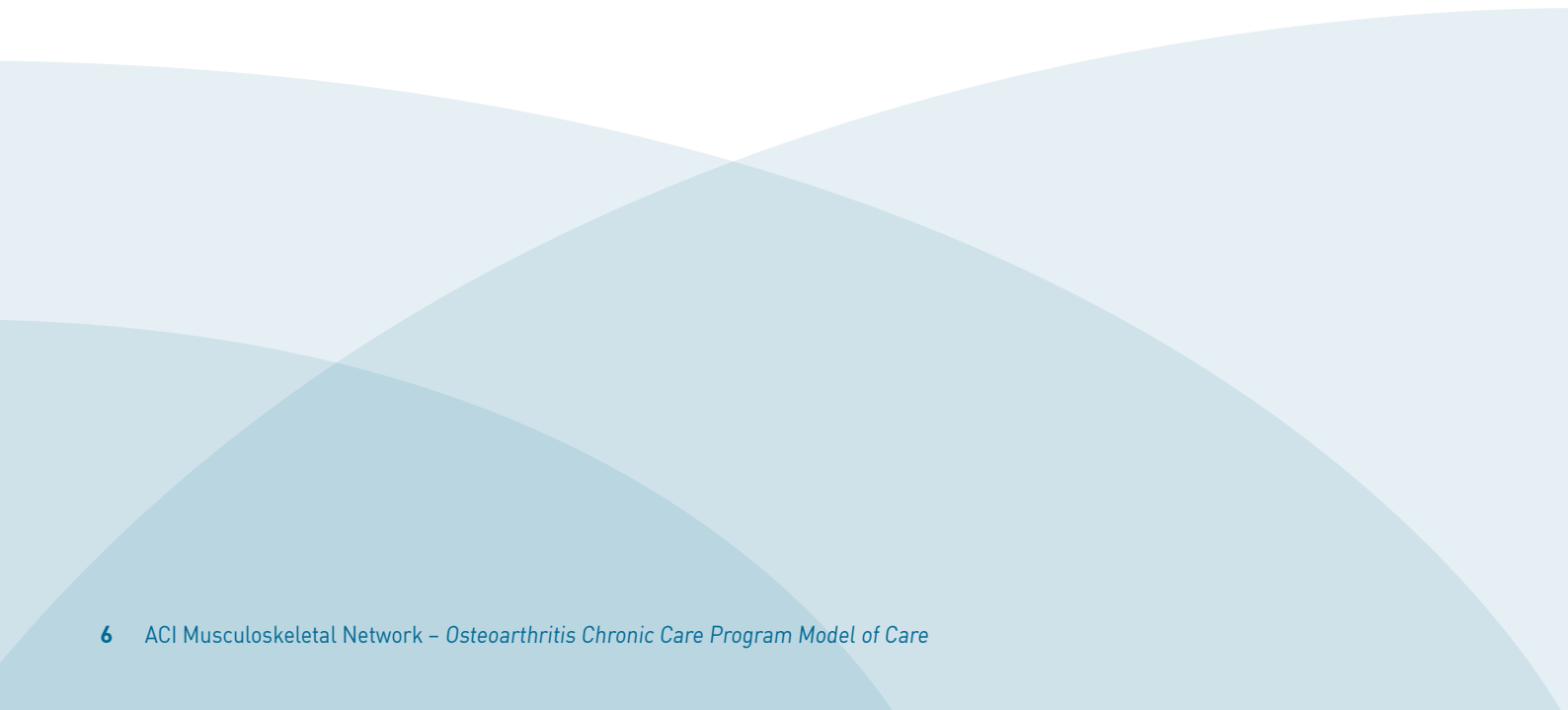
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The draft was distributed throughout the NSW Health system and to relevant professional colleges and associations in late 2011. Feedback was considered and included as appropriate in finalising the model.



EXECUTIVE SUMMARY

INTRODUCTION

Musculoskeletal conditions affect hundreds of millions of people around the world. In people over the age of 60, joint diseases account for more than half of their chronic conditions. In Australia, arthritis affects more than 15% of the population and the incidence is projected to increase to almost 25% by 2050. Whilst arthritis can affect people at any age, it is more prevalent in older people, with evidence of osteoarthritis (OA) in more than 25% of Australians over the age of 65. As a chronic, non-fatal condition, there has been a common misconception that OA is an inevitable part of growing older. OA is the clinical and pathological outcome of a range of disorders that result in structural and functional failure of synovial joints. This progressive joint failure can cause pain, stiffness and loss of joint function. It will result in disability and compromised quality of life for almost one third of those reporting the disease.

In 2007, Australian health system expenditure on OA was \$2.0 billion. Health expenditure on arthritis in general was more than was spent on coronary heart disease, diabetes, depression, stroke or asthma. In economic terms, the total cost of arthritis in Australia, including productivity costs, and direct health costs, is almost \$24 billion. As the Australian population ages, and the prevalence of obesity and associated joint injury increases, OA will place an increasing burden on individuals, societies and health care systems.

BACKGROUND

Recognition of the growing burden of OA and its related conditions, and the need for action to address the unsustainable growth in health care costs, has led to action at international, national and state levels. The World Health Organisation launched the Bone and Joint Decade in January 2000 to raise awareness of the growing societal impact of musculoskeletal conditions.

In 2002, the Australian Government identified arthritis and other musculoskeletal conditions as a national health priority and commissioned the National Arthritis and Musculoskeletal Conditions Advisory Group to develop a national action plan and a national service improvement framework for OA, rheumatoid arthritis and osteoporosis. These were endorsed as key strategic documents in the Better Arthritis and Osteoporosis Care Initiative 2006-2010. This initiative aimed to improve the primary, secondary and tertiary prevention and management of these conditions. The Department of Health and Ageing commissioned the Royal Australasian College of General Practitioners to develop guidelines for these three conditions, and the National Health and Medical Research Council approved these guidelines for publication in 2009 and 2010.

State level projects for the early identification and comprehensive, conservative management of individuals with OA have been implemented in some settings in Victoria and Queensland. In New South Wales, individual sites have investigated a variety of models but outcomes have been variable, and there has been no coordinated approach to address the problem.

CURRENT CONTEXT

Guidelines report positive outcomes from conservative management for individuals with OA. Strategies for slowing disease progression, relieving pain and minimising disability are at the forefront of conservative management. Evidence supports the inclusion of exercise, injury avoidance, weight loss, pharmacologic treatment and timely access to surgery as safe and effective treatments for OA. However, this is not always reflected in clinical practice, and current management is episodic, uncoordinated and often lacking in evidence-base. Best practice treatment for ambulatory hip and knee OA involves a diverse team of health care practitioners providing a comprehensive and integrated program. It is therefore appropriate to consider the management of OA within a chronic disease model of care rather than the current episodic approach.

To address this divergence between best practice and current clinical practice, the Agency for Clinical Innovation (ACI) is recommending a model of care for people with OA using a chronic disease management approach.

NSW OSTEOARTHRITIS CHRONIC CARE PROGRAM (OACCP)

The model developed by the ACI is guided by best practice, and offers improved coordination of care by designing an inter-disciplinary conservative management model for patients with OA. The objective of the OACCP is to reduce pain, improve function and quality of life of NSW residents with OA, who have elected conservative management of their joint disease, or who are waiting to undergo elective lower limb joint replacement surgery. Central to this model is face to face participant access to clinical staff and health care services to support self-management through goal setting and the development of individual plans for long term behaviour change.

People with OA of the hip or knee are eligible to participate in the OACCP. A musculoskeletal coordinator will, in conjunction with the multidisciplinary team, assess individuals and link them with relevant health care providers to support timely and effective care that is flexible and responsive to individual needs. The coordinator will be responsible for engaging and maintaining relationships with relevant stakeholders, and will create a facility-based service that incorporates all components of a chronic disease rehabilitation program.

The program will be piloted at seven sites across NSW and the ACI will be responsible for central coordination, support of implementation and assistance with evaluation of each local OACCP during the pilot phase. Each site will report key performance and clinical indicators to the ACI for evaluation of program participation and stakeholder satisfaction. To facilitate the best possible outcomes, each site will be encouraged to work with the ACI Musculoskeletal Network which has developed this model for the chronic care management of osteoarthritis. Key points for inclusion in the OACCP are:

- a medical officer who will be an active team member and provide medical governance
- a Musculoskeletal Care Coordinator who will lead a multidisciplinary team to deliver the program
- pre-program face-to-face screening and follow-up assessments using defined tools to record functional capacity and co-morbidity management
- interventions to increase functional capacity and to manage morbid risks through nutrition, physical activity and exercise (strength and aerobic) support
- maximisation of self-management support by linking with Arthritis NSW for the provision of evidence-based self-management programs
- the tracking of individual and service outcomes using ACI developed tools including a specifically designed web-based database
- enablement of individuals to access appropriate and timely surgery based on clinical need
- improvement of primary and tertiary care interface by promoting communication and coordinated care between service providers through a shared, documented action plan.

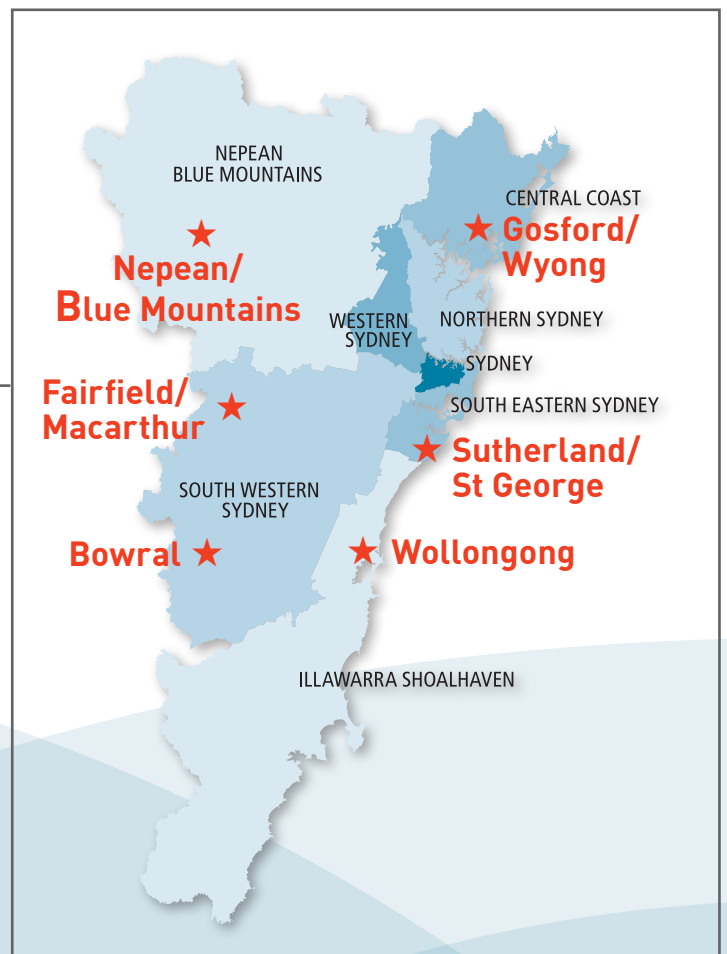
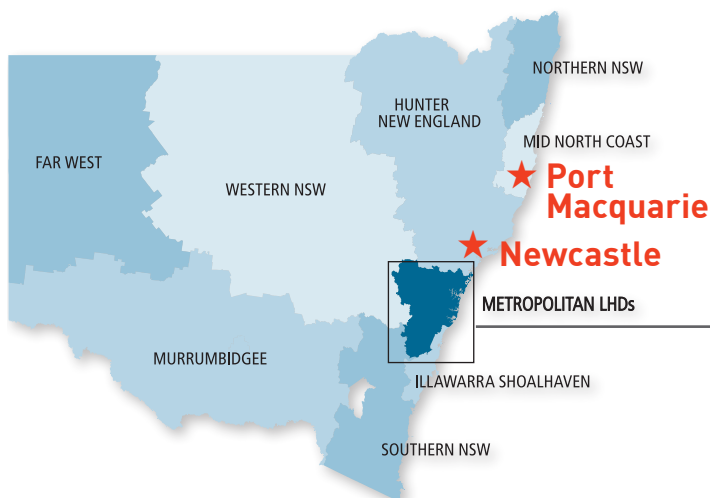
AIMS AND OBJECTIVE OF THE NSW OACCP

The core aims of the OACCP are to reduce pain and increase the functional capacity and quality of life of the participants within the framework of a chronic care model.

The objective is to improve the coordination of care and the inter-disciplinary, conservative management of individuals with OA. Individuals participating in the program are expected to develop or enhance their strategies to manage pain, and improve their functional status and quality of life. Comprehensive disease management of OA is expected to benefit participants and other stakeholders by improving the quality of care provided and reducing their use of health services.

The program will contribute to better management of participants' pain and conditions associated with their OA, and to the possible delay or prevention of the need for joint replacement surgery. In time it is expected this model of care will be provided from a variety of settings across primary, community and outpatient health sites in accordance with local needs and resources.

OACCP Pilot Sites



Pilot Sites

- ★ Fairfield/Macarthur/Bowral
- ★ Gosford/Wyong
- ★ Nepean/Blue Mountains
- ★ Newcastle
- ★ Port Macquarie
(Port Macquarie/Kempsey/Camden Haven)
- ★ Sutherland/St George
- ★ Wollongong

CONTEXT AND SCOPE OF THE NSW OACCP

The OACCP will support the development, implementation and evaluation of a comprehensive, multidisciplinary treatment program for OA. The model provides for care within a chronic disease management model, rather than single practitioner, episodic care. This addresses the fact that, while pathways for specific treatments for OA such as elective joint replacement have been developed, a comprehensive pathway of conservative, inter-disciplinary management has been lacking.

Essential to this model are methods which incorporate best practice physical and psychosocial management, and strategies to encourage collaboration and communication between health providers across disciplines and settings. The improved involvement and communication between health care practitioners participating in this multidisciplinary model has been shown to improve individual disease management and outcome [1, 2].

The chronic care approach will require concerted collaboration between all stakeholders and their respective professional societies. These include individuals with OA and their carers, family and friends, consumer advocacy groups such as Arthritis NSW, Local Health Districts (LHDs) and their Boards and Clinical Councils, allied health professionals, nurses, general practitioners (GPs) in primary care, specialist medical practitioners, and the professional bodies to which these health practitioners belong.

The following resources were referred to in developing this document:

- National Action Plan for Osteoarthritis, Rheumatoid Arthritis and Osteoporosis [3]
- National Health Priority Action Council National Service Improvement Framework for Osteoarthritis, Rheumatoid Arthritis and Osteoporosis 2006 [4]
- National Health Priority Action Council National Chronic Disease Strategy 2006 [5]
- Royal Australasian College of General Practitioners guideline for the non-surgical management of hip and knee osteoarthritis 2009 [6]
- Conservative OA management guidelines from international groups including the Osteoarthritis Research Society International [7-9]
- NSW Department of Health NSW Chronic Care Program: Rehabilitation for Chronic Disease Volume 1, 2006 and Implementing - Volume 2, 2006 [10]

The program will specifically target those people in NSW with a diagnosis of OA, who have modifiable risk factors for OA progression, such as obesity and poor muscle strength and control, and who would benefit from additional support of their self-management strategies. During the pilot phase of the program, most participants will be drawn from the elective joint replacement waiting lists at each of the pilot sites.

THE NEED FOR CHANGE

A large prospective cohort study provided evidence that approximately 70% of knee replacements are associated with, or attributed to, excess weight [11]. Further, it has been estimated that if all overweight and obese people reduced their weight by 5kg, or to within the normal body mass index (BMI) range, approximately 25-50% of all knee replacements could be avoided [12]. Despite this information, fewer than 8% of Australians reported trying to lose weight as part of their OA treatment [13].

A recent analysis of the BEACH (Bettering the Evaluation and Care of Health) survey report, from April 2004 to

March 2009, suggests suboptimal use of allied health practitioner interventions to support effective lifestyle and behaviour changes for exercise and weight loss [14]. Over the five year study period, only 3.9% of OA encounters were referred for allied health intervention, of which 81.7% were referrals to physiotherapy, 3.3% were to hydrotherapy, and 0.8% to a dietitian. Where knee OA was a new problem, 5.5% were referred to allied health professionals.

Case studies 1 and 2 reflect examples of osteoarthritis management currently offered in primary care.

CASE STUDY 1: Rosie



Rosie is a 64 year old lady who has a long history of painful knees which have significantly limited her day to day activities for the past three to four years. She paces her household chores and is frustrated that her interactions with her four grandchildren are limited. She used to take them to the local park on a regular basis but the pain now is such that she cannot tolerate even a short period of activity with them.

Unfortunately, this has not helped her manage her hypertension and diabetes, and a year ago, she presented to the local hospital with angina. This resulted in her having a stent to her right coronary artery and now she has to take aspirin, perindopril and atorvastatin. Since that time, her GP has

been loath to prescribe any medication besides paracetamol for her arthritic pain. While her GP and other health professionals had advised her to take daily walks to manage her diabetes and heart problems, she could not tolerate the resultant knee pain. This has resulted in her weight increasing further and her blood pressure becoming difficult to manage despite her medications.

Recently, Rosie went to see her GP after a four day history of increased knee pain and swelling. On examining Rosie, her GP noted she had recently put on more weight and her body mass index (BMI) was now 35. The general examinations, which included respiratory, cardiac and abdominal examinations, were normal, although her blood pressure was 165/95. While there was documentation of her temperature, skin condition and initial laboratory studies, there was no record of Rosie's musculoskeletal examination.

Despite her co-morbidities, Rosie's GP reluctantly prescribed an anti-inflammatory. Rosie is advised to go home and rest. She is given no advice about OA, its relationship to being overweight, nor its management in the presence of common co-morbidities. She is advised that if her pain does not settle within two to three months she will be referred to an orthopaedic surgeon to talk about a possible joint replacement.

CASE STUDY 2: Frank



Frank is 70 years of age and presented to his GP with a two year history of left hip and right knee pain with activity. He complains of intermittent buckling of his right knee and an inability to play his golf regularly. His left hip aches at night, and after sport he tends to limp due to the pain.

He has been an avid golfer and gardener all his life, and has enjoyed playing golf three times a week since he retired. Over the last three months, Frank has been playing golf just once a week due to pain in both his hip and one knee. He also feels it is much more difficult to tend to his lawns and garden, as what starts as a little pain in his hip at the beginning of the day develops into quite a great deal of pain after mowing his lawn.

Frank saw his GP, a friend from the golf club, a year ago and his GP recommended Frank continue playing golf, but instead of walking, he could consider using a golf cart. His other mates at the golf club swear by a heat-inducing arthritic cream before and after golf, and they suggest he give it a try.

Despite taking up these suggestions, Frank's hip pain continued to worsen. He returned to his GP who referred him to an orthopaedic specialist. The specialist confirmed that Frank had OA of both his hips and one of his knees and he would require replacement of his hip and knee joints. Frank is currently on the waiting list for surgery and has had to give up golf as he was unable to deal with the pain at the end of a round.

BACKGROUND TO THE NSW OACCP

Osteoarthritis (OA) is a chronic disease and it is recognised as a national health priority in the National Chronic Disease Strategy [5]. It is understood that OA has multiple, complex causes which identify it as a chronic disease. These include:

- gradual onset, although sudden onset and acute exacerbations can be a feature of the disease
- occurrence at any age, with increased prevalence as individuals age
- compromise of quality of life through pain and dysfunction of affected joints, with resultant effects on physical capabilities and psychological well being
- an enduring, persistent disease process which may lead to a gradual deterioration of health [15].

Nearly one in five Australians has arthritis, most of whom have OA (17%) [16]. In 2007, there were an estimated 3.85 million Australians with arthritis, including 2.4 million of working age (15-64 years). In economic terms, the total cost of arthritis in Australia attributable to the burden of disease, productivity costs, and direct health costs, is almost \$24 billion [17]. In people 65 years of age and older the risk of disability due to knee OA is greater than disability due to any other medical condition [18, 19]. It is anticipated that as the Australian population ages and becomes increasingly obese, the prevalence of OA will increase. Some predictions are that by 2020, the number of people who suffer from OA will double [17]. The primary risk factors for OA are joint injury and excessive skeletal loading associated with work and obesity.

Despite the impending wave of this disabling disease, the current management of OA is largely episodic and palliative, and often limited to the use of medication and cautious waiting for eventual total joint replacement [20]. In 1999, the Australian Government provided financial incentives in the form of Medical Benefit Schedule (MBS) item numbers to support GPs in managing the needs of people with chronic disease. In 2005, this strategy was supplemented by further MBS items to support GPs to develop chronic care plans and coordinated team care plans. It was intended these items would encourage primary care referrals to allied health practitioners for chronic disease management (CDM).

The findings of the BEACH survey, and the fact that the majority of people with symptomatic OA are managed in primary care, present a strong rationale to implement chronic disease management programs within primary care settings. There are a number of evidence-based recommendations to guide health professionals in the management of OA [6, 7, 9, 21-24], but despite remarkable consistency between these recommendations, and in spite of attempts to disseminate their information for consistent implementation, clinical practice does not reflect these guidelines [20, 25-27]. Access for allied health CDM MBS items is currently limited by the demands on primary care settings, workforce availability and/or access to consultation, which has not allowed for wholesale uptake of coordinated chronic care management programs.

The discrepancy in OA care between evidence-based guidelines and the reality of clinical practice, suggests problems with dissemination of information or the implementation of recommended care, or both [28]. Barriers to implementation may relate to the inherent complexity of the guideline documents, clinician factors such as beliefs and attitudes, system factors that inhibit access to the recommendations at the point of care, or individual factors which hinder uptake, adoption and maintenance of new behaviours. It is not only the management of OA that exhibits such barriers. The divergence from evidence-based care is also seen with other chronic diseases where it is estimated that only 50% of the disease treatment is appropriate [29].

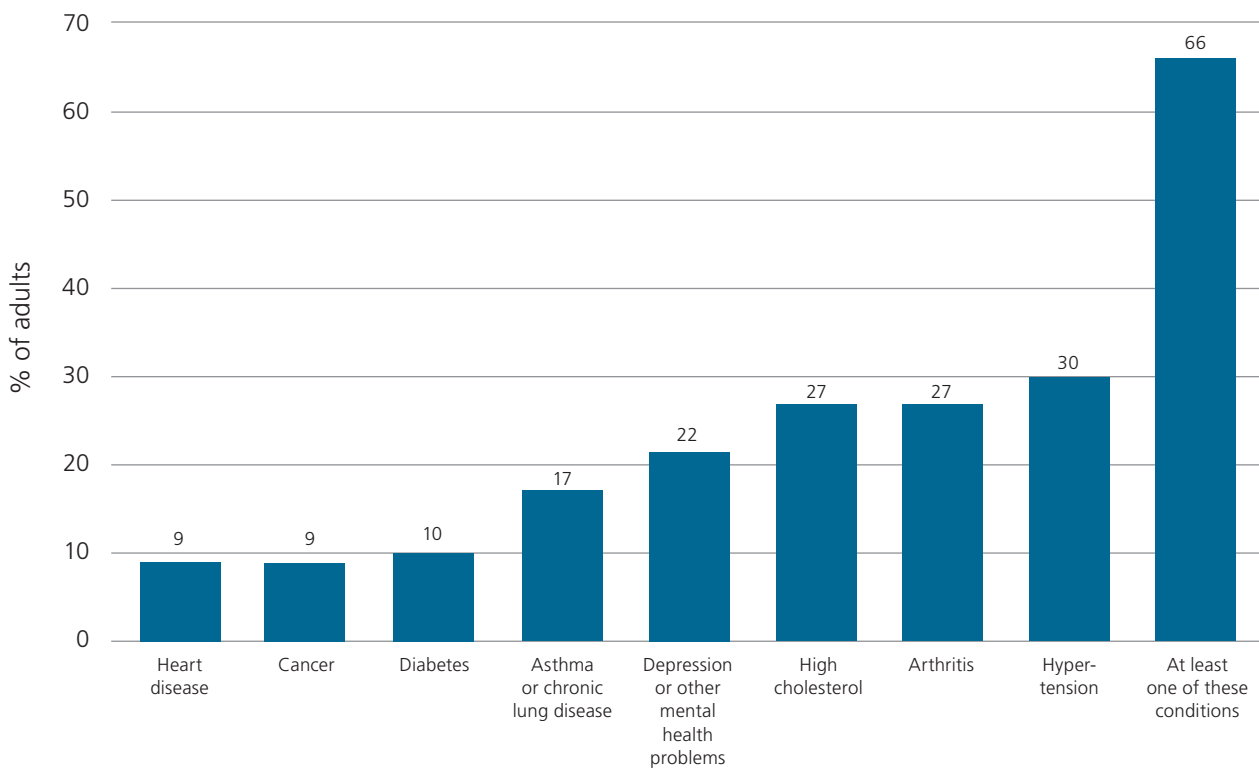
In recognition of these barriers to optimal care, the OACCP has been developed to enable clinicians to develop innovative system redesign strategies which involve comprehensive chronic disease management. Key components of comprehensive chronic disease management include:

- changes to health system organisations, such as organisational culture;
- clinical information systems;
- redesign of service delivery with links to community initiatives; and
- support to enable individuals to self-manage their disease with the aim of improving their health outcomes long term [30-33].

Evidence-based recommendations have the potential to improve the quality of an individual's health care by promoting interventions of proven benefit while discouraging unnecessary, ineffective or harmful interventions [34]. The numerous recommendations for the management of OA developed in recent years by a number of scientific societies and health care

organisations [7, 9, 21-23] provide general consistency [34-37] and the OACCP builds on this existing knowledge. The OACCP has created a clinically relevant, locally applicable model of care for individuals who suffer from OA and who are confronted by a long-lasting condition which may cause pain, stiffness and loss of function with subsequent poor quality of life.

Diagram 1: Percentage of NSW adults who have ever been told by a doctor that they have one of the chronic diseases shown



Bureau of Health Information. Healthcare in Focus: how NSW compares internationally, December 2010. Sydney (NSW), 2010. Accessed 25 February 2011 [38]

GUIDING FRAMEWORKS AND STRATEGIES

The growing burden of musculoskeletal disease was recognised by the World Health Organisation with their endorsement of the Bone and Joint Decade 2000 – 2010 and their inclusion of musculoskeletal conditions as part of the Global Burden of Disease Study 2000 [39]. Following on from the international recognition of this problem, the Australian government has recommended several strategies to address the burgeoning issue of arthritis as a chronic condition. These strategies are outlined below.

National Health Priority Areas (NHPA)

In 2002, all Australian health ministers designated arthritis and musculoskeletal conditions as Australia's seventh National Health Priority Area. The NHPAs were an initiative to bring a national focus to health policy for those conditions that have a significant impact on the health of Australians. They were, in part, Australia's response to the World Health Organisation's "Health for All by 2000".

<http://www.aihw.gov.au/nhpa/index.cfm>

The National Chronic Disease Strategy (NCDS)

In November 2005, the Australian Health Ministers' Conference (AHMC) endorsed a national strategic policy approach to manage and improve chronic disease prevention and care in the Australian population. This strategy provided an overarching framework for the national direction, which is aimed at improving chronic disease prevention and care. It is a nationally agreed agenda to encourage coordinated action in response to the growing impact of chronic disease on the health of Australians and on the Australian health care system.

<http://www.health.gov.au/internet/main/publishing.nsf/Content/pq-ncds-strat>

National Service Improvement Framework (NSIF)

To assist a national approach to several chronic diseases, five supporting national service improvement

frameworks have been developed for asthma, cancer, diabetes, heart, stroke and vascular disease and OA, rheumatoid arthritis and osteoporosis. These frameworks provide flexible opportunities to improve prevention and care strategies for specific chronic conditions.

<http://www.health.gov.au/internet/main/publishing.nsf/Content/pq-ncds-arthritis>

National Arthritis and Musculoskeletal Conditions Advisory Group (NAMSCAG)

The NAMSCAG, in 2005, commenced development of a National Action Plan (NAP) to reduce the burden of disease and disability associated with OA, rheumatoid arthritis and osteoporosis, and to improve health-related quality of life. The NAP was to provide a blueprint for national initiatives to improve the health-related quality of life for people living with OA, rheumatoid arthritis and osteoporosis, reduce the cost and prevalence of these conditions, and to reduce the impact on individuals, their carers' and communities. The NAP was developed to complement both the NCDS and NSIF. Draft indicators were developed in 2006 in conjunction with the AIHW and various experts to improve the national data quality and range [40].

<http://www.aihw.gov.au/publications/phe/amca05/amca05-c01.pdf>

Chronic Disease Indicators Database

This database was initiated in 2005-06 by the Department of Health and Ageing to provide nation-wide surveillance of chronic diseases and their associated determinants. It is an essential element of a national surveillance system around those chronic diseases which represent the most significant national burden, and to provide evidence for preventative interventions which are effective.

<http://www.aihw.gov.au/cdi/index.cfm>

INTERNATIONAL MODELS

There is a paucity of literature reporting the implementation of guidelines for OA management into system wide chronic care osteoarthritis programs. One study from the Netherlands examined the feasibility and effectiveness in the real life implementation of OA programs and established positive outcomes using a randomised controlled trial methodology [41]. The authors reported statistically significant effect for knowledge, pain and self-efficacy in the knee program and for pain in the hip program. Further, the authors described results from this study to have ecological validity, meaning the ability of programs tested under controlled conditions to produce comparable outcomes in real life conditions. Large scale implementation was encouraged by the authors across the Dutch primary health care system along with continuous monitoring of the implementation of the program and its outcomes.

Multiple studies report positive effects on pain and functional levels in OA of the hip and knee: the North American internet-based arthritis self-management program [42], a Scandinavian evidence-based exercise and health education program [41], and an exercise and weight loss program in Denmark [43]. One Swedish program, BOA (Better Management of Patients with Osteoarthritis), has published the model but is yet to publish outcomes [44]. The model has the primary objectives of reducing the need for health care use and sick leave due to OA, as well as increasing quality of life and level of independence and physical activity among people with OA in the hip or knee. The secondary aim of the BOA is to ensure people with OA receive equal and optimal management on the first contact with a health care provider, independent of where initiation of this first contact occurs.

The BOA includes three sessions with a physiotherapist and occupational therapist to provide health education, specific exercises and advice on weight control. The program is planned to pilot at ten centres and is based on the knowledge that only a minority of all people who receive surgery for OA have seen a physiotherapist at any time before surgery. Outcome measures were not recorded or reported.

Although high levels of evidence support the benefit of regular exercise, weight loss, education and appropriate analgesia, the implementation of multimodal, multidisciplinary programs to address the symptoms of OA of the hip and knee, has not been widely reported or disseminated.

AUSTRALIAN MODELS

Recently, there have been efforts to develop models of care for the conservative management of OA. At state level, programs have been rolled out with a view to improving participant satisfaction, disease management and elective surgery wait times and numbers, but definitive evaluation of their influence is either not available or has not been undertaken. Some of these programs are outlined below.

Osteoarthritis Clinical Pathway Project (OACP)

This is an OA pathway for managing OA of the hip and/or knee which was funded under the Australian Government Arthritis and Musculoskeletal Quality Improvement Program (AMQuIP) [2, 45]. The reported primary aims of the program are to reduce symptoms, prevent disability, maintain and improve quality of life and to ensure timely access to joint replacement treatment. A multidisciplinary team utilising a musculoskeletal coordinator is responsible for interventions, such as health education, and referral to existing community services including physiotherapy, hydrotherapy, dietetics, occupational therapy and self-management groups.

www.mh.org.au/royal_melbourne_hospital/cehseu-oa-pathway/w1/i1001511/

http://www.health.vic.gov.au/oahks/downloads/oahksforum_b-gordon.pdf

Orthopaedic Wait List (OWL)

This was developed, and first implemented, in Victoria. It aims to improve coordination of the management of people with hip or knee OA and prioritise those people on outpatient and elective surgery waiting lists according to clinical need. Interventions include early assessment and referral of people not currently requiring surgery to appropriate conservative care, which includes physiotherapy, rheumatology, weight loss and education. This program has been implemented at one site in NSW and has informed the development of the NSW OACCP model of care, along with the Queensland model.

<http://www.health.vic.gov.au/oahks/index.htm>

The Queensland Orthopaedic Physiotherapy Screening Clinics (OPSC)

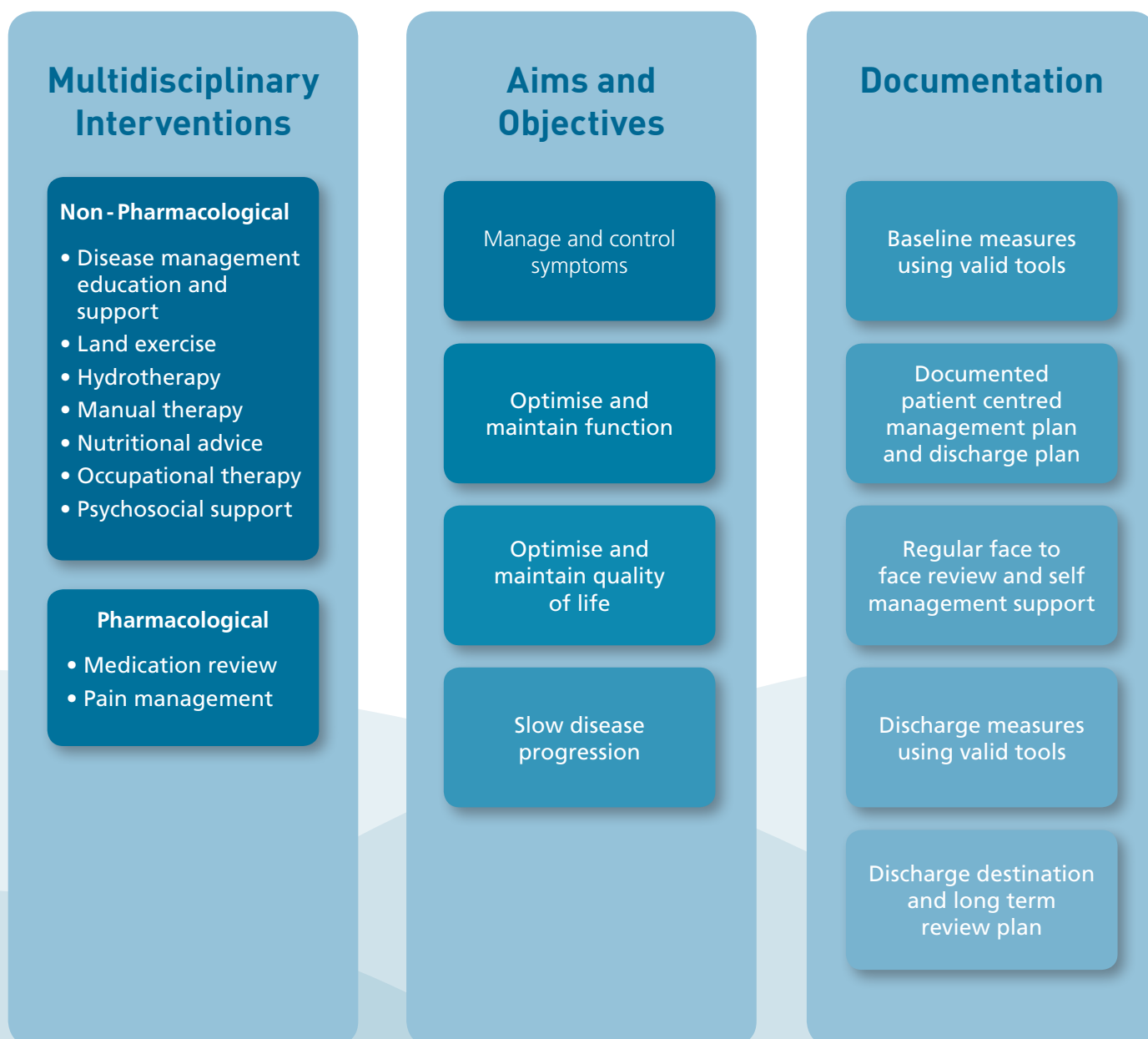
In this model, the physiotherapist acts as case manager for people from orthopaedic surgical waiting lists with a view to facilitating comprehensive management and improved participant knowledge and self-efficacy. The primary aim of the program is to improve access to multidisciplinary non-operative management for those people for whom surgery is not the first option. The secondary aim is to decrease waiting times to see an orthopaedic surgeon for people requiring surgery. All referrals to the outpatient physiotherapy department are triaged by an experienced physiotherapist with a view to inclusion in the program.

On inclusion, the person undergoes a comprehensive assessment and has a management plan designed, which incorporates interventions from a multidisciplinary team of physiotherapists, occupational therapists, dietitians, and psychologists. Following completion of the interventions, participants who still require a consultation with the orthopaedic surgeon resume their original position on the orthopaedic outpatient waiting list. Initial reports on the program indicate success in reducing elective joint replacement wait list numbers and wait time.

KEY ELEMENTS OF THE NSW MODEL OF CARE FOR THE OACCP

The model of care for the OACCP describes a comprehensive, multidisciplinary management program for OA of the hip and/or knee. It is structured around a quality framework that is person-centred, collaborative and evidence-based, and which targets improvements in pain, function and quality of life for the individual living with this chronic disease. The ideal participant journey through the OACCP will include the use of some, or all, of the following elements.

Diagram 2: Osteoarthritis Management Plan



Overview of the chronic care model

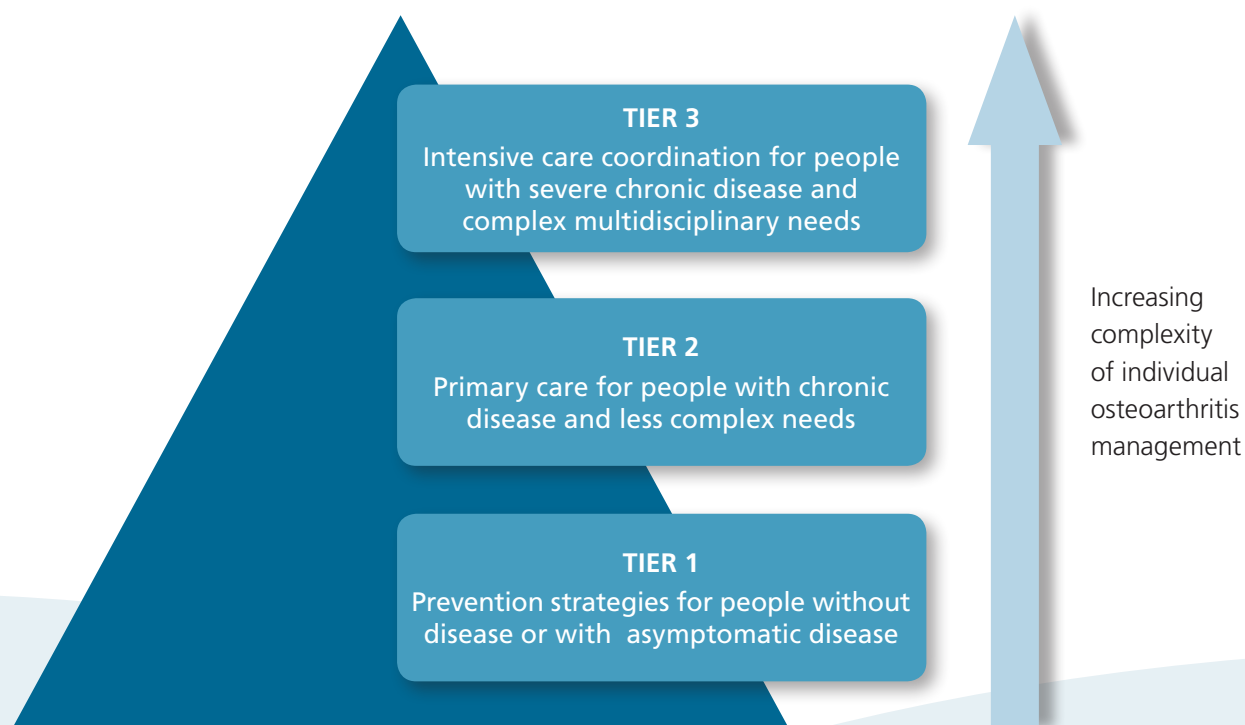
The program must include the key principles of The Chronic Care Model [30, 46]. CDM service models are of proven effectiveness for chronic conditions such as chronic heart failure, chronic obstructive pulmonary disease and diabetes [1, 47-49]. In NSW the model is used effectively for the management and rehabilitation of people with cardiac and pulmonary diseases [50]. These services are guided by the NSW Rehabilitation for Chronic Disease policy directive [10] and guideline [51]. OA management within a chronic care program is an appropriate context to address the disabling features of this disease.

The key principles from the National Chronic Disease Strategy [5] and the NSW policy directives which have been incorporated into this model are:

- prevention across the continuum
- early detection and early treatment
- integration and continuity of prevention and care
- self-management

The Chronic Care Model recognises the need for a variety of interventions depending on the social, psychological and physiological needs of individuals. Diagram 3 is one example of the various levels of care described in The Chronic Care Model [30]. People accessing the OACCP will require care coordination and interventions at Tier 2 and 3.

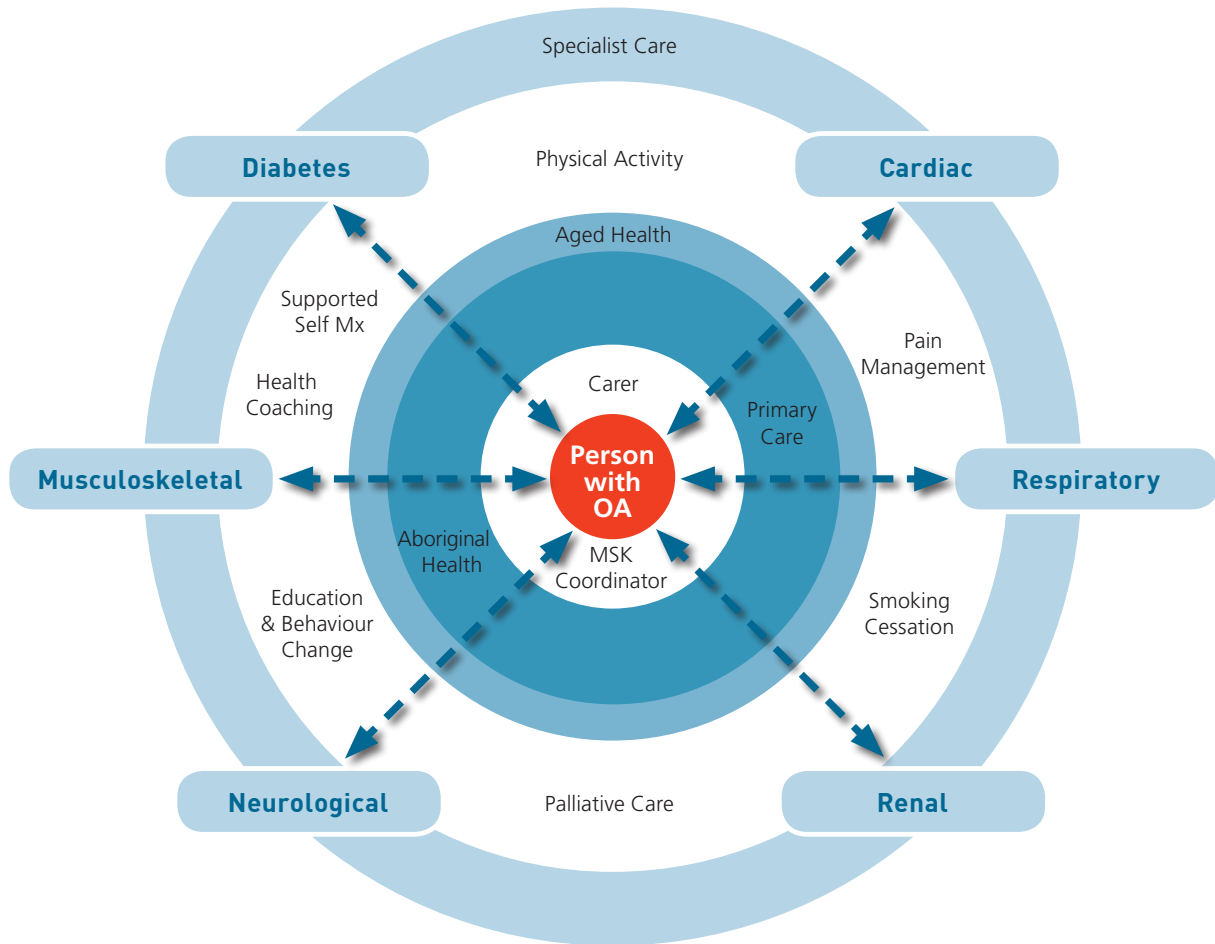
Diagram 3: Intensities of chronic care management across the disease trajectory



Adapted from J Savage, Models of care for chronic disease. Background paper for the Models of Access and Clinical Service Delivery Project [52]

The chronic disease and care networks of ACI have considered how chronic care should be delivered across NSW. Diagram 4 displays the concept of the integration of holistic care and individual needs while giving consideration to the particular requirements of specific diseases. It reveals the extent of the requirements of a program of chronic care for people with OA.

Diagram 4: ACI Model of Care for Chronic Disease – Osteoarthritis Chronic Care Program



A systematic approach to osteoarthritis management

The OACCP recognises the Queensland and Victorian conservative OA care models, but has been developed to better represent the NSW context and the characteristics of a chronic disease management model. This approach takes advantage of existing expertise and systems to re-engineer the approach to OA care. Central to this is a collaborative, comprehensive multidisciplinary approach, a person-oriented and participatory program, and a process of continuous practice improvement for evaluation and adjustment of the program.

Current clinical practice reflects a multitude of factors, including clinician and patient preference and health care system support. Efforts to guide OA management in the future are best directed towards implementing practices with the flexibility to be effective in a variety of contexts. A number of quality indicators have been developed in OA but they have not been widely or systematically used. With the convergence of increasing need, advances in information technology and the future of health care costs being unsustainable in their present form, there is a favourable environment for the funding, development and use of innovation in health care.

Principles of conservative OA management

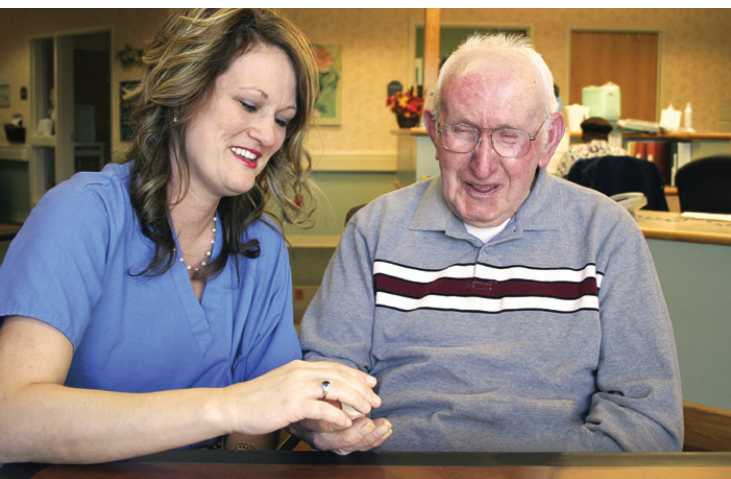
The main goals of management of OA of the hip and knee, determined from a literature scan, are:

- symptom control of pain and stiffness;
 - limitation of disease progression;
 - optimisation and maintenance of function;
 - optimisation and maintenance of quality of life;
 - effective use of health care.
- **Self-management** All participants in the OACCP will be supported to manage their own health and well being for as many of their health needs as possible. This may include self-monitoring of individual health parameters, engagement in healthy activities which are known to produce positive outcomes, or encouragement to be an active partner in their medical and surgical health care decisions [31, 33, 53]. Medium to long term self-management support may be provided by Arthritis NSW through programs such as Challenging Arthritis, Osteoarthritis of the Knee Self Management Program and Moving On (www.arthritisnsw.org.au).
 - **Exercise** All eligible participants will be engaged in an appropriate exercise program which will incorporate individually prescribed strength and aerobic exercises consistent with recommended practice [5, 54, 55]. Exercise and physical activity will be delivered via one on one supervision, group sessions or instruction for supported, home-based exercise. OA evidence suggests supervised group or individual treatment are superior to independent home exercise to achieve reductions in pain [56], while all modes of delivery produce similar results for physical function [57, 58]. The frequency, duration and intensity of the exercise program may affect clinical outcomes [59]. A minimalist approach, where individuals are given a pamphlet or audiovisual material outlining a standardised exercise program and discharged to implement the exercises without support, has been shown to be ineffective [60].

- **Weight Loss** All participants who are overweight or obese will be encouraged to lose a minimum of 5% of their body weight through a combination of diet and exercise [61]. Overweight is defined as a BMI of between 25 and 30 (wt [kg] / ht [m]²). Obesity is defined as a BMI \geq 30 (wt [kg] / ht [m]²). A recent systematic review and meta-analysis concluded that physical ability improves in obese and overweight people with knee OA after moderate weight reduction [43]. Supporting people to lose weight requires appropriate expertise to address the complex interaction of diet, exercise or activity and behaviour change. Behaviour change underpins successful engagement. OACCP sites will include available local resources to effect this important aspect of OA management.
- **Psychological management** Psychological distress is common in people with OA [62]. The evidence indicates that up to 50% of people with OA will suffer from depression [63]. All OACCP participants will be screened for psychological distress and those found to have moderate or high levels of depression, anxiety or stress will have further investigation to inform an appropriate management plan. The Depression, Anxiety and Stress Scale (DASS) 21-item version, an Australian-developed tool commonly used in chronic care programs across NSW, has been chosen as the screening tool for the OACCP pilot project. The DASS is just one component in determining the need for further intervention and the assessing clinician will seek further assessment if needed. LHDs have pathways to guide clinicians to appropriate local services and in all circumstances, the participant's GP will be included in decisions regarding referrals or interventions recommended from the OACCP.



- **Pharmacologic Assessment** All participants taking analgesic medication, whether over the counter, complementary or prescription, should have a pharmacologic review to exclude unanticipated drug interactions, inappropriate polypharmacy (for example, multiple varieties of NSAIDs) and potential complications to existing comorbidities (for example, poorly controlled hypertension on NSAIDs or constipation associated with opiates) [64, 65]. This review should be done by a pharmacist, medical practitioner or nurse as part of the team review.
- **Disease Management Education** Participants will be provided with an understanding of their OA including the disease process and its evidenced-based management [66]. This information sharing will highlight the importance of following the developed management plans, and the specific lifestyle behaviour necessary to facilitate improvement in quality of life or to slow disease progression. Some of these behaviour modifications include taking medicines as prescribed, appropriate exercise habits, pacing of activity and weight reduction. Advice will also be included on appropriate footwear and other measures to unload damaged joints, and there will be opportunity for question and answer sessions and sharing information with other participants.



OACCP multidisciplinary team

The OACCP team will be led by a dedicated Musculoskeletal (MSK) Coordinator (Appendix 1). The coordinator at funded pilot sites will be a physiotherapist who has extensive experience in the provision of care to people with MSK conditions, and an understanding of their clinical, social and psychological care needs. The key role of the coordinator is to lead and coordinate the development, implementation and ongoing evaluation of the OACCP by participating in expert musculoskeletal assessment and interventions. They will be a collaborative leader of the multidisciplinary team. The team could be drawn from, depending on local resources, the following practitioners:

- GP as leader of the individual's healthcare and their practice staff
- Specialist doctors from the fields of medicine and surgery
- Physiotherapists (in addition to the Coordinator)
- Nurses
- Occupational Therapists
- Dietitians
- Psychologists
- Social Workers
- Pharmacists
- Exercise Physiologists
- Podiatrists
- Others as identified as necessary.

Each site will draw from these disciplines as available and as needed for their participants. All team members must demonstrate an understanding of the substantial benefit to be found in an interdisciplinary approach to chronic care. Team members will have a deep understanding of behaviour change theories, which are essential to support behaviour change in the targeted population. The team members will have knowledge of how and where individuals can gain access to their day-to-day needs to maintain or enhance their musculoskeletal health. They will have a goal of providing the most appropriate care in the most appropriate place for each individual to help them to self-manage their OA with conservative treatments. Participants will have the opportunity to maximise these benefits with a view to avoiding or delaying joint replacement surgery, if appropriate.

Case identification and access to the program

People with OA may be referred to the OACCP by any health professional, or by self-referral, once a determination has been agreed that the philosophies of a chronic care management program are appropriate for an individual's OA. Referring health professionals may include GPs, surgeons, specialist physicians, training doctors, allied health professionals, nurses, or hospital administration from surgical wait lists. Individuals may self-refer and support will be provided to gain the necessary medical referral as a part of assessment for eligibility.

People with OA of the knee or hip are eligible if they meet two clinical criteria determined with participants using their usual pain relief strategies:

- Pain associated with their knee and/or hip on most days of the last month
- Visual Analogue Scale (VAS) pain score of at least four out of ten at the initial assessment (confirmed either over the phone or at the initial visit).

For participants whose reported pain level falls below the VAS threshold, alternatives to OA management will be offered including the Arthritis NSW Self-Management programs and community exercise programs such as Heart Moves and Fit and Fabulous over Fifty.

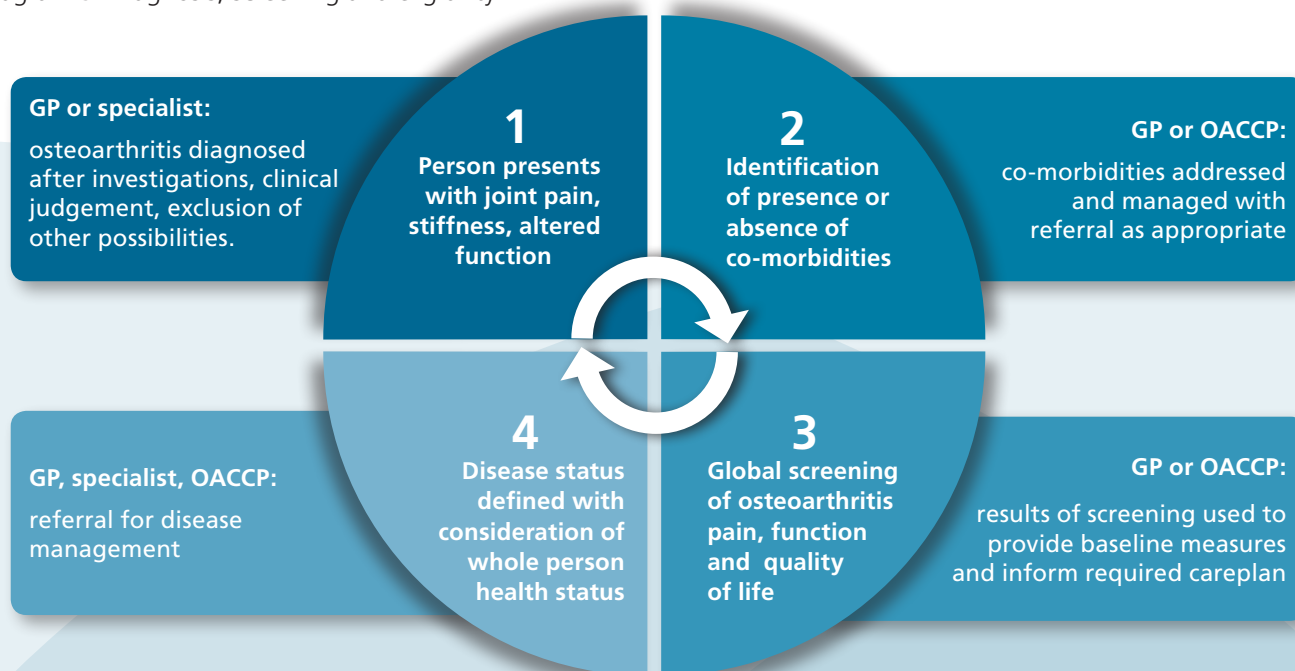
Care coordination and case management

Elements of care coordination and case management are required for all participants in the OACCP. The level of coordination required depends on the individual's needs, which may be purely musculoskeletal, related to existing co-morbidities or to their psychosocial needs. All participants undergo an initial face-to-face assessment where their physical health, disease status, co-morbidities, quality of life and psychological status are evaluated. From this assessment various options for the delivery of care may be chosen.

GPs are central to the coordination of care for people with OA, as outlined in the RACGP Guidelines for care of patients with OA. They are key members of the team and provide access to important elements of chronic disease management, especially within the primary care or community sectors. GPs have a key role in providing coordination of care as a member of the multi-disciplinary team. While chronic illnesses are increasingly impacting their roles and workload, there are opportunities for the OACCP to support GPs in the management of people with OA.

It may be beneficial to develop a Memorandum of Understanding between the Medicare Local or Division of GPs and the relevant LHD to define aims, roles and responsibilities, resource commitments, communication and performance indicators. This may be essential if a site's sustainability plan includes the use of CDM items with GP case conferencing as a component of service provision.

Diagram 5: Diagnosis, screening and eligibility



Options for care

People entering the OACCP may elect any of the following methods as options for care. The decision on which option to undertake will be made by each individual in conjunction with the OACCP team members at the time of initial assessment, goal setting and management plan development. The decision will be made with consideration of the person's preference, their individual care needs and the availability of services in the local area. The option chosen may be a mix of the following available methods of service delivery:

- **Health service site.** Interventions with multidisciplinary team input to address care needs. Ideally, participants will attend the health service site at least twice a week for as many weeks as is required to support the person to self-management of their needs. On-site locations may include the physiotherapy department, other outpatient areas, or community health sites. Links with the Connecting Care chronic disease programs may provide synergies for both services to the benefit of participants.
- **Community accessed services.** Commonly, these will be partly funded by a GP Management Plan (GPMP; Medicare item 721). Access to a multidisciplinary team will incorporate local private health practitioner settings. While the GPMP will supplement some of the required health practitioner visits, the participant will privately fund other required services or could access the health service site for the necessary interventions. Examples of private practitioner care settings include: GP clinics e.g. practice nurses to explain disease management including medication management, dietitians in private practice, Heart Moves programs, over 50's programs, and Stepping On programs. A phone counselling service may be included by the OACCP team to coach the person towards attaining levels of intensity with their interventions which will gain positive change. These partnerships will require open, transparent communication, capacity building and leadership to successfully support individual participants.
- **Self-directed interventions** may be an option for some participants, however, regular weekly (or more often) phone counselling by the OACCP team will be necessary to coach the person towards attaining levels of intensity that will gain positive change.

- **Face to face assessment.** These are a 'must do' component of the OACCP at entry and at 12, 26 and 52 weeks after entry to the program. These assessment points are not flexible, but rather, are an integral part of supported chronic disease management and of the program evaluation process, along with being an opportunity for health care interventions for those who require or opt for this mode of service delivery.

Care pathways

Local Health Districts (LHD) will develop clinical pathways for the health management of individuals requiring chronic care of their OA. These will include all aspects of chronic care as described in the Chronic Care Model [30] as well as the requirements for pre-surgical interventions as will be described in the ACI Musculoskeletal Network Guideline for the Pre, Peri and Post-operative Care of People Requiring Elective Hip and Knee Replacement Surgery, which is currently under development.

Service directories

MSK Coordinators will be responsible for creating and maintaining local service directories for OA care. Service directories will be living documents which include appropriate opportunities in local communities for the participants of the OACCP to utilise their new skills to self-manage their chronic condition. The overall service directory will be maintained centrally by the ACI, with sites able to update their local content.

Acceleration to surgical intervention

Participants who have either knee dysfunction and a Knee Osteoarthritis Outcome Score (KOOS), or hip dysfunction and Hip Osteoarthritis Outcome Score (HOOS), of less than or equal to 30 out of 100 should be considered for accelerated surgery [67]. While this score provides a good indication of disease specific impact, a thorough investigation of other outcome measures should be undertaken in conjunction with this score when determining escalation for orthopaedic assessment.

On confirmation of the participant's deterioration to a point which requires escalation to surgery in the short term, discussion with the individual's medical team should occur as soon as possible. This is to be followed with formal correspondence to the medical or surgical referrer, documenting the results of the OACCP assessment and the reasons for suggested escalation. A copy will be forwarded to the participant's GP if he/she is not the referrer. The OACCP participant should remain in the program in the interim for optimisation of their co-morbidities, management of pain and interventions aimed at alleviating psychosocial issues. Early surgical assessment should be prioritised.

OACCP re-entry

For participants who complete the OACCP and are discharged, re-entry is possible if their referrer believes this is necessary, as long as they fulfil the original inclusion criteria.

Key performance indicators (KPIs)

Individual service sites will report key performance indicators (KPI) through the OACCP specific data system developed by the ACI for the overall recordings of OACCP assessments, goal setting and care planning.

Assessment of the OACCP will be consistent with other chronic disease management programs in NSW.

During the pilot testing of this model of care, the ACI will provide quarterly reporting to the NSW Ministry of Health, LHDs and the participating sites. These reports will also be available on the ACI Musculoskeletal Network web pages. As new sites implement the OACCP, they will be required to collect data at the same time points and follow the same reporting mechanisms. The KPIs to be collected from each site will be:

1. Number of people assessed and who have a management plan developed measured as a percentage of the total referred for assessment.
2. Number of people commencing their recommended management plan within three months of assessment measured as a proportion of KPI 1. Objective success will be 80%.

3. Number of people completing* their recommended management plan as a proportion of KPI 1. Objective success will be 80%.

* completion is defined as implementation of 80% of the recommended management plan measured at 12 months from assessment

Clinical Indicators

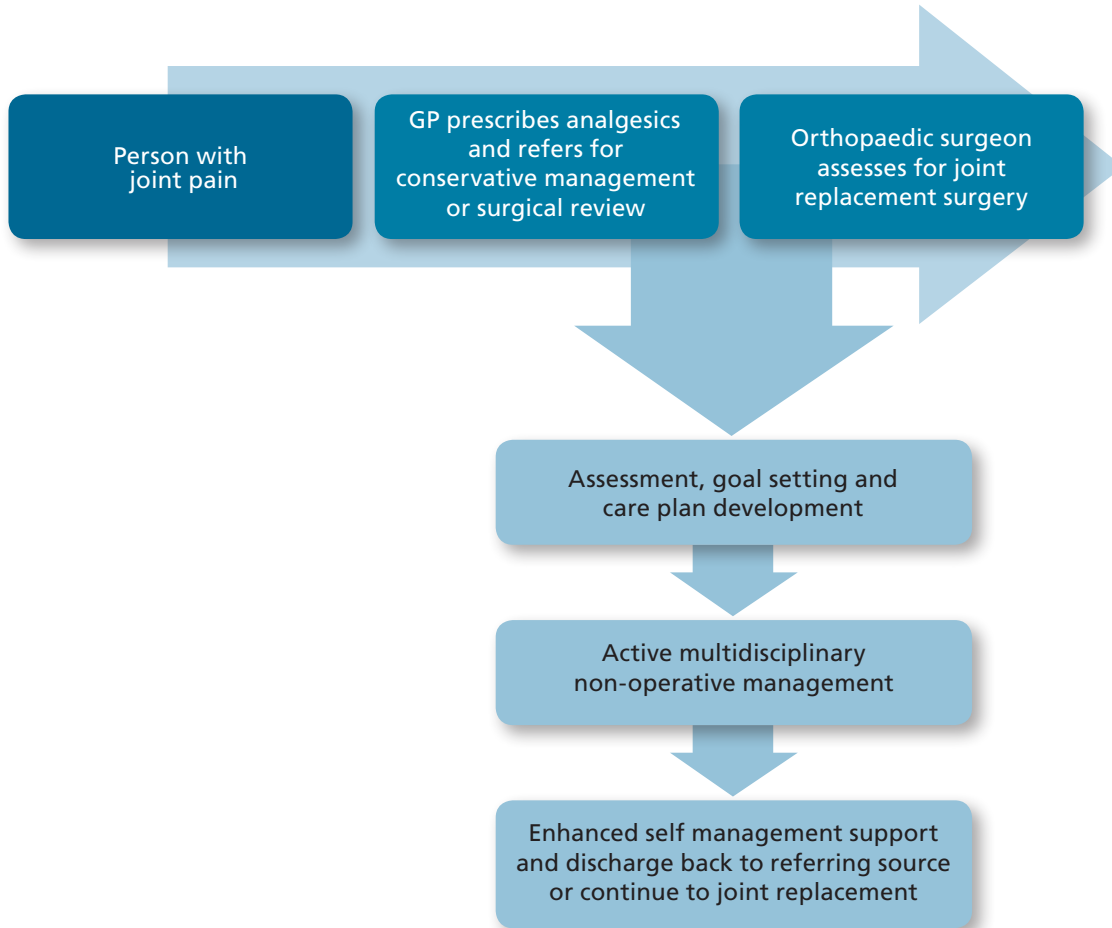
The following validated tools will be used by sites participating in the pilot project to monitor outcomes. Permission for use of these tools has been arranged where necessary. Other critical clinical indicators will be measured and recorded at the specified timeframes. All outcome measures are described in the OACCP Manual and recorded in the Musculoskeletal Network database that relates specifically to the OACCP. Participant goals are set collaboratively between the individual participant and the OACCP team.

1. Disease Specific Measures
 - Hip Dysfunction and Osteoarthritis Outcome Score (HOOS)
 - Knee Injury and Osteoarthritis Outcome Score (KOOS)
 - Multi-attribute Prioritisation Tool (MAPT)
 - Willingness to undertake surgical intervention
2. Pain and Function Measures
 - Visual Analogue Scale (VAS) for index joint pain
 - Timed Up and Go (TUG)
 - Six Minute Walk Test (6MWT)
3. Quality of Life Measure
 - EuroQoL (EQ-5D-5L)
4. Psychological Measure
 - Depression, Anxiety and Stress Scale 21 item version (DASS 21)
5. Demographic, Referral and Co-morbidity Data.

The ACI Musculoskeletal Network, in consultation with local sites, will review and modify on an ongoing basis the clinical indicators, mindful of the need to demonstrate key outcomes – reduced pain and increased functional capacity and quality of life of participants.

It is anticipated that at the end of the pilot period, some OACCP clinical indicators will be removed to streamline clinical practice while still monitoring outcomes to assist with evaluation of, and alteration to, the model of care.

Diagram 6: Ideal participant journey through the OACCP



IDEAL PATIENT EXPERIENCE



66 year old Judy had experienced right knee pain for some time. Recently, the pain had become worse and now kept her awake at night, and it was much worse if she had been busy during the day. She had gained weight recently, and she knew this contributed to her worsening knee pain.

Judy felt that she was in a slow downward spiral that was affecting her health in many different ways. Her knee pain limited her activity, her reduced activity led to weight gain, her weight gain made her feel bad about herself, and she was becoming increasingly frustrated with life. Judy realised that this could not continue so decided to talk with her GP.

Judy's GP had heard this story many times. Her history of decreased activity, uncontrolled knee pain, feelings of helplessness and weight gain were common complaints, and were consistent with a diagnosis of osteoarthritic change in the knee. The GP assured Judy that certain analgesics and anti-inflammatory medication could help control the pain. Her problems of weight gain and frustration required a different approach involving a variety of interventions for Judy to have the best possible outcome.

The GP took time to give Judy an understanding of the causes of OA and to point out that conservative management targeting weight loss and muscle strength could contribute positively to managing her symptoms. As OA is a chronic condition the GP realised that it would be important to measure Judy's progress in order to provide her with objective feedback that would encourage Judy to continue with her lifestyle changes. As a first step the GP arranged for Judy to have X-rays of her knee, and referred her to the OACCP at her local health service.

Judy was contacted by the local MSK Coordinator, prior to an appointment with the OACCP, to assess her eligibility and suitability for their program. Judy fulfilled the criteria to participate in the program, and at her first visit baseline measures were recorded. She worked with the MSK Coordinator to develop an overall management plan. This plan involved Judy seeing a dietitian to help her lose weight, working with a physiotherapist to oversee a water-based exercise program and specific strengthening exercises to increase her functional capacity, and seeing a pharmacist to advise on medication to better manage her pain.

It was anticipated that her psychological issues would diminish as her symptoms improved. Judy was also given written information specific to OA that had been developed by Arthritis NSW. Judy's progress would be formally monitored and assessed at the OACCP at three, six and twelve month intervals, and there were opportunities for her to be reviewed more frequently if need be. Judy agreed to attend the OACCP twice a week until her first formal review, and also agreed to see her GP's practice nurse to clarify her knowledge of OA and its impact on her overall health.

Judy returned to her GP to view and discuss the X-rays of her knee. The GP showed Judy the changes seen on the X-rays and explained that these were consistent with OA of the knee. Her condition was not so advanced to show significant narrowing of the usual joint space. They also discussed the option of referral to an orthopaedic surgeon. The GP told her that he would write to the MSK Coordinator at the OACCP to advise them of the X-ray results and the discussion around a possible surgical referral. This information was added to Judy's management plan which had been developed at the OACCP, and the GP agreed to work with Judy on all aspects of the recommendations in the plan.

At her three month review at the OACCP, Judy had lost 3kg and her waist measurement had decreased by 5cm. Her DASS-21 scores put her in the normal range for all measures. With the help of the MSK Coordinator Judy reset her goals for the next three months, and further appointments were made with the physiotherapist and dietitian.

At her six month review Judy had lost another 2kg and significant improvement was shown in both her VAS for pain, and her quality of life questionnaire. After reviewing her goals again Judy identified the support that she might need from the OACCP in order to achieve her new aims.

After twelve months Judy's symptoms had significantly reduced and she was able to shop at the local supermarket without having to rest halfway round. Her weight had been constant for the past six months, and she was adhering to her ongoing exercise program.

Judy decided to delay her appointment with the orthopaedic surgeon and she discussed this decision with her GP and MSK Coordinator. She was discharged from the OACCP with long-term exercise goals and further support techniques to help maintain an appropriate diet and exercise program. She was also given the details of her local Arthritis NSW group to access their self-management programs. Judy was advised that she could return to the program if she felt the need and the MSK Coordinator sent letters to Judy's GP and orthopaedic surgeon regarding her progress.

IMPLEMENTATION

The objective of the OACCP is to improve the coordination of care and the inter-disciplinary, conservative management of individuals with OA. It is expected individuals participating in the program will develop or enhance their strategies to manage pain, as well as improve their functional status and quality of life.

During the life of the pilot project, and possibly beyond, the ACI will be available centrally for consultation and support on the implementation and evaluation of the OACCP, and provision of a central location for data collection, analysis and reporting. Each site initiating the OACCP as a pilot project in 2011 / 2012 will report to the ACI standardised indicators for the evaluation of the program components and the participant outcomes. Ongoing identification of improvements to the care of people with OA, as well as modifications to the model of care, will be part of the evaluation process of the pilot project.

Each site will be required to work closely with the ACI Musculoskeletal Network to facilitate the best possible outcomes of this service enhancement.

Year 1

- Finalise the OACCP model of care document including consultation across the Musculoskeletal Network, the health system across NSW, and consumers through Arthritis NSW and the ACI Consumer Network
- Develop overarching position description for the MSK Coordinator role
- Develop and adopt dynamic and flexible policy and procedures to guide implementation of the model at a local level – OACCP Site Manual
- Install an electronic data collection process to capture relevant outcome data and generate reports on key performance and clinical indicators
- Collaborate with pilot sites and their LHD to guide an implementation plan which is representative of the specific needs of each particular site
- Commence regular reporting to the Health Services Performance Improvement Branch, NSW Ministry of Health and LHD on the outcomes of the sites involved in the OACCP pilot project

- Aim to enrol 300 participants at each site by the end of the financial year 2011/12
- Follow up more than 2,500 participants for at least six months; some will have 12 months of follow-up.

Year 2

- Ongoing review, support and service or project adjustment as necessary
- Continue regular reporting to the Health Services Performance Improvement Branch, NSW Ministry of Health, and all sites implementing the OACCP
- Make reports available on the ACI MSK Network web pages
- Complete a comprehensive report on the outcomes of the eight pilot sites and any comparative non-intervention sites that may contribute to the data collection.

Site personnel resource allocation

It is anticipated the MSK Coordinator at each site would be able to see 10 new people each week by the end of a set-up phase of approximately 3 months, during which participant numbers per week would gradually increase. This would then enable maintenance of follow-ups at 3, 6 and 12 months for existing participants. This figure is factored on an estimate that each individual assessment takes up to one and a half hours to complete, and the assessment includes assistance by other members of the multidisciplinary team to undertake parts of the assessment. Data entry and other non-clinical aspects of the OACCP will ideally be supported by a clinical support officer.

EVALUATION, MONITORING AND DATA SYSTEM

The OACCP will be evaluated through two differing avenues and reporting will be to the ACI Executive and Board, the NSW Ministry of Health and the participating LHDs. Firstly, disease-specific clinical outcomes of the OACCP will be reported via a web-based tool, to allow record keeping and real time analysis of data. The OACCP data system will form the initial component of an overarching data system for the ACI Musculoskeletal Network.

The evaluation of OA-specific clinical outcomes will include identification of OA care needs and significant co-morbidities. Data will be captured and reported using clinical measurements and validated tools for pain, quality of life, psychological status and disease-specific functional capacity. Data from the participating health service sites will be entered via the NSW Health intranet at the site of intervention. Development of data linkages between the OACCP data system and electronic patient records used by health services, such as eMR and CHIME, will be pursued by ACI and local sites.

De-identified data will be analysed by the ACI, who will be responsible for ensuring adequate control of data quality and completeness of data entry. The collected data will facilitate the development of quarterly reports, with the aim that the OACCP data system will have the capability to provide flexible reporting on several musculoskeletal disease outcomes as required by the ACI Musculoskeletal Network.

Secondly, the OACCP will be included as part of the ACI Musculoskeletal Network evaluation framework. This framework will consider the value of networking with colleagues across NSW and across health disciplines. Information to be derived from the evaluation of the network and the OACCP will include answering such questions as how does this project impact the satisfaction of the providers of OA care, and how does this project impact on the delivery of healthcare in NSW for OA.

COMMUNICATION STRATEGY

The ACI Musculoskeletal Network will, through a planned communication strategy, ensure relevant stakeholders are aware of this model of care, the pilot sites and the process of implementation and evaluation across these sites in NSW. The strategy will provide opportunities for stakeholders to feedback to the ACI Musculoskeletal Network on any aspect of the model to enable continuous evaluation and modification as is deemed necessary.

The ACI Musculoskeletal Network will regularly distribute changes, updates and information on the progress of implementation and evaluation of the model to related groups and organisations. These groups and organisations include, but are not limited to, Arthritis NSW, the Australian Physiotherapy Association, the Australian Orthopaedic Association, the Australian Orthopaedic Nurses Association, the Australian Rheumatology Association, General Practitioners via GP NSW networks, the Rheumatology Health Professionals Association and other allied health networks and their associations.

Educational outreach programs detailing the aims of the OACCP, and strategies for incorporating it into every day clinical practice, will be future opportunities explored by the ACI Musculoskeletal Network.

BUDGET

The budget for the pilot of the OACCP has been provided by a one-off grant from NSW Ministry of Health. The grant incorporates costs associated with the set up and piloting of the OACCP in seven sites across NSW:

- Fairfield/Macarthur/Bowral
- Gosford/Wyong
- Nepean/Blue Mountains
- Newcastle
- Port Macquarie
- Sutherland/St George
- Wollongong

The funding will enable sites to provide:

- A musculoskeletal coordinator who is a senior physiotherapist and provides leadership of their site's OACCP;
- Incorporation of other multidisciplinary team members as are required and available at each site;
- Clinical support in order to allow effective clinical care from the clinical team members and their input to the OACCP;
- Extra resources as required, for example, computer hardware and software, other clinical capital items such as blood glucose monitors or weighing scales.

Each site has also nominated an appropriate medical officer to mentor the OACCP team and provide clinical input as required.

APPENDIX 1: POSITION DESCRIPTION

MUSCULOSKELETAL COORDINATOR OACCP PILOT PROJECTS

POSITION DETAILS			
Position Title	Musculoskeletal Coordinator	Department	
Position No.	Health Service		
Award Classification	Physiotherapist Level 3/4	Location:	
Reports to:	Hours	1FTE	Duration: Time limited to 12 months
Reports directly to:	Date Evaluated: February 2011		
Other Roles Reporting to Position's Manager:			

About the NSW Ministry of Health

With almost a third of the state's budget allocated to the health portfolio, NSW Health is one of its largest human services agencies. For more information go to www.health.nsw.gov.au. As one component of the wider NSW Health system, the Ministry plays a key role in:

- shaping overall policy development, funding strategies and system-wide planning of health services
- partnering with Local Health Districts, NSW communities and their organisations to promote health, prevent injury and disease, and drive improvements to areas such as the 'patient experience'

About *(Your Health Service)*

Suggest one paragraph description

Role and purpose of the *(Your Health Service)*

Can expand more here, possibly include key strategic directions of your health service

About (Your Department)

A few paragraphs about your department, its aims and objectives

Roles and Accountabilities

- Lead and coordinate the development, implementation and ongoing evaluation of the OACCP at *(your health service)*
- Provide expert musculoskeletal assessment and interventions for people accessing the *(your health service)* OACCP
- Participate in the chronic care assessments and interventions for people accessing the *(your health service)* OACCP
- Work collaboratively with multidisciplinary team members within and outside of the OACCP at *(your health service)*
- Ensure effective collaboration with medical practitioners in the local area including the nominated medical lead for the OACCP, specialist doctors and general practitioners
- Identify and act upon opportunities in collaboration with the multidisciplinary team members at *(your health service)*, other project site coordinators, and the *ACI Musculoskeletal Network* in order to achieve the best possible outcomes of the OACCP
- Provide high level advice concerning further development of the OACCP across NSW in collaboration with other project site coordinators and the *ACI Musculoskeletal Network*
- Lead the OACCP at *(your health service)* in the collection, monitoring and reporting of key performance indicators, clinical indicators and other required reporting of the program for the duration of the project
- Ensure opportunities are available in *(your health service)* localities for interventions of the OACCP at the health service site as well as in private settings. This will involve collegial collaboration with private health providers in the local area and consumer organisations
- Demonstrated successful project management, implementation and evaluation skills
- High level oral and written communication and interpersonal skills
- Proficiency in the use of Information systems including statistical programs, Microsoft applications, email, Clinical Information Access Program (CIAP)
- Current unrestricted NSW drivers licence
- *Please add department specific requirements here. Please be conscious of chronic care versus acute episodic care.*

CERTIFICATION

We have read the above position description and are satisfied it accurately describes the position.

Position Holder's Name _____

Signature _____ Date _____

Manager's Name _____

Signature _____ Date _____

APPENDIX 2: ABBREVIATIONS

ACI	Agency for Clinical Innovation
AIHW	Australian Institute of Health and Welfare
AHMC	Australian Health Ministers Conference
BEACH	Bettering the Evaluation and Care of Health
BHI	Bureau of Health Information
BMI	Body Mass Index
CDM	Chronic Disease Management
CIs	Clinical Indicators
DASS	Depression Anxiety Stress Scale
HOOS	Hip Dysfunction and Osteoarthritis Outcome Score
KOOS	Knee Injury and Osteoarthritis Outcome Score
KPIs	Key Performance Indicators
LHDs	Local Health Districts
MAPT	Multi-attribute Prioritisation Tool
MBS	Medicare Benefits Schedule
MSK	Musculoskeletal
NAMSCAG	National Arthritis and Musculoskeletal Conditions Advisory Group
NAP	National Action Plan
NCDS	National Chronic Disease Strategy
NHPA	National Health Priority Areas
NSIF	National Service Improvement Framework
NSW	New South Wales
OA	Osteoarthritis
OACCP	Osteoarthritis Chronic Care Program
OACP	Osteoarthritis Clinical Pathway Project
OPSC	Osteoarthritis Physiotherapy Screening Clinic
OWL	Orthopaedic Waitlist Project
VAS	Visual Analogue Scale

REFERENCES

1. Zwar, N., Harris, M., Griffiths, R., Roland, M., Dennis, S., Powell Davies, G. and Hasan, I. *A systematic review of chronic disease management*. Research Centre for Primary Health Care and Equity, School of Public Health and Community Medicine, UNSW 2006; Available from: http://www.anu.edu.au/aphcri/Domain/ChronicDiseaseMgmt/Approved_25_Zwar.pdf.
2. Brand, C.A., Amatya, B., Gordon, B., Tosti, T. and Gorelik, A. (2010), Redesigning care for chronic conditions: improving hospital based ambulatory care for people with osteoarthritis of the hip and knee. *Internal Medicine Journal*. 40(6): p. 427-436.
3. National Arthritis and Musculoskeletal Conditions Advisory Group (NAMSCAG) (2004), *Opportunities to improve health related quality of life and reduce the burden of disease and disability*. Department of Health and Ageing: Canberra.
4. National Health Priority Action Council (NHPAC) (2006), *National service improvement framework for osteoarthritis, rheumatoid arthritis and osteoporosis*. Department of Health and Ageing: Canberra.
5. National Health Priority Action Council (NHPAC) (2006), *National Chronic Disease Strategy*. Australian Government Department of Health: Canberra.
6. Royal Australian College of General Practitioners (2009), *Guideline for the non-surgical management of hip and knee osteoarthritis*, R.A.C.G.P, Editor: Melbourne.
7. Zhang, W., Moskowitz, R.W., Nuki, G., Abramson, S., Altman, R.D., Arden, N., Bierma-Zeinstra, S., Brandt, K.D., Croft, P., Doherty, M., Dougados, M., Hochberg, M., Hunter, D.J., Kwoh, K., Lohmander, L.S. and Tugwell, P. (2008), OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. *Osteoarthritis and Cartilage*. 16(2): p. 137-162.
8. Zhang, W., Nuki, G., Moskowitz, R.W., Abramson, S., Altman, R.D., Arden, N.K., Bierma-Zeinstra, S., Brandt, K.D., Croft, P., Doherty, M., Dougados, M., Hochberg, M., Hunter, D.J., Kwoh, K., Lohmander, L.S. and Tugwell, P. (2010), OARSI recommendations for the management of hip and knee osteoarthritis: part III: Changes in evidence following systematic cumulative update of research published through January 2009. *Osteoarthritis and Cartilage*. 18(4): p. 476-499.
9. Richmond, J., Hunter, D., Irrgang, J., Jones, M.H., Levy, B., Marx, R., Snyder-Mackler, L., Watters, W.C., Haralson, R.H., Turkelson, C.M., Wies, J.L., Boyer, K.M., Anderson, S., St Andre, J., Sluka, P. and McGowan, R. (2009), Treatment of osteoarthritis of the knee (nonarthroplasty). *Journal of the American Academy of Orthopaedic Surgeons*. 17(9): p. 591-600.
10. (2006), *NSW Chronic Care Program: rehabilitation for chronic disease volume 1*. NSW Department of Health: North Sydney.
11. Liu, B., Balkwill, A., Banks, E., Cooper, C., Green, J. and Beral, V. (2007), Relationship of height, weight and body mass index to the risk of hip and knee replacements in middle-aged women. *Rheumatology*. 46(5): p. 861-867.
12. Coggon, D., Reading, I., Croft, P., McLaren, M., Barrett, D. and Cooper, C. (2001), Knee osteoarthritis and obesity. *International Journal of Obesity and Related Metabolic Disorders: Journal of the International Association for the Study of Obesity*. 25(5): p. 622-627.
13. Australian Institute for Health and Welfare (2007), *A picture of osteoarthritis in Australia*, in *Arthritis Series no. 5 Cat. no. PHE93*. AIHW Canberra.
14. Australian Institute for Health and Welfare (2010), *Use of health services for arthritis and osteoporosis*, in *Arthritis Series no. 14. Cat. no. PHE 130*. AIHW: Canberra.

15. Losina, E., Walensky, R.P., Reichmann, W.M., Holt, H.L., Gerlovin, H., Solomon, D.H., Jordan, J.M., Hunter, D.J., Suter, L.G., Weinstein, A.M., Paltiel, A.D. and Katz, J.N. (2011), Impact of obesity and knee osteoarthritis on morbidity and mortality in older Americans. *Annals of Internal Medicine*. 154(4): p. 217-226.
16. Australian Institute for Health and Welfare (2011), *Key indicators of progress for chronic diseases and associated determinants: data report*. AIHW: Canberra. Cat. no. PHE142.
17. Access Economics for Arthritis Australia. *Painful Realities: the economic impact of arthritis in Australia*. 2007; Available from: http://www.arthritisaustralia.com.au/images/stories/documents/reports/2011_updates/painful%20realities%20report%20access%20economics.pdf
18. Centers for Disease Control Prevention (1994), Arthritis prevalence and activity limitations -- United States 1990. *MMWR - Morbidity and Mortality Weekly Report*. 43(24): p. 433-438.
19. Guccione, A.A., Felson, D.T., Anderson, J.J., Anthony, J.M., Zhang, Y., Wilson, P.W., Kelly-Hayes, M., Wolf, P.A., Kreger, B.E. and Kannel, W.B. (1994), The effects of specific medical conditions on the functional limitations of elders in the Framingham Study. *American Journal of Public Health*. 84(3): p. 351-358.
20. Hunter, D.J. (2011), Lower extremity osteoarthritis management needs a paradigm shift. *British Journal of Sports Medicine*. 45(4): p. 283.
21. Anonymous (2000), Recommendations for the medical management of osteoarthritis of the hip and knee: 2000 update. American College of Rheumatology Subcommittee on Osteoarthritis Guidelines. *Arthritis and Rheumatism*. 43(9): p. 1905-1915.
22. Zhang, W., et al. (2005), EULAR evidence based recommendations for the management of hip osteoarthritis: report of a task force of the EULAR Standing Committee for International Clinical Studies Including Therapeutics (ESCIIT). *Annals of the Rheumatic Diseases*. 64(5): p. 669-681.
23. Jordan, K.M., et al. (2003), EULAR Recommendations 2003: an evidence based approach to the management of knee osteoarthritis: Report of a Task Force of the Standing Committee for International Clinical Studies Including Therapeutic Trials (ESCIIT). *Annals of the Rheumatic Diseases*. 62(12): p. 1145-1155.
24. (2010), *Guideline for the non-surgical management of hip and knee osteoarthritis*, Royal Australian College of General Practitioners, Editor: Melbourne.
25. Glazier, R.H., Dalby, D.M., Badley, E.M., Hawker, G.A., Bell, M.J., Buchbinder, R. and Lineker, S.C. (1998), Management of common musculoskeletal problems: a survey of Ontario primary care physicians. *Canadian Medical Association Journal*. 158(8): p. 1037-1040.
26. Jawad, A.S. (2005), Analgesics and osteoarthritis: are treatment guidelines reflected in clinical practice? *American Journal of Therapeutics*. 12(1): p. 98-103.
27. DeHaan, M.N., Guzman, J., Bayley, M.T. and Bell, M.J. (2007), Knee osteoarthritis clinical practice guidelines -- how are we doing? *Journal of Rheumatology*. 34(10): p. 2099-2105.
28. Woolf, S.H., Grol, R., Hutchinson, A., Eccles, M. and Grimshaw, J. (1999), Clinical guidelines: potential benefits, limitations, and harms of clinical guidelines. *British Medical Journal*. 318(7182): p. 527-530.
29. Henley, M.B., Turkelson, C., Jacobs, J.J. and Haralson, R.H. (2008), AOA symposium. Evidence-based medicine, the quality initiative, and P4P: performance or paperwork? *Journal of Bone and Joint Surgery - American Volume*. 90(12): p. 2781-2790.
30. The McColl Institute for Innovation. *The Chronic Care Model*. 2009; Available from: http://www.improvingchroniccare.org/index.php?p=The_Chronic_Care_Model&s=2.
31. Holman, H.R., and Lorig, K.R. (1997), Overcoming barriers to successful aging: self-management of osteoarthritis. *Western Journal of Medicine*. 167: p. 265-268.
32. Lorig, K.R., Sobel, D.S., Ritter, P.L., Laurent, D. and Hobbs, M. (2001), Effect of a self-management program on patients with chronic disease. *Effective Clinical Practice*. 4(6): p. 256-262.
33. Osborne, R.H., Wilson, T., Lorig, K.R. and McColl, G.J. (2007), Does self-management lead to sustainable health benefits in people with arthritis? A 2-year transition study of 452 Australians. *Journal of Rheumatology*. 34(5): p. 1112-1117.
34. Misso, M.L., Pitt, V.J., Jones, K.M., Barnes, H.N., Piterman, L. and Green, S.E. (2008), Quality and consistency of clinical practice guidelines for diagnosis and management of osteoarthritis of the hip and knee: a descriptive overview of published guidelines. *Medical Journal of Australia*. 189(7): p. 394-399.

35. Pencharz, J.N., Grigoriadis, E., Jansz, G.F. and Bombardier, C. (2002), A critical appraisal of clinical practice guidelines for the treatment of lower limb osteoarthritis. *Arthritis Research*. 4(1): p. 36-44.
36. Poitras, S., Avouac, J., Rossignol, M., Avouac, B., Cedraschi, C., Nordin, M., Rousseaux, C., Rozenberg, S., Savarieau, B., Thoumie, P., Valat, J.P., Vignon, E. and Hilliquin, P. (2007), A critical appraisal of guidelines for the management of knee osteoarthritis using Appraisal of Guidelines Research and Evaluation criteria. *Arthritis Research and Therapy*. 9(6): p. R126.
37. Zhang, W., Moskowitz, R.W., Nuki, G., Abramson, S., Altman, R.D., Arden, N., Bierma-Zeinstra, S., Brandt, K.D., Croft, P., Doherty, M., Dougados, M., Hochberg, M., Hunter, D.J., Kwoh, K., Lohmander, L.S. and Tugwell, P. (2007), OARSI recommendations for the management of hip and knee osteoarthritis, part I: critical appraisal of existing treatment guidelines and systematic review of current research evidence. *Osteoarthritis and Cartilage*. 15(9): p. 981-1000.
38. Bureau of Health Information. *Healthcare in focus: how NSW compares internationally*. December 2010; Available from: http://www.bhi.nsw.gov.au/publications/health_in_focus.
39. Woolf, A.D. (2000), The bone and joint decade 2000 - 2010. *Annals of the Rheumatic Diseases*. 59(2): p. 81-82.
40. Australian Institute for Health and Welfare (2006), *National indicators for monitoring osteoarthritis, rheumatoid arthritis and osteoporosis*. AIHW cat. No. PHE 77: Canberra.
41. de Jong, O.R., Hopman-Rock, M., Tak, E.C. and Klazinga, N.S. (2004), An implementation study of two evidence-based exercise and health education programmes for older adults with osteoarthritis of the knee and hip. *Health Education Research*. 19(3): p. 316-325.
42. Lorig, K.R., Ritter, P.L., Laurent, D.D., Plant, K. (2008), The internet based arthritis self-management program: a one-year randomised trial for patients with arthritis or fibromyalgia. *Arthritis and Rheumatism*. 59(7): p. 1009-1017.
43. Christensen, R., Bartels, E.M., Astrup, A. and Bliddal, H. (2007), Effect of weight reduction in obese patients diagnosed with knee osteoarthritis: a systematic review and meta-analysis. *Annals of the Rheumatic Diseases*. 66(4): p. 433-439.
44. Thorstensson, C., Garellick, G. and Dahlberg, L. *Better management of patients with osteoarthritis*. Abstracts of the 2010 World Congress on Osteoarthritis September 23 - 26 2010; Available from: <http://www.boaregistret.se/en/BOAPart3.aspx>.
45. Brand, C.A. (2007), Translating evidence into practice for people with osteoarthritis of the hip and knee [Review]. *Clinical Rheumatology* 26: p. 1411-1420.
46. Wagner, E.H. (1998), Chronic disease management: what will it take to improve care for chronic illness? *Effective Clinical Practice*. 1(1): p. 2-4.
47. Lemmens, K.M., Nieboer, A.P., and Huijsman, R. (2009), A systematic review of integrated use of disease-management interventions in asthma and COPD. *Respiratory Medicine*. 103(5): p. 670-691.
48. Weingarten, S.R., Henning, J.M., Badamgarav, E., Knight, K., Hasselblad, V., Gano Jr, A. and Ofman, J.J. (2002), Interventions used in disease management programmes for patients with chronic illness - which ones work? Meta-analysis of published reports. *British Medical Journal*. 325(7370): p. 925.
49. Adams, S.G., Smith, P.K., Allan, P.F., Anzueto, A., Pugh, J.A. and Cornell, J.E. (2007), Systematic review of the chronic care model in chronic obstructive pulmonary disease prevention and management. *Archives of Internal Medicine*. 167(6): p. 551-561.
50. (2003), *NSW Clinical Service Framework for Heart Failure: a practice guide for the prevention, diagnosis and management of heart failure in NSW Volume 2*. NSW Department of Health: North Sydney.
51. (2006), *NSW Chronic Care Program: implementing rehabilitation for chronic disease volume 2*. NSW Department of Health: North Sydney.
52. Savage, J. *Models of care for chronic disease*. Background paper for the Models of Access and Clinical Service Delivery Project, Australasian Society for HIV Medicine, 2009c; Available from: <http://www.ashm.org.au/images/resources/policy/macsdchronicdiseasepaper.pdf>.
53. Lorig, K.R., and Holman, H. (2003), Self-management education: history, definition, outcomes, and mechanisms. *Annals of Behavioral Medicine*. 26(1): p. 1-7.
54. Bennell, K.L., Hunt, M.A., Wrigley, T.V., Lim, B-W. and Hinman, R.S. (2009), Muscle and exercise in the prevention and management of knee osteoarthritis: an internal medicine specialist's guide. *Medical Clinics of North America*. 93(1): p. 161-177.

55. Roddy, E., Zhang, W., Doherty, M., Arden, N.K., Barlow, J., Birrell, F., Carr, A., Chakravarty, K., Dickson, J., Hay, E., Hosie, G., Hurley, M., Jordan, K.M., McCarthy, C., McMurdo, M., Mockett, S., O'Reilly, S., Peat, G., Pendleton, A. and Richards, S. (2005), Evidence based recommendations for the role of exercise in the management of osteoarthritis of the hip or knee -- the MOVE consensus. *Rheumatology*. 44(1): p. 67-73.
56. McCarthy, C.J., Mills, P.M., Pullen, R., Roberts, C., Silman, A. and Oldham, J.A. (2004), Supplementing a home exercise programme with a class-based exercise programme is more effective than home exercise alone in the treatment of knee osteoarthritis. *Rheumatology*. 43(7): p. 880-886.
57. Fransen, M., and McConnell, S. (2008), Exercise for osteoarthritis of the knee. *Cochrane Database of Systematic Reviews*. Issue 4 (Art. No.: CD004376. DOI: 10.1002/14651858.CD004376.pub2).
58. Fransen, M., McConnell, S., Hernandez-Molina, G. and Reichenbach, S. (2009), Exercise for osteoarthritis of the hip. *Cochrane Database of Systematic Reviews*. Issue 3 (Art. No.: CD007912. DOI: 10.1002/14651858.CD007912).
59. Bennell, K.L., and Hinman, R.S. (2011), A review of the clinical evidence for exercise in osteoarthritis of the hip and knee. *Journal of Science and Medicine in Sport*. 14(1): p. 4-9.
60. Ravaud, P., Giraudeau, B., Logeart, I., Larquier, J., Rolland, D., Treves, R., Euller-Ziegler, L., Bannwarth, B. and Dougados, M. (2004), Management of osteoarthritis (OA) with an unsupervised home based exercise programme and/or patient administered tools. A cluster randomised controlled trial with a 2x2 factorial design. *Annals of the Rheumatic Diseases*. 63: p. 703-708.
61. Messier, S.P., Loeser, R.F., Miller, G.D., Morgan, T.M., Rejeski, W.J., Sevick, M.A., Ettinger, W.H. Jr., Pahor, M. and Williamson, J.D. (2004), Exercise and dietary weight loss in overweight and obese older adults with knee osteoarthritis: the Arthritis, Diet, and Activity Promotion Trial. *Arthritis and Rheumatism*. 50(5): p. 1501-1510.
62. Yohannes, A.M., and Caton, S. (2010), Management of depression in older people with osteoarthritis: A systematic review. *Aging and Mental Health*. 14(6): p. 637-651.
63. Lin, E.H., Katon, W., Von Korff, M., Tang, L., Williams, J.W., Jr., Kroenke, K., Hunkeler, E., Harpole, L., Hegel, M., Areal, P., Hoffing, M., Della Penna, R., Langston, C. and Unutzer, J. (2003), Effect of improving depression care on pain and functional outcomes among older adults with arthritis: a randomised controlled trial. *Journal of the American Medical Association*. 290(18): p. 2428-2429.
64. Harvey, W.F., and Hunter, D.J. (2009), The role of analgesics and intra-articular injections in disease management. *Medical Clinics of North America*. 93(1): p. 201-211.
65. Hay, E.M., Foster, N.E., Thomas, E., Peat, G., Phelan, M., Yates, H.E., Blenkinsopp, A. and Sim, J. (2006), Effectiveness of community physiotherapy and enhanced pharmacy review for knee pain in people aged over 55 presenting to primary care: pragmatic randomised trial. *British Medical Journal*. 333(7576): p. 995.
66. Warsi, A., Wang, P.S., LaValley, M.P., Avorn, J. and Solomon, D.H. (2004), Self-management education programs in chronic disease: a systematic review and methodological critique of the literature. *Archives of Internal Medicine*. 164(15): p. 1641-1649.
67. Gossec, L., Paternotte, S., Maillefert, J.F., Combesure, C., Conaghan, P.G., Davis, A.M., Gunther, K.P., Hawker, G., Hochberg, M., Katz, J.N., Kloppenburg, M., Lim, K., Lohmander, L.S., Mahomed, N.N., March, L., Pavelka, K., Punzi, L., Roos, E.M., Sanchez-Riera, L., Singh, J.A., Suarez-Almazor, M.E., Dougados, M. and Oarsi-Omeract Task Force (2011), The role of pain and functional impairment in the decision to recommend total joint replacement in hip and knee osteoarthritis: an international cross-sectional study of 1909 patients. Report of the OARSI-OMERACT Task Force on total joint replacement. *Osteoarthritis and Cartilage*. 19(2): p. 147-154.

