

## 5 Reducing the burden of arthritis

Arthritis is a very common condition, and one that makes a significant contribution to pain, functional limitation, disability and reduced quality of life. Health expenditure attributable to arthritis, through medical and allied health consultations, the use of medications and surgical procedures, is also substantial. However, the burden of arthritis can be reduced through intervention at various points along the disease continuum, including prevention, early diagnosis, prompt initiation of treatment, ongoing management and timely access to joint replacement.

This chapter highlights opportunities for reducing the burden of arthritis in Australia, by examining the various points at which intervention can be undertaken. The discussion centres on osteoarthritis and rheumatoid arthritis, as these are the two most common forms of arthritis, as well as being targets of public health strategies under the National Health Priority Area of arthritis and musculoskeletal conditions.

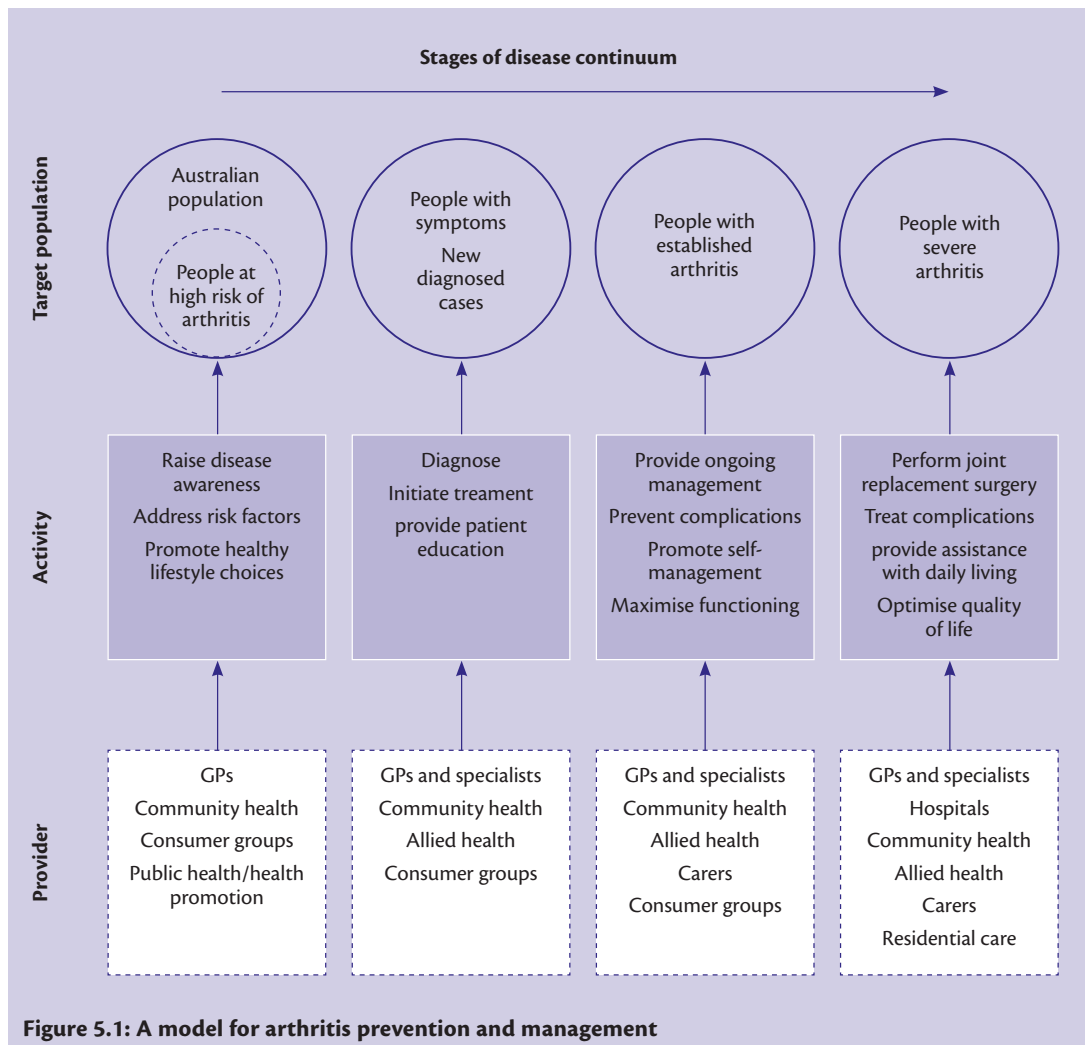
### THE DISEASE CONTINUUM

In their report *Preventing chronic disease: a strategic framework* (NPHP 2001), the National Public Health Partnership described a generic model of chronic disease prevention and control, which illustrated various intervention points across the continuum of care and identified the health services that could contribute at each stage. Drawing on this generic model, the arthritis-specific model shown below highlights potential intervention points for arthritis and identifies the health service areas responsible for these (Figure 5.1). This new model provides a framework for the following discussion of opportunities for reducing the burden of arthritis in Australia.

### PREVENTION

Understanding the causal mechanisms that lead to a disease, and identifying factors that increase the likelihood of developing it (known as 'risk factors'), are vital elements for its prevention. In terms of public health strategies for disease prevention, targeting of modifiable risk factors (that is, those that are able to be changed) can result in widespread health benefits. Many public health strategies for chronic disease prevention are centred on encouraging positive lifestyle choices—for example, undertaking regular physical activity, consuming a balanced diet and maintaining healthy weight. These actions promote general good health and wellbeing, as well as reducing the risk of a range of chronic diseases including Type 2 diabetes, osteoarthritis, cardiovascular disease, osteoporosis and some forms of cancer (AIHW 2002).

Although some risk factors (for example, family history, age or sex) are not able to be modified and so are not in themselves able to be the targets of prevention strategies, these factors can help to identify people or groups at high risk of developing a disease so that prevention strategies and relevant medical services can be targeted and located to best effect.



### Risk factors for osteoarthritis

In recent years, increased understanding of some of the causes of and risk factors for osteoarthritis has helped to develop public health strategies to prevent or delay its onset. Several potentially modifiable risk factors have been identified. In addition to the positive lifestyle choices outlined above, avoiding or limiting repetitive load-bearing activities and preventing joint trauma are beneficial. The links between some of these factors and the development of osteoarthritis are outlined below.

#### *Overweight and obesity*

Being overweight or obese can contribute to osteoarthritis, particularly in females (Sandmark et al. 1999). Osteoarthritis develops gradually over many years, with the degenerative process beginning long before any symptoms are noticed. Exposure to risk factors early in life, therefore, influences health status at older ages. The Framingham Study, for example, predicted knee osteoarthritis among obese people as early as three decades in advance of its onset (Felson et al. 1988).

Obesity increases the load across the weight-bearing joints, thus increasing the stress on the cartilage and ligaments. It is more strongly associated with osteoarthritis of the knee than the hip, although it is related to both (Lievence et al. 2002). However, obesity has also been associated with osteoarthritis of non-weight-bearing joints such as the joints of the hand. This suggests that obesity may cause metabolic changes that can promote osteoarthritis (Eaton 2004).

Osteoarthritis can in turn contribute to overweight and obesity. The painful joints may limit physical activity, causing weight gain. However, exercise is an important part of the management of osteoarthritis, and the type and length of exercise undertaken can be modified to avoid pain and minimise the strain on the joints. This is discussed in more detail later in this chapter.

### ***History of joint trauma or injury***

Individuals with a history of joint trauma or injury are more likely to develop osteoarthritis (Gelber et al. 2000; Lau et al. 2000). Injury damages the tissues within the joint, which can increase the stress on the cartilage. The process of osteoarthritis then develops slowly over many years before it starts to cause symptoms of pain or stiffness in the previously injured joint.

Joint injuries associated with increased risk of osteoarthritis include dislocation, contusion, fracture, and tears of the menisci or ligaments. These injuries are common in sporting and recreational activities that place repeated high impacts or torsional (twisting) loads on the joints (for example, football, netball and basketball); the knee is frequently injured in this manner. However, participation in moderate exercise has many health benefits and does not of itself increase osteoarthritis risk. In fact, regular physical activity may actually decrease the risk of osteoarthritis (Rogers et al. 2002), and strong muscles may protect against cartilage loss in middle age (Foley et al. 2007). Case-control studies have found that the sports-related increase in risk of osteoarthritis can be explained by joint injury (Sutton et al. 2001; Thelin et al. 2006).

Joint trauma caused by surgery (such as meniscectomy, the surgical removal of the meniscus) can also increase the risk of osteoarthritis at the site of surgery later in life (Felson et al. 2000).

### ***Repetitive joint-loading tasks***

Repetitive movements that involve placing abnormal strain, stress or heavy loads on the joints increase the risk of osteoarthritis. These types of movements are often required in certain manual occupations, such as jobs in the building industry. Jobs involving continuous kneeling, squatting, and climbing stairs are associated with higher rates of knee osteoarthritis, whereas jobs that require heavy lifting, including farming and construction, are associated with higher rates of hip osteoarthritis (Felson et al. 2000; Lau et al. 2000).

### ***Joint misalignment***

Congenital abnormalities (conditions that are present at birth) can cause an abnormal load distribution across the joint due to an alteration of the mechanical alignment of the joint during movement (Arden & Nevitt 2006). The alignment of a joint affects the load across the cartilage and other tissues. Areas of cartilage under high load or pressure can degrade faster or be damaged by joint movement, increasing the risk of early-onset osteoarthritis.

## ***Non-modifiable influences on osteoarthritis***

### **AGE**

The prevalence of osteoarthritis in all joints increases sharply with age. Radiological and autopsy surveys show a steady rise in osteoarthritic changes in joints from age 30 years onwards. By age 65 years, around 80% of the population have some radiographic evidence of osteoarthritis, though only one-quarter report any pain or disability (Nuki et al. 1999). Possible mechanisms for the influence of age on osteoarthritis include diminished capacity for cartilage repair, hormonal changes and the cumulative effects of environmental exposures (Petersson & Jacobsson 2002).

### **GENDER**

Females are at higher risk of developing osteoarthritis of the hand and knee than males (Arden & Nevitt 2006; Srikanth et al. 2005). They are affected more frequently, more severely, and at more sites. Females have a higher rate of knee cartilage tissue loss than males (Ding et al. 2007), though the reasons for this are unknown. Factors that might contribute to the increased risk of osteoarthritis in females include the effects of female sex hormones and growth factors, the different distribution of weight in females compared to males, and the possible advantages of the larger bone and body size of males on the volume of cartilage tissue at certain joints (Ding et al. 2003).

### **FAMILY HISTORY AND GENETICS**

Osteoarthritis appears to run in families. Children of parents with early-onset osteoarthritis, or osteoarthritis involving more than one joint, are at increased risk of developing the disease (Loughlin 2002).

Genetic factors can affect cartilage repair mechanisms and joint alignment. Twin studies have shown that genetic factors account for 60–65% of the variation in osteoarthritis of the hands and hips, and 40–50% in osteoarthritis of the knees (March & Bagga 2004). Multiple genes are involved, but their roles in affecting an individual's risk of osteoarthritis have not yet been clarified (Lally 2004).

## **Risk factors for rheumatoid arthritis**

Although recent advances in the understanding of disease progression in rheumatoid arthritis have led to the development of new treatment options (for example, biologic drugs), the causes or triggers of the autoimmune response that leads to the disease have not yet been isolated. Only one modifiable factor relating to the development of rheumatoid arthritis—tobacco smoking—has been clearly identified, and its nature as a disease trigger is complex. Other factors such as diet, obesity and the use of oral contraceptives have been linked to increased or decreased risk of rheumatoid arthritis in some studies, but the evidence is not conclusive.

Given the uncertainty surrounding modifiable risk factors for rheumatoid arthritis, primary prevention of the disease itself is not yet a reality. However, secondary prevention (that is, preventing progression of disease in people who have already been diagnosed) through early diagnosis and prompt initiation of treatment, can reduce the extent of disability and functional limitations generally associated with rheumatoid arthritis. This is discussed in detail later in this chapter.

Some influences on rheumatoid arthritis risk are described below.

### ***Tobacco smoking***

Tobacco smoking is the only modifiable influence on rheumatoid arthritis that has been clearly identified to date. Exactly how smoking increases the risk of the disease is unclear, but may relate to its effect as a trigger of immune response for certain proteins, its effect on sex hormone levels and its propensity to cause damage to a variety of bodily tissues (Harrison 2002; Klareskog et al. 2006b). Only certain subtypes of rheumatoid arthritis are related to smoking, namely the anticitrulline antibody-positive form and the seropositive (or rheumatoid factor positive) form.

Smoking has not been found to independently increase the risk of rheumatoid arthritis in the general population, but rather to interact with certain genetic factors associated with rheumatoid arthritis and lead to high risk in people with these factors (Klareskog et al. 2006a).

### ***Genetic factors***

Family studies indicate the high heritability of rheumatoid arthritis. Severe rheumatoid arthritis is found at approximately four times the expected rate in first-degree relatives of people with the disease. Approximately 10% of people with rheumatoid arthritis have an affected first-degree relative (Silman & Hochberg 2001). The disease also exhibits a higher concordance rate in identical twins than in fraternal twins (Silman et al. 1993). Certain genes (including a particular combination of human leukocyte antigens, referred to as the HLA-DR shared epitope) have been found to be highly associated with rheumatoid arthritis.

### ***Gender (hormonal factors)***

Rheumatoid arthritis is more common among females than males. This may be due to the role of female sex hormones, particularly during menopause (Kuiper et al. 2001). Other factors that may be involved in the higher incidence of rheumatoid arthritis in females include their low levels of the male sex hormones and high levels of prolactin (a protein involved in milk production) (Brennan & Silman 1995). Pregnancy also influences the timing of the disease, with the period just after childbirth being a high-risk time for developing first symptoms (Silman et al. 1992).

### ***Environmental factors***

The presence of high-risk genes is not sufficient to develop rheumatoid arthritis. Additional environmental factors are required to expose this susceptibility—in other words, something must happen to trigger the onset of the disease. Exposure to an infectious agent, such as a virus or bacteria, is suspected, though none have been clearly linked with the disease. However, any infectious agent involved is merely a trigger, and not a cause: rheumatoid arthritis is not transmissible from person to person.

### ***Other influences***

In addition to the above-mentioned genetic, environmental and biochemical factors, several other factors such as socioeconomic status, education and psychosocial wellbeing may play a role in the development and progression of rheumatoid arthritis (Callahan & Pincus 1988; Symmons 2003).

Rheumatoid arthritis is not as common in less developed countries (Woolf & Pfleger 2003). It is also less common in rural areas (Symmons 2002), although the differences between rural and non-rural areas are small. Among some populations where the prevalence of rheumatoid arthritis is naturally very low (for example, among tribal African communities), increased prevalence in urbanised groups compared with those still living traditionally has been documented (Solomon et al. 1975). The reasons for this variation are not well understood, and likely relate to a combination of genetic, sociological and environmental factors.

## DETECTION AND DIAGNOSIS

Pain and stiffness are often the first symptoms of arthritis. However, musculoskeletal symptoms can have many causes, and sometimes it can be difficult to distinguish the symptoms of arthritis from those of other diseases and conditions. For this reason, diagnosis usually involves a combination of investigations including a medical history, physical examination, and pathology and imaging tests. The main symptoms of osteoarthritis and rheumatoid arthritis, and the ways these conditions are diagnosed, are described below.

### Symptoms

The **osteoarthritis** process occurs gradually over many years, and symptoms tend to come on gradually. They may vary from day to day and between individuals, but generally include the following symptoms in the affected joints:

- pain (generally worse when moving, and eased by rest)
- tenderness
- stiffness (generally worse after rest, and improved by movement)
- limitation of movement
- swelling
- a creaking sound or sensation on movement (known as 'crepitus').

By comparison, the symptoms of **rheumatoid arthritis** usually develop quite quickly, over a few weeks to months or in some cases over just a few days. The main joint symptoms are:

- pain (usually worse in the morning or after long periods of rest)
- stiffness (generally worse in the morning and lasting more than an hour)
- heat
- swelling
- weakening of the surrounding muscles
- painless lumps under the skin (called 'nodules').

People with rheumatoid arthritis also often experience a general feeling of being unwell.

## Diagnosis

A diagnosis of **osteoarthritis** is generally based on a description of symptoms, physical examination and medical history. Occasionally, pathology tests may be ordered; these are to rule out other potential causes of the symptoms displayed and not to detect osteoarthritis itself. X-rays are sometimes used, but as cartilage does not show up on X-rays these only show results when the osteoarthritis is severe and the bone itself has been damaged. Other imaging techniques such as ultrasound and magnetic resonance imaging (MRI) are being used in clinical studies to see if they are able to detect osteoarthritic changes at an earlier stage.

**Rheumatoid arthritis** can be difficult to diagnose in its early stages, as symptoms vary in appearance and severity. There is no single test that can detect rheumatoid arthritis, and since the symptoms may be similar to those of other joint disorders it can take time to rule out other conditions. An accurate diagnosis is obtained through a combination of blood tests, joint X-rays, physical examination and the use of other imaging techniques such as MRI and ultrasound. MRI and ultrasound are very sensitive tools for detecting early joint symptoms and erosions, and may help to diagnose rheumatoid arthritis at an early stage (Oliver et al. 2005), but these techniques are not yet in routine clinical use.

Diagnostic criteria for rheumatoid arthritis have been developed by the American College of Rheumatology (ACR) (Box 5.1) (Arnett et al. 1988). These criteria identify 'definite' rheumatoid arthritis, and are used to classify the disease in epidemiological studies and clinical trials. Initiating treatment in patients with undifferentiated inflammatory arthritis or 'probable' rheumatoid arthritis before the ACR criteria are met may be beneficial in many cases (van Dongen et al. 2007).

### Box 5.1: ACR 1987 revised criteria for the diagnosis of rheumatoid arthritis

*Rheumatoid arthritis is defined by the presence of any four of the following:*

1. *morning stiffness in and around the joints, lasting at least 1 hour and present for at least 6 weeks*
2. *arthritis of three or more joints including the elbows, wrists, hands, knees, ankles or feet, present for at least 6 weeks*
3. *arthritis of hand or wrist joints present for at least 6 weeks*
4. *symmetrical arthritis of joints listed in criterion 2, present for at least 6 weeks*
5. *rheumatoid nodules*
6. *serum rheumatoid factor positive*
7. *radiographic changes in the hand or wrist joints, including erosions or bony decalcification.*

Source: Arnett et al. 1988.

### Importance of early diagnosis and intervention for rheumatoid arthritis

Early diagnosis of rheumatoid arthritis is important for reducing the severity of symptoms and preventing disability. Degeneration occurs early in the course of disease, so before this happens it is important to make a diagnosis and begin treatment. Treatment with disease-modifying anti-rheumatic drugs (DMARDs), if appropriate, is commenced as early as possible. Treatment with these drugs aims to reduce joint pain and swelling and prevent joint damage. The type of DMARD used is determined by the likely prognosis or history of the condition, based on how the person presents initially. Careful monitoring by a doctor or specialist is required to achieve optimal results and minimise side effects.

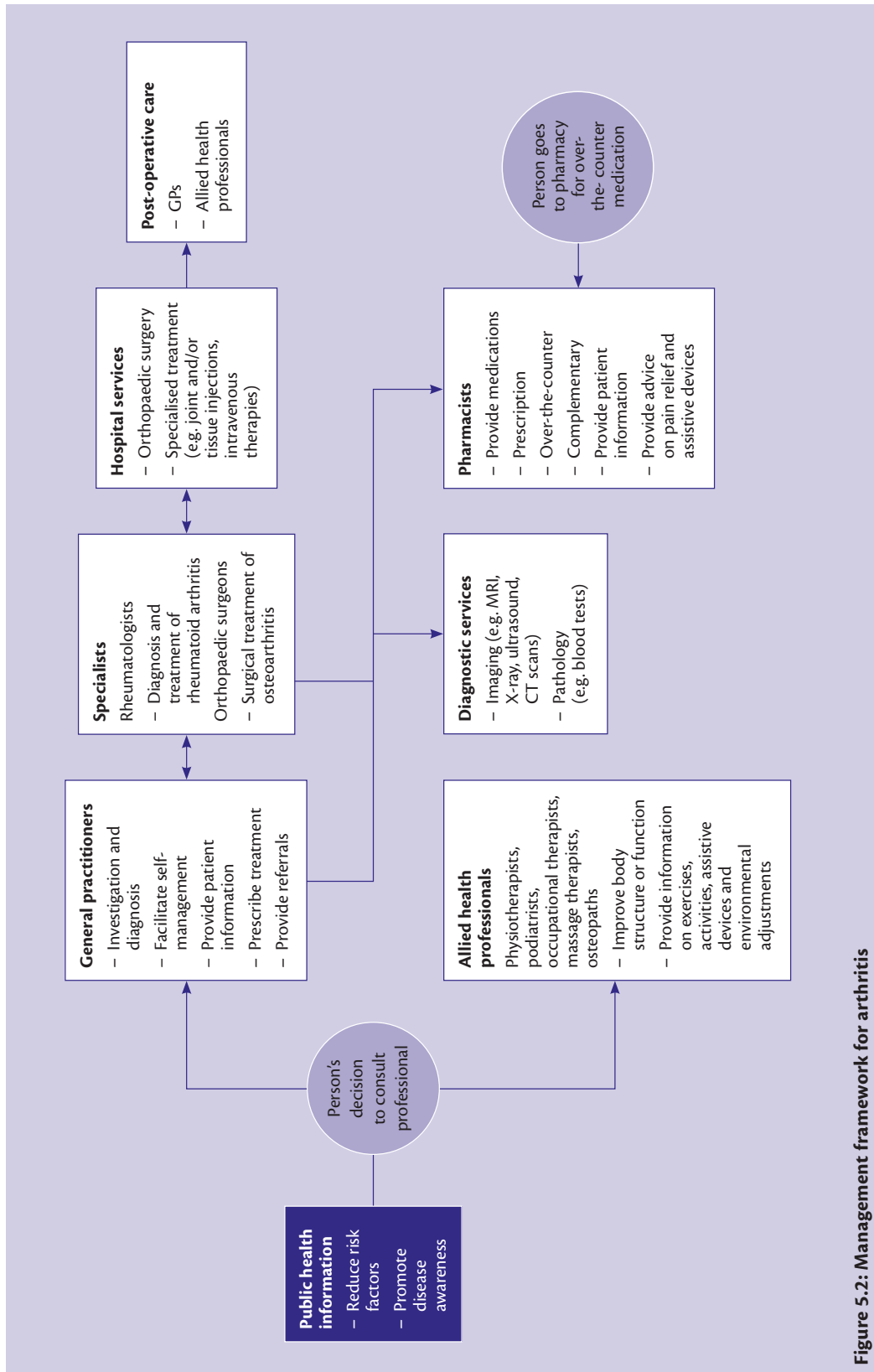


Figure 5.2: Management framework for arthritis



The goals of treatment for rheumatoid arthritis are controlling symptoms, preventing or limiting degeneration of the joints and minimising subsequent disability. Recently, combination therapies (a biologic plus a DMARD; for example, etanercept with methotrexate) have been shown to be effective in improving symptoms, reducing disease progression and inducing remission in a large proportion of patients (Breedveld et al. 2006; Goekoop-Ruiterman et al. 2007; van der Heijde et al. 2006). Remission is now considered a realistic treatment goal (Montecucco 2006), although therapy usually needs to be maintained.

## ARTHRITIS MANAGEMENT

Effective management of arthritis involves a variety of health practitioners. Treatment options are complex: a combination of physical therapy, medication and lifestyle modification is required to limit pain, maximise function and optimise quality of life. In some cases, joint replacement surgery may be necessary to relieve pain and improve function at a badly affected joint; this is more common in osteoarthritis. Improvements in surgical and anaesthetic techniques have meant that joint replacement surgery is now more widely available, particularly for those at older ages.

People with arthritis seek health care both for acute flare-ups of symptoms and for the ongoing management of their condition. A person's knowledge about the condition, self-management skills and confidence, access to primary health care services, disease severity, symptoms and personal beliefs can affect their help-seeking behaviour and influence their choice of health professional.

The general practitioner sees the largest volume of people with arthritis; they can refer to and coordinate care with specialists and other health professionals (Figure 5.2). Guidelines for the diagnosis and management of osteoarthritis and rheumatoid arthritis have been developed by the Royal Australian College of General Practitioners (see <[www.racgp.org.au](http://www.racgp.org.au)>). Specialists such as rheumatologists and orthopaedic surgeons are important for diagnosis of rheumatoid arthritis and surgical treatment of osteoarthritis. Allied health practitioners (such as physiotherapists, occupational therapists and podiatrists) also play key roles in the management team.

### Management options

Arthritis cannot be cured. The aims of management are therefore to relieve pain, reduce inflammation, protect the joints from damage, maintain joint function and (for rheumatoid arthritis) to prevent or reduce involvement in other parts of the body. Early prevention of joint damage and induction of remission are key goals in rheumatoid arthritis. Management generally comprises a combination of medication, physical therapy, self-management education and (where necessary) surgery.

The most common management actions reported by people with arthritis in the 2004–05 National Health Survey (NHS) were taking vitamin and mineral supplements and using pharmaceuticals (Table 5.1). A range of physical therapies were also reported, with exercise being the most common. Approximately 30% of people with arthritis reported that they took no actions or treatments for arthritis in the 2 weeks before the survey was conducted. Note that not all of the treatments described below are recommended for all types of arthritis.

Medications and physical therapy act through different mechanisms to treat arthritis. Medications act by suppressing pain, providing non-specific suppression of the immune system or inflammatory process, or preventing progressive damage to joint structures. Physical therapy strengthens and maintains mobility of the muscles and ligaments surrounding the joint, protecting the joint from further damage and improving functioning. Physical activity also improves mental health.

**Table 5.1: Management actions taken for arthritis, 2004–05**

Action	Per cent
Exercised most days	18.8
Strength or resistance training	5.5
Water therapy	3.7
Weight loss	5.2
Change of diet or eating pattern	3.5
Massage	6.3
Used physical aids	2.3
Used vitamin/mineral supplements	39.0
Used pharmaceutical medication	37.4
Visited a GP or specialist	10.8
Visited an allied health professional	4.4
Other actions	1.8
No action	29.5

*Notes*

1. Includes people that self-reported a doctor's or nurse's diagnosis of any form of arthritis. Data were not reliable enough to allow separation into specific types of arthritis.
2. More than one action may be reported.

Source: AIHW analysis of the 2004–05 NHS CURF.

## Exercise

Exercise can have many benefits for people with arthritis and is an essential part of therapy. In addition to reducing joint stiffness and maintaining mobility, regular exercise can reduce the risk of developing other chronic diseases such as diabetes and cardiovascular disease. In people who already have other chronic conditions, exercise can help manage these conditions and reduce the risk of complications.

The main types of exercise recommended for people with arthritis are aerobic fitness, quadriceps (thigh) muscle strengthening and resistance exercises. People with arthritis may find it difficult to exercise, or they may be reluctant to do so because of the pain experienced in the joints. However, exercise programs can be tailored to suit the needs and abilities of a person with arthritis and to provide support for the affected joints—for example, by exercising in water. No matter what type of exercise is performed, to obtain the greatest benefit it is important that it is done regularly.

Exercise for people with rheumatoid arthritis is directed at maintaining muscle strength and joint mobility without increasing joint inflammation. Regular aerobic and resistance exercises are beneficial for people with rheumatoid arthritis, and have been shown to reduce symptoms and disease activity, and increase functional capacity (Hakkinen et al. 2001).

## Self-management

Educating people with arthritis about their condition, how they can best manage it and how to reduce the risk of exacerbation or complications is known as self-management. Self-management courses can provide counselling, encouragement and a support network. These courses can also advise on the appropriate use of aids, joint protection (that is, how to avoid aggravating the joint and causing further injury), the likely progression of the condition and the purpose of and options for treatment.

Informing patients about their condition can lead to improvements in pain, functioning and quality of life. In Australia, arthritis-specific self-management courses are offered by the Arthritis Australia affiliates in each state and territory (freecall 1800 011 041), and general chronic disease self-management courses are offered by community and Aboriginal health centres, and through some general practices.

## Aids to realign joints

When the bones are out of alignment in a joint, certain surfaces of cartilage are put under higher load, causing osteoarthritis in that part of the joint. Realignment of knee joints can be achieved through the use of orthotics and taping. There is no clear evidence for whether this practice can actually prevent osteoarthritis from developing, but it may reduce symptoms.

In people with osteoarthritis in one side of the knee, a wedged insole may help take pressure off the affected side and put the knee joint into better alignment. This can reduce pain and improve functioning of the joint. An Australian trial is currently assessing the effectiveness of wedged insoles in people with medial (inner) knee osteoarthritis (Bennell et al. 2007).

When the area behind the kneecap (patella) is affected, symptoms may be improved by taping the kneecap into correct alignment. Taping can be used along with exercises to strengthen the muscles that hold the patella in the correct alignment.

## Weight loss and reduction of joint loading

Carrying excess body weight or performing certain repetitive movements puts additional pressure (or 'load') on the joints, particularly the hips and knees. In people with osteoarthritis, this causes pain and increases the rate of cartilage breakdown. Reducing the load on the joints is therefore an important part of osteoarthritis treatment.

In people who are overweight, weight loss helps to reduce the pain and disability associated with knee osteoarthritis, can slow the progression of the disease and may even reverse cartilage damage (Ding et al. 2006). Similarly, avoiding prolonged standing, kneeling and squatting can improve symptoms in people with knee or hip osteoarthritis. This may be difficult because these activities are often part of a person's job. In these cases, an occupational therapist can advise on appropriate activities and recommend different ways of doing tasks so that the load on the affected joints is minimised.

For people with arthritis affecting the hands, flexible splinting of some joints in the hand can reduce unwanted motion and pain and may be useful for short periods, but used long term this can cause muscle wasting that is detrimental to joint function.

## RICE therapy

RICE therapy (rest, ice, compression and elevation) is used to manage acute flare-ups of arthritis symptoms. It is generally undertaken in the first 48 hours after an injury or flare-up of symptoms, to reduce pain and swelling. The joint is rested and kept in an elevated position, ice is applied for 10 minutes every 1–2 hours, and compression bandages or strapping are used to support the joint. Heat therapy should not be used during this time, but can be applied for pain relief after the initial 48-hour period.

Rest can also improve symptoms of rheumatoid arthritis.

## Use of medications

Medications are an important part of the management of arthritis. Prescribing, advising or supplying medications is the most common management action taken by general practitioners in consultations for osteoarthritis and rheumatoid arthritis. A wide variety of medications for the treatment of arthritis are available in Australia.

Medications can be obtained either by prescription or over the counter (that is, without a prescription). The major types of prescription and over-the-counter medications used in arthritis management are described in Chapter 4. Natural and herbal supplements, vitamins and minerals ('complementary medicines') are also widely available and commonly used, though evidence for the effectiveness of these types of medicines is limited. The complementary medicines most commonly used by people with arthritis are glucosamine and chondroitin (Box 5.2).

In the 2004–05 NHS, 19% of people with osteoarthritis and 47% of those with rheumatoid arthritis reported that they were taking at least one pharmaceutical (that is, medications other than complementary medicines) for their condition. Use of complementary medicines was reported by 28% of people with osteoarthritis and 19% of those with rheumatoid arthritis.

Pharmaceuticals commonly used for osteoarthritis include paracetamol and other analgesics, and non-steroidal anti-inflammatory drugs (NSAIDs) such as celecoxib. For rheumatoid arthritis, commonly used pharmaceuticals include paracetamol and other analgesics, NSAIDs, corticosteroids and disease-modifying anti-rheumatic drugs (DMARDs) such as methotrexate.

### Box 5.2: Glucosamine and chondroitin: complementary medicines commonly used for arthritis

*Glucosamine and chondroitin are the building blocks of one of the components of cartilage. Taking dietary supplements of these compounds may reduce pain in people with mild to moderate symptoms of osteoarthritis, although evidence for the effectiveness of these supplements is limited.*

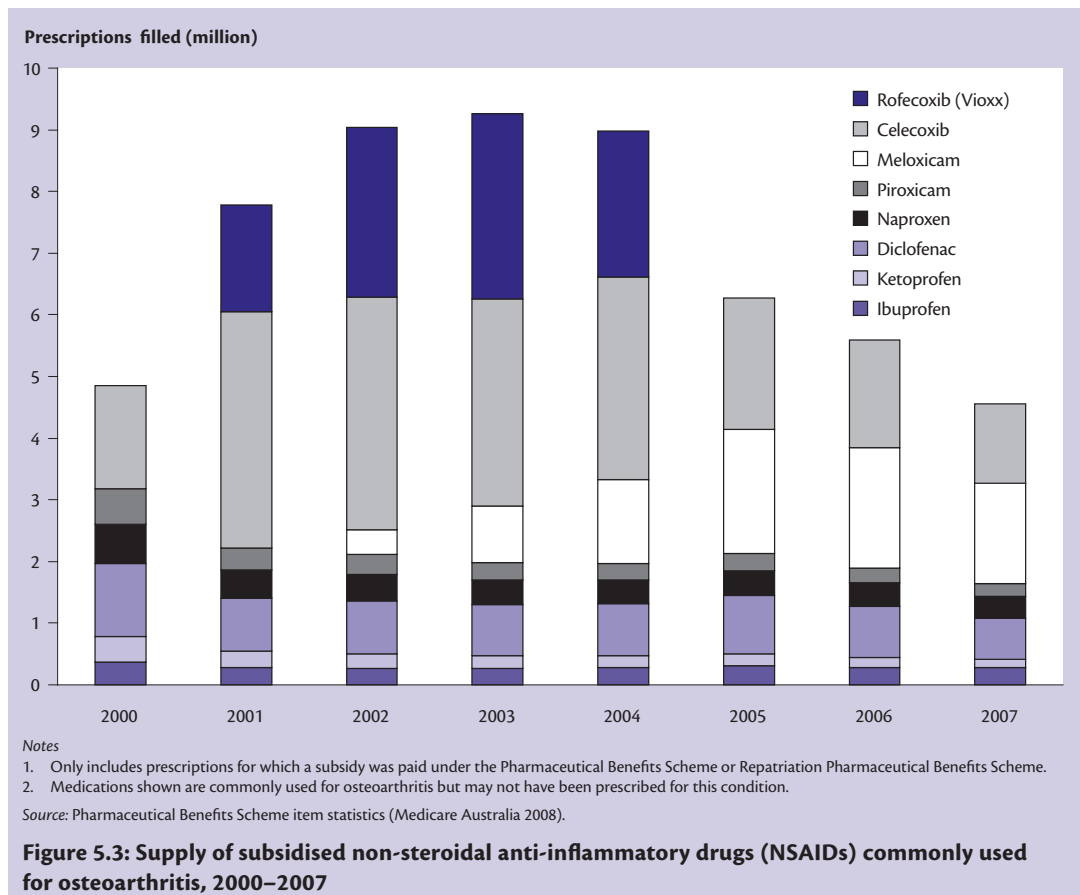
*Glucosamine comes in two forms: glucosamine sulphate and glucosamine hydrochloride. It is made from crab, lobster or shrimp shells, so it can have adverse effects in people allergic to seafood. Glucosamine can cause gastrointestinal upsets and be a problem for people with abnormal glucose tolerance.*

*Chondroitin is made from animal cartilage and can cause adverse effects in people taking blood-thinning agents such as heparin and warfarin.*

### Trends in pharmaceutical use

Between 2000 and 2005 there were significant changes in the type of NSAID prescriptions supplied with a subsidy from the Australian Government’s Pharmaceutical Benefits Scheme (PBS) or Repatriation PBS (Figure 5.3). This occurred because of the introduction of two COX-2 specific NSAIDs—rofecoxib (also known as Vioxx<sup>®</sup>) and celecoxib—into the schemes. The number of subsidised prescriptions filled for rofecoxib peaked in 2003, but in late 2004 the drug was recalled from the market because of increased risks of cardiovascular and renal complications. Over the following 12 months, the supply of celecoxib prescriptions decreased, while the supply of meloxicam increased. Over 2006 and 2007 the supply of celecoxib continued to decrease, but the number of meloxicam prescriptions was stable. The number of subsidised prescriptions filled for other NSAIDs (piroxicam, naproxen, diclofenac, ketoprofen and ibuprofen) declined between 2000 and 2001, but have since remained relatively steady.

Trends in the use of other subsidised pharmaceuticals commonly taken for osteoarthritis, including paracetamol, opioids and corticosteroids, are not shown here. These types of drugs can be used for many different conditions, and so the trend in supply may not be related to the treatment of osteoarthritis.



## Complications and comorbidities

'Complications' in this sense are health problems or other diseases a person may have as a result of their arthritis. These problems may be related to the disease process itself, or they may be a side-effect of arthritis treatment.

### *Complications in osteoarthritis*

As previously noted, osteoarthritis involves only the joints and the osteoarthritic process does not directly affect other parts of the body. As age increases, people with osteoarthritis are likely to also have other diseases, known as comorbid conditions. Although the presence of these comorbid conditions may affect the way that osteoarthritis is managed (for example, the type of medication taken), they are not complications of osteoarthritis.

One problem to which osteoarthritis may contribute is obesity. Joint pain and stiffness may make people with osteoarthritis reluctant to exercise, or they may have difficulty doing so, and this can lead to weight gain. As well as putting extra stress on the weight-bearing joints, obesity is a risk factor for many chronic diseases including heart disease, stroke and Type 2 diabetes, so maintaining a healthy weight is important. As described above, exercise and weight loss are essential therapies for arthritis, and activities can be tailored to ensure affected joints are properly supported.

Some of the medications used to manage osteoarthritis may cause adverse side effects, such as high blood pressure, heart failure, nausea and peptic ulcers. These are complications of osteoarthritis treatment. To reduce the risk of these side effects, medication should be used as instructed and monitored by a health professional. The types of medication used for arthritis are described in detail in Chapter 4.

### *Complications in rheumatoid arthritis*

In addition to joint deformities and associated disability, people with rheumatoid arthritis may experience a range of complications, resulting both from the disease process and from the medications used to manage it.

The underlying autoimmune process may attack tissues throughout the body, including the lungs, the membranes surrounding the heart, the eyes and occasionally the blood vessels. This can lead to potentially serious complications such as heart failure, heart attack, myocarditis (inflammation of the heart muscle), breathing difficulties and anaemia. Regular monitoring for signs of these conditions is necessary so that appropriate treatment or preventive action can be initiated as early as possible. Aggressive control of cardiovascular risk factors (blood pressure and cholesterol levels) is recommended (RACGP 2007).

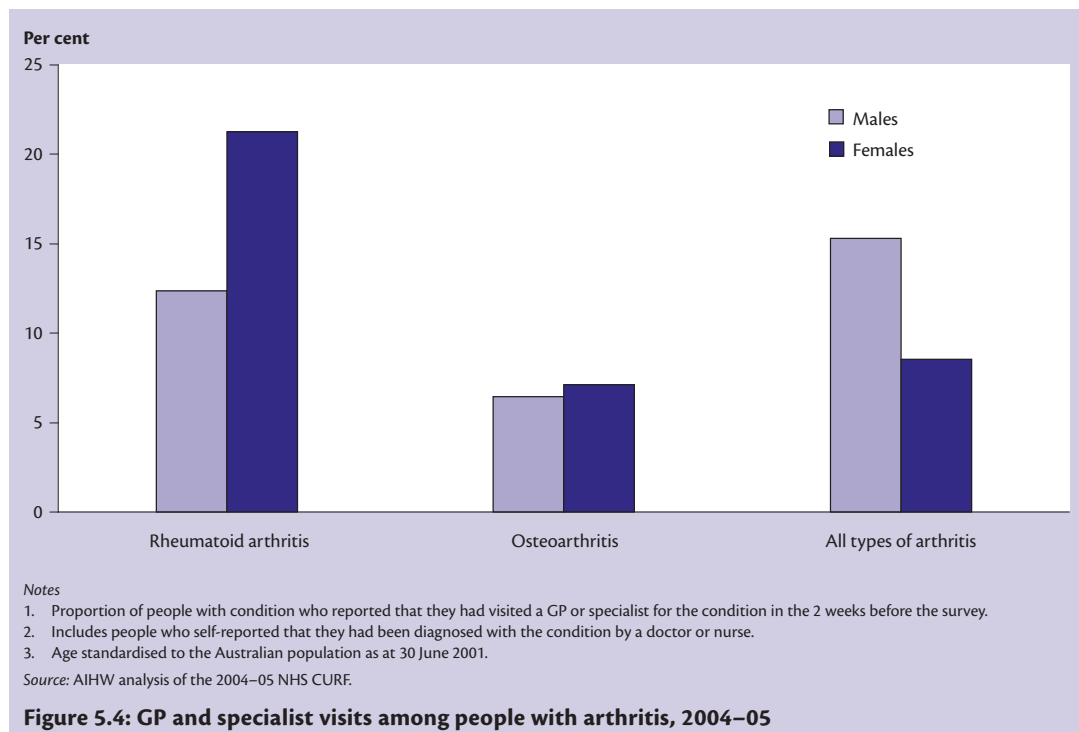
The medications used to manage rheumatoid arthritis can also have adverse side effects. These may include ulcers, osteoporosis, nausea, kidney problems, headaches and disruption of liver function. Some of the medications may depress the immune system, leading to increased risk of infections and immune-related diseases such as cancer (Sihvonen et al. 2004). Careful monitoring of medication use, regular testing for side-effects and early treatment of complications is needed (RACGP 2007). Detailed information about the various types of medication used in rheumatoid arthritis management is provided in Chapter 4.

People with rheumatoid arthritis have an increased risk of premature death, with a life expectancy on average 5–10 years younger than the general population (Kvien 2004). Begg et al. (2007) estimated that more than 1,600 years of life lost in Australia in 2003 could be directly attributed to rheumatoid arthritis. Cardiovascular disease and cancers are the most common causes of death in people with the disease.

## Management by GPs and specialists

General practitioners play a central role in the management of arthritis in the community. This role includes assessment, prescription, education, referral and review. Specialist services are also important, particularly for people with rheumatoid arthritis and among those for whom surgery is being considered.

In the 2004–05 NHS, 6% of males and 7% of females with osteoarthritis reported that they had visited a GP or specialist for their condition in the 2 weeks before the survey was conducted (Figure 5.4). Among people with rheumatoid arthritis, 12% of males and 21% of females reported visiting a GP or specialist for their condition during that 2-week period.



## Services provided by GPs

The BEACH survey of general practice found that osteoarthritis was the eighth most common problem managed by GPs in 2007–08 (Britt et al. 2008). Osteoarthritis made up 1.7% of all problems managed by GPs in that year, and was managed in 26 out of every 1,000 encounters (more than one problem can be managed at each encounter). This equates to almost 2.8 million Medicare-paid GP consultations between 1 April 2007 and 31 March 2008. Of osteoarthritis problems managed by GPs, 20% were new problems (that is, the first presentation of the problem to a medical practitioner).

Rheumatoid arthritis is less commonly managed by GPs than osteoarthritis. This most likely reflects the lower prevalence of rheumatoid arthritis and the greater role of specialists in its management. Rheumatoid arthritis made up 0.3% of problems managed by GPs in 2007–08, managed at 5 out of every 1,000 encounters. Twelve per cent of rheumatoid arthritis problems managed by GPs were new problems.

**Table 5.2: Management provided by general practitioners for osteoarthritis and rheumatoid arthritis, 2007–08**

Type of management	Osteoarthritis (OA)		Rheumatoid arthritis (RA)	
	Per cent <sup>(a)</sup> of all OA encounters (n = 2,474)	Per cent <sup>(a)</sup> of new OA encounters <sup>(b)</sup> (n = 485)	Per cent <sup>(a)</sup> of all RA encounters (n = 435)	Per cent <sup>(a)</sup> of new RA encounters <sup>(b)</sup> (n = 53)
Medications	70	63	69	70
Referrals	11	13	14	34
<i>Orthopaedic surgeon</i>	5	4	0	0
<i>Physiotherapist</i>	3	5	2	12
<i>Rheumatologist</i>	1	2	9	23
Pathology	2	3	18	16
<i>C-reactive protein</i>	—	1	6	6
<i>Erythrocyte sedimentation rate</i>	—	—	8	9
<i>Full blood count</i>	—	2	15	9
<i>Liver function test</i>	—	1	9	2
<i>Rheumatoid factor</i>	—	—	2	6
Imaging	14	36	6	24

— less than 1%

(a) Per cent of encounters where at least one management action of this type was undertaken. Where more than one such action has been undertaken in a single encounter it has been counted once, for example, if two medications were prescribed at a single encounter it was counted once.

(b) Encounters where the problem was being presented to a medical practitioner for the first time.

Source: AIHW analysis of the 2007–08 BEACH survey.

GPs manage osteoarthritis and rheumatoid arthritis using a variety of strategies (Table 5.2). Medication is the most common management strategy employed for arthritis by GPs, with at least one medication being prescribed, advised or supplied in 70% of encounters for osteoarthritis and 69% of those for rheumatoid arthritis in 2007–08. As might be expected, imaging and referrals were more commonly used for new problems than for existing problems.

The most common medications prescribed, advised or supplied for osteoarthritis were paracetamol (prescribed/advised in 23% of encounters), meloxicam (13%) and celecoxib (8%), with methotrexate (20% of rheumatoid arthritis encounters), paracetamol (8%) and meloxicam (7%) being the most commonly prescribed, advised or supplied medications for rheumatoid arthritis (Table 5.3).



**Table 5.3: Top 10 medications prescribed, advised or supplied by GPs for osteoarthritis and rheumatoid arthritis, 2007–08**

Osteoarthritis (n = 2,474)			Rheumatoid arthritis (n = 435)		
Medication	Class	Per cent <sup>(a)</sup>	Medication	Class	Per cent <sup>(a)</sup>
Paracetamol	Non-opioid analgesic	23	Methotrexate	DMARD	20
Meloxicam	NSAID (COX-2)	13	Paracetamol	Non-opioid analgesic	8
Celecoxib	NSAID (COX-2)	8	Meloxicam	NSAID (COX-2)	7
Paracetamol/Codeine	Opioid analgesic	7	Prednisolone	Corticosteroid	6
Tramadol	Opioid analgesic	4	Hydroxychloroquine sulphate	DMARD	6
Diclofenac sodium systemic	NSAID	4	Celecoxib	NSAID (COX-2)	5
Glucosamine	Natural medicine	4	Diclofenac sodium systemic	NSAID	3
Oxycodone	Opioid analgesic	3	Sulfasalazine digestive	DMARD	3
Naproxen	NSAID	2	Tramadol	Opioid analgesic	3
Buprenorphine	Opioid analgesic	2	Prednisone	Corticosteroid	3

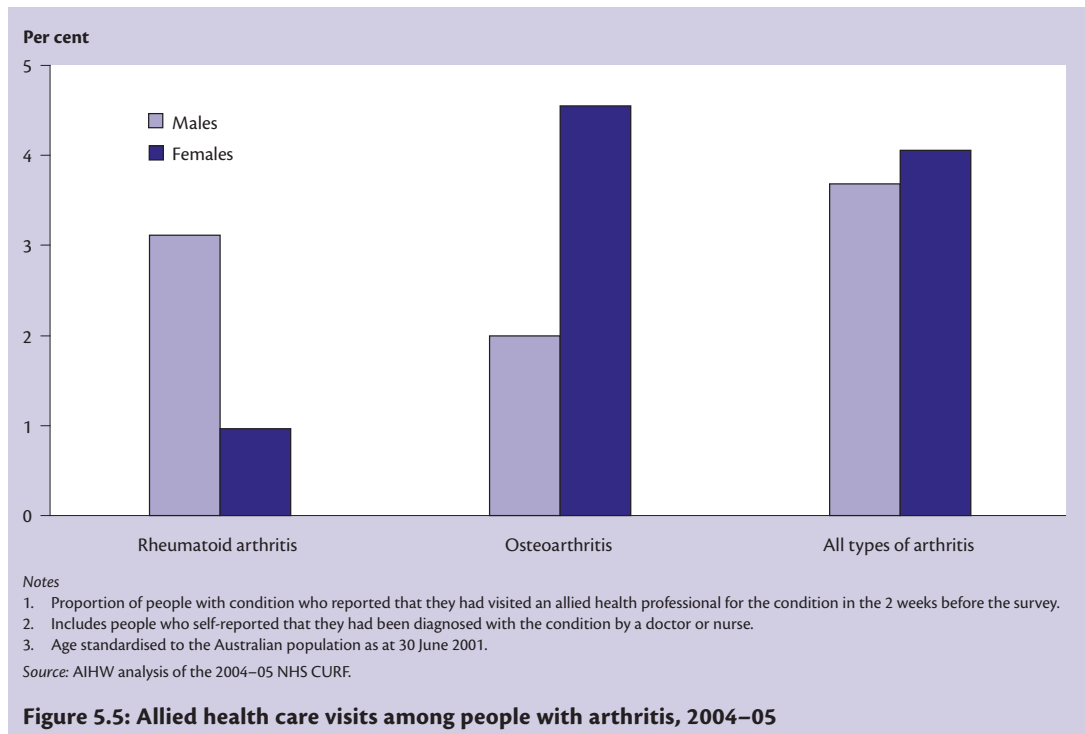
(a) Per cent of encounters for the condition in which the medication was prescribed, advised or supplied for that condition.

Source: AIHW analysis of the 2007–08 BEACH survey.

## Use of allied health services

Allied health and complementary practitioners (such as physiotherapists, podiatrists, occupational therapists, pharmacists, massage therapists, osteopaths and chiropractors) play important roles in the management of arthritis. The treatment that allied health professionals provide is generally aimed at improving body structure or function. They may also recommend or provide information about self-management (including exercises, activities and other therapies) and suggest environmental adjustments that can be made to help people overcome functional limitations, maintain independence and reduce the risk of injury.

Among respondents to the 2004–05 NHS who reported a diagnosis of rheumatoid arthritis or osteoarthritis, few people (2% and 4%, respectively) reported that they visited allied health professionals for their condition in the 2 weeks before the survey was conducted (Figure 5.5).



## Surgery

Surgery can be a very useful and successful form of management for arthritis, particularly in people with severe disease. A number of procedures are available (Box 5.3), of which joint replacement (also called ‘arthroplasty’) is the most common.

In 2006–07, almost 99,000 surgical procedures were performed on people with the principal diagnosis of osteoarthritis, and over 5,000 procedures were performed on people with the principal diagnosis of rheumatoid arthritis (Table 5.4). The average length of stay in hospital was 6.9 days for surgery due to osteoarthritis and 10.5 days for surgery due to rheumatoid arthritis. Knee and hip replacements were the most common procedures performed for osteoarthritis, whereas knee replacement and excision of lesion of soft tissue were the most common procedures performed for rheumatoid arthritis.

### Box 5.3: Common surgical procedures for arthritis

**Osteotomy:** to cut or reshape bone. It is performed to slow the progression of disease, especially when wear is occurring on a single disc of cartilage.

**Arthroscopy:** to look inside the joint. This procedure is used in the early stages of osteoarthritis for temporary symptom relief and to know what is happening in the joint. This procedure may be accompanied with a meniscectomy, where all or part of a torn meniscus is removed, and other repairs such as debridement, osteoplasty or chondroplasty (described below).

- **Debridement:** the surgical removal of lacerated, devitalized, or contaminated tissue.
- **Osteoplasty:** replacement of lost bone tissue or reconstruction of defective bony parts.
- **Chondroplasty:** shaving of articular cartilage.
- **Incision:** a cut or wound of body tissue made especially in surgery.
- **Excision:** surgical removal of all or part of diseased tissue or organ.

**Arthrodesis:** where bones within a joint are fused together. This procedure can successfully relieve pain and is most commonly performed in the spine and in the small joints of the wrist, hand and foot.

**Arthroplasty:** joint replacement, or to replace some or all of the bones in the joint with artificial components. It is the most common surgical treatment of the osteoarthritic hip, knee and shoulder joint; the pain and disability of severe osteoarthritis can be reduced, restoring some patients to near-normal function.

**Table 5.4: Most common surgical procedures performed in separations with the principal diagnosis of osteoarthritis or rheumatoid arthritis, 2005–06**

Principal diagnosis	Procedure	Number	Per cent <sup>(a)</sup>
<b>Osteoarthritis</b>	Total arthroplasty of knee, unilateral	24,462	25
	Total arthroplasty of hip, unilateral	17,829	18
	Arthroscopic meniscectomy of knee with debridement, osteoplasty or chondroplasty	9,344	9
	Hemiarthroplasty of knee	3,208	3
	Arthroscopic debridement of knee	2,033	2
	Other	41,893	42
	<b>Total</b>		<b>98,769</b>
<b>Rheumatoid arthritis</b>	Total arthroplasty of knee, unilateral	312	6
	Excision of lesion of soft tissue, not elsewhere classified	245	5
	Administration of agent into joint or other synovial cavity, not elsewhere classified	225	4
	Arthrodesis of 1st metatarsophalangeal joint	177	3
	Aspiration of joint or other synovial cavity, not elsewhere classified	173	3
	Other	4,303	79
	<b>Total</b>		<b>5,435</b>

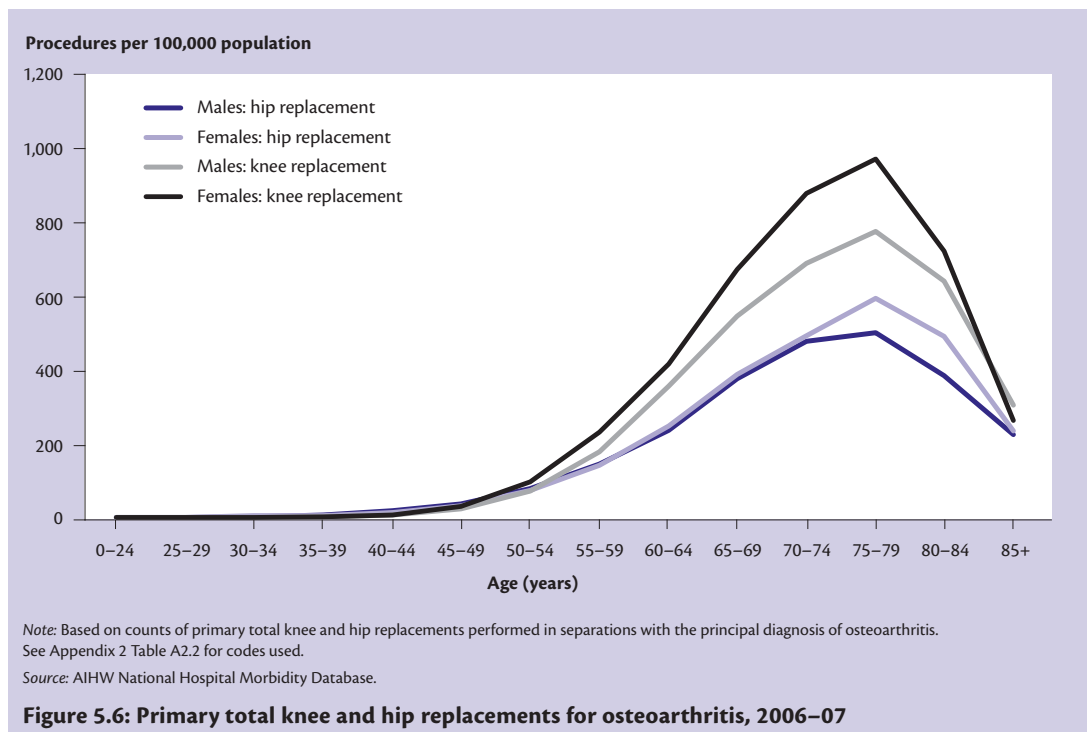
(a) Per cent of total surgical procedures performed for the condition.

Source: AIHW National Hospital Morbidity Database.

**Joint replacement**

Joint replacement has been one of the most significant advancements in the management of osteoarthritis during the last few decades. This procedure has become more accessible because of improvements in surgical techniques and anaesthesia, and better blood products used during surgery. Total joint replacement is generally indicated when a person no longer responds to less invasive forms of management and the pain and/or loss of function experienced makes normal daily living difficult.

Rates of primary total knee and hip replacement in people with the principal diagnosis of osteoarthritis are highest in the 75–79 years age group (Figure 5.6). The procedure rate among females is higher than among males, particularly for knee replacement. This is most likely a result of the higher prevalence of osteoarthritis in females.



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