



**Australian Government**

**Australian Institute of  
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# **Health-care expenditure on arthritis and other musculoskeletal conditions 2008–09**

ARTHRITIS SERIES NO. 20



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*Authoritative information and statistics  
to promote better health and wellbeing*

ARTHRITIS SERIES

Number 20

# **Health-care expenditure on arthritis and other musculoskeletal conditions 2008–09**

Australian Institute of Health and Welfare  
Canberra

Cat. no. PHE 177

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### **Australian Institute of Health and Welfare**

Board Chair  
Dr Andrew Refshauge

Director  
David Kalisch

Any enquiries about or comments on this publication should be directed to:

Digital Communications and Media Unit  
Australian Institute of Health and Welfare  
GPO Box 570  
Canberra ACT 2601  
Tel: (02) 6244 1032  
Email: [info@aihw.gov.au](mailto:info@aihw.gov.au)

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# Acknowledgments

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# Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
bDMARD	biologic disease-modifying anti-rheumatic drug
BEACH	Bettering the Evaluation and Care of Health survey
DMARD	disease-modifying anti-rheumatic drug
GP	general practitioner
HSD	Highly Specialised Drugs
ICD-10	International Classification of Diseases and Health-related Problems, 10th revision (used in Australia for mortality data)
ICD-10-AM	International Classification of Diseases and health-related problems, 10th revision, Australian Modification (used in Australia for hospital morbidity data)
MBS	Medicare Benefits Schedule
NHCDC	National Hospital Cost Data Collection
NHMD	National Hospital Morbidity Database
NHS	National Health Survey
NMDS	National Minimum Data Set
NPHEd	National Public Hospitals Establishments Database
NSAID	non-steroidal anti-rheumatic drug
PBS	Pharmaceutical Benefits Scheme
RPBS	Repatriation Pharmaceutical Benefits Scheme

# Symbols

n.p.	not publishable because of small numbers, confidentiality or other concerns about the quality of the data
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# Summary

This report provides information about Australia's health-care expenditure on arthritis and other musculoskeletal conditions, including that on patterns of expenditure by health-care sector, type of musculoskeletal condition, age group, sex and over time.

The main findings of the report are that, in 2008–09:

- In Australia, estimated health-care expenditure on arthritis and other musculoskeletal conditions totalled \$5,690 million – the fourth most expensive disease group, accounting for 9% of total health-care expenditure allocated to hospital admitted patient services, out-of-hospital medical services and prescription pharmaceuticals (\$65,129 million).
- Osteoarthritis accounted for 29% of health-care expenditure on arthritis and other musculoskeletal conditions (\$1,637 million), followed by back problems (\$1,177 million or 21%), rheumatoid arthritis (\$355 million or 6%) and osteoporosis (\$306 million or 5%). The remaining expenditure (39%) was distributed across the broad range of 'other' musculoskeletal conditions.
- More than half (54%) of the health-care expenditure on arthritis and other musculoskeletal conditions was on hospital admitted patient services (\$3,091 million), followed by 30% on out-of-hospital medical expenses (\$1,677 million) and 16% on prescription pharmaceuticals (\$922 million).
- The pattern of expenditure across health-care sectors varied markedly among musculoskeletal conditions. For example, the majority of expenditure for rheumatoid arthritis and osteoporosis was on pharmaceuticals (77% and 63%, respectively) and the largest proportion for osteoarthritis was on admitted patient hospital services (77%).
- Health-care expenditure on arthritis and other musculoskeletal conditions was greatest for people aged 65–74 (\$1,245 million) although the per person expenditure was highest for people aged 75–84 (an average of \$1,007 per person aged 75–84).
- Health-care expenditure on these arthritis and other musculoskeletal conditions overall was higher for females than males (an average of \$301 per female compared with \$229 per male).

It is difficult to compare absolute expenditure estimates over time due to data limitations and method changes; however, the patterns of expenditure by health sector have remained relatively stable, with expenditure on hospital admitted patient services being the dominant component of expenditure at all three time points in recent estimates (2000–01, 2004–05 and 2008–09).

Data are drawn from the AIHW Disease Expenditure Database, with a focus on estimates for 2008–09, the most recent year for which data are available.

The term 'expenditure' used in this report refers to expenditure through the health system that can be allocated by disease, and covers about 70% of total health-care expenditure in Australia. This method has various limitations, described in detail in the report, which mean that the expenditure information presented here underestimates the total cost of arthritis and other musculoskeletal conditions to the community. While these limitations affect the absolute estimates of disease expenditure (total dollars), they do not notably affect the relative expenditure (or rankings) across disease groups.

# 1 Introduction

This report presents information about Australia's health-care expenditure on arthritis and other musculoskeletal conditions in 2008–09. This includes information on patterns of expenditure by health-care sector, type of musculoskeletal condition, age group, sex and over time.

Arthritis and other musculoskeletal conditions are a diverse group of over 150 different conditions, including various forms of arthritis, back problems and osteoporosis (WHO Scientific Group 2003).

This report presents detailed expenditure estimates for four conditions: osteoarthritis, rheumatoid arthritis, back problems and osteoporosis, with other conditions not covered by these categories presented under the heading 'other' musculoskeletal conditions. A brief overview of these musculoskeletal conditions is provided in Box 1.1.

## **Box 1.1: Arthritis and other musculoskeletal conditions covered in this report**

***Osteoarthritis:*** A degenerative joint condition that mostly affects the hands, spine and joints such as the hips, knees and ankles. Its main feature is the breakdown of the cartilage that overlies the ends of the bones in the joints. Age is the strongest factor in the development and progression of osteoarthritis. Other more modifiable risk factors are being overweight, physical inactivity, joint trauma and repetitive joint loading tasks (for example, kneeling, squatting and heavy lifting).

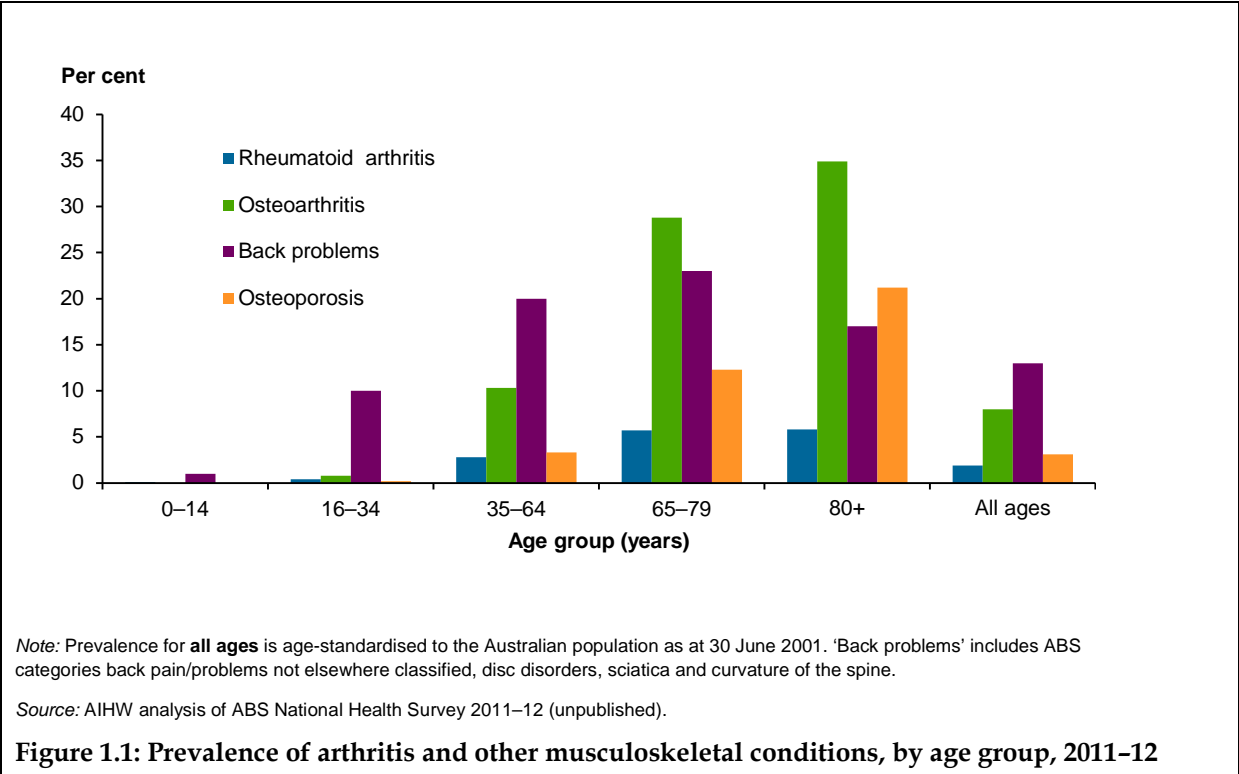
***Rheumatoid arthritis:*** A chronic disease marked by inflammation of the joints, most often affecting the hand joints in a symmetrical fashion (that is, both sides of the body are affected at the same time). The immune system attacks the tissues lining the joints, causing pain, swelling and stiffness. Over time there is progressive and irreversible joint damage, resulting in deformities and severe disability. The exact cause of rheumatoid arthritis is not well understood although there is a strong genetic component.

***Back problems:*** Back problems are a range of conditions related to the bones, joints, connective tissue, muscles and nerves of the back. Back problems here include back pain or problems where there is no identifiable cause or diagnosis, disc disorders, sciatica and curvature of the spine. The occurrence of back problems can be associated with several factors such as age, physical fitness, smoking, being overweight and type of occupation (for example, those requiring lifting, bending, twisting, pulling and pushing).

***Osteoporosis:*** Thinning and weakening of bones often occurs with age, increasing the risk of fracture. Osteoporosis occurs in both sexes but is more common in women. The risk factors associated with the development of osteoporosis include increasing age, female sex, family history of the condition, low vitamin D levels, low intake of calcium, low body weight, smoking, excess alcohol consumption, physical inactivity, long-term corticosteroid use and reduced oestrogen levels.

***'Other' musculoskeletal conditions:*** These include specific conditions such as gout, juvenile arthritis, ankylosing spondylitis and systemic lupus erythematosus and broad categories such as systemic connective tissue disorders, soft tissue disorders, osteopathies and chondropathies, and other disorders of the musculoskeletal system and connective tissue.

Arthritis and other musculoskeletal conditions are very common in Australia, affecting more than one-quarter of Australians or 6.1 million people (28% of the total population) in 2011–12 (ABS 2012). The most commonly reported musculoskeletal conditions are arthritis (including osteoarthritis, rheumatoid arthritis, juvenile idiopathic arthritis and other forms of arthritis), affecting an estimated 3.3 million people; back problems (affecting 3 million people, including 1.8 million people with back pain/back problems not further classified and 1.2 million people reporting diagnosed disc disorders, sciatica or curvature of the spine); and osteoporosis, affecting 728,000 people. Arthritis and other musculoskeletal conditions (particularly back problems) are most common among the older population, but are also experienced by younger age groups (Figure 1.1).



Arthritis and other musculoskeletal conditions may have a substantial impact on the health and quality of life of those affected. While rarely a direct cause of death, these conditions are a major cause of pain, fatigue, deformity, mobility limitations and functional impairment (for example, difficulty gripping, lifting, climbing stairs). They are a major cause of disability, with 44% of all people with arthritis and other musculoskeletal conditions reporting activity limitations in daily tasks such as self-care and mobility (AIHW 2012).

The overall burden of these conditions is high, both in Australia and internationally. For example, according to the Global Burden of Disease 2010 Study, the burden of low back pain is ranked sixth in the world and first in Australasia (Australia and New Zealand); neck pain, twenty-first in the world and tenth in Australasia; and osteoarthritis, thirty-eighth in the world and twenty-third in Australasia (Hoy et al. 2014a, 2014b; Murray et al. 2012).

The ongoing management of musculoskeletal conditions involves a combination of self-management, primary care (that is, care provided by general practitioners (GPs) and allied health service providers such as physiotherapists, exercise physiologists, pharmacists and podiatrists), care delivered by medical specialists in the community, care provided in hospitals and prescribed medication.

## 2 Methods and limitations

Generally, the method for estimating disease expenditure is a mixture of ‘top-down’ and ‘bottom-up’ approaches, where total expenditure across the health system is estimated and then allocated to the relevant conditions based on the available service use data. This method yields consistency, good coverage and totals that add up to known expenditure but it is not as comprehensive for any specific disease as a detailed ‘bottom-up’ analysis, which would include the actual costs incurred for that disease. In most cases, however, a lack of data means that a more granular ‘bottom-up’ analysis is not possible.

In interpreting this report, readers should be aware that ‘expenditure’ estimates refer only to the 70% of total recurrent health-care expenditure (that is, non-capital expenditure on health goods and services through the health system) in Australia that can be allocated to disease groups. A summary of the inclusions and exclusions of the Australian Institute of Health and Welfare (AIHW) Disease Expenditure Database, as applied to the health conditions in this report, is provided in Table 2.1. Further details on methods and limitations are included in this chapter and at Appendix B.

### The AIHW Disease Expenditure Database

The main source of information for this report is the AIHW Disease Expenditure Database. It provides a broad picture of the use of health system resources classified by disease group, and is a reference source for planners and researchers interested in costs and use patterns for particular disease groups. This information is also useful for comparing expenditure for different diseases and for ranking diseases by levels of expenditure.

Estimates in the Disease Expenditure Database are derived by combining information from the National Hospital Morbidity Database (NHMD), the National Public Hospitals Establishments Database (NPHED), the Health Expenditure Database, the National Hospital Cost Data Collection (NHCCDC) and the Bettering the Evaluation and Care of Health (BEACH) survey.

The Disease Expenditure Database contains estimates of expenditure by disease category, age group and sex for admitted patient hospital services, out-of-hospital medical expenses, prescription pharmaceuticals, optometry and dental services, community mental health services and public health cancer screening.

The areas of expenditure that apply to arthritis and other musculoskeletal conditions – and hence are included in this report – are:

- hospital admitted patient services
- out-of-hospital medical expenses
- prescription pharmaceuticals.

Funding for these health-care sectors comes from both government and non-government sources (including private health insurance and individuals).

The AIHW is continually seeking to improve the methods used to produce these estimates. As a consequence, disease expenditure estimates are subject to revision and the most recently published results may not be directly comparable with previously published data.

A data quality statement for the Disease Expenditure Database is at Appendix B. It provides further information on aspects of the quality of the data being reported by the AIHW and is included to help readers understand the limitations of the data and make informed judgments about their use of the data.

### **Health-care expenditure exclusions and other data limitations**

It is not possible to allocate all expenditure on health goods and services by disease. Expenditure on non-admitted hospital patient services and most community and public health programs, for instance, which support the treatment and prevention of many conditions, cannot be allocated to one specific disease or injury. This is also true of capital expenditure on health facilities and equipment.

Table 2.1 summarises the areas for which health expenditure can (inclusions) and cannot (exclusions) be allocated by disease in the 2008–09 Disease Expenditure Database. Further details on specific areas of expenditure also follow.

Readers need to bear in mind that cost-of-illness data provide estimates only of the impact a disease has on health-care expenditure. The estimates of the cost of treating and/or preventing a disease cannot be used to indicate the loss of health due to that disease.

For example, indirect costs such as loss of productivity related to illness, and costs associated with lost productivity due to carers having to take time off to care for a person with arthritis or another musculoskeletal condition, are not included in the Disease Expenditure Database. They are, however, likely to constitute a high financial burden for people with these conditions and their families, friends and society in general, through lost productivity and the considerable cost of ongoing management and treatment.

Care should be taken not to interpret expenditure associated with disease treatment as simply an estimate of the savings that would result from prevention of disease. Conversion of the opportunity cost – or the benefits forgone – of resources being devoted to disease treatment into expenditure savings involves a number of additional considerations. See, for example, *Disease costing methodology used in the disease costs and impact study 1993–94* (AIHW: Mathers et al. 1998).

**Table 2.1: AIHW Disease Expenditure Database: inclusions and exclusions for analysis presented in this report**

<b>Area of expenditure</b>	<b>Inclusions</b>	<b>Exclusions</b>
<b>Hospital expenses</b>	Cost of services for admitted patients in: <ul style="list-style-type: none"> <li>• public hospitals</li> <li>• private acute hospitals</li> <li>• psychiatric hospitals</li> <li>• medical services provided to private admitted patients in hospitals</li> </ul>	Costs for: <ul style="list-style-type: none"> <li>• non-admitted patient hospital services</li> <li>• Highly Specialised Drugs</li> </ul>
<b>Out-of-hospital medical expenses</b>	Cost of services provided by, or on behalf of, registered medical practitioners that are funded by: <ul style="list-style-type: none"> <li>• Medicare Benefits Schedule (MBS)</li> <li>• Department of Veterans Affairs</li> <li>• compulsory motor vehicle third-party insurance</li> <li>• workers' compensation insurance</li> <li>• private health insurance funds</li> <li>• Australian Government premium rebates allocated to medical services</li> <li>• MBS co-payments and other out-of-hospital pocket payments</li> <li>• non-MBS medical services (such as provision of vaccines for overseas travel)</li> </ul>	Costs for: <ul style="list-style-type: none"> <li>• medical services provided to public patients at outpatient clinics in public hospitals</li> <li>• residential aged care</li> <li>• other health practitioner services</li> <li>• community health services expenditure</li> <li>• expenditure on public health programs</li> <li>• health administration, health aids and appliances, and patient transport (ambulance)</li> </ul>
<b>Pharmaceuticals</b>	Costs for: <ul style="list-style-type: none"> <li>• pharmaceuticals under the Pharmaceutical Benefits Scheme (PBS)</li> <li>• Repatriation Pharmaceutical Benefits Scheme (RPBS)</li> <li>• under co-payment prescriptions (those pharmaceuticals listed in the PBS and RPBS, the total costs of which are equal to or less than the statutory patient contribution for the class of patient concerned)</li> <li>• private prescriptions (pharmaceuticals dispensed through private prescriptions that do not fulfil the criteria for payment or benefit under the PBS or RPBS)</li> </ul>	Costs for over-the-counter drugs (including pain medications, vitamins, herbal and other complementary medicines)
<b>Capital costs</b>	Nil	Excluded because not possible to allocate to specific diseases
<b>Indirect costs</b>	Nil	Costs include: <ul style="list-style-type: none"> <li>• loss of productivity</li> <li>• travel costs of patients</li> <li>• costs incurred by carers and family</li> <li>• informal community care costs</li> <li>• costs relating to lost quantity and quality of life</li> <li>• community non-health services costs (for example, home help, Meals on Wheels)</li> </ul>

### **Hospital admitted patient services**

Expenditure on hospital admitted patient services refers to the cost of services for admitted patients in both public and private acute hospitals and psychiatric hospitals, as well as expenditure on medical services provided to private admitted patients in hospitals.

Expenditure on hospital admitted patient services is based on hospitalisations (episodes of care) using the principal diagnosis for each hospitalisation, with diagnosis information coded to the International Classification of Diseases, Tenth Revision, Australian Modification (ICD-10-AM). No expenditure is allocated for additional diagnoses recorded during these hospitalisations. This means that, for example, health complications, such as fractures associated with osteoporosis, are not included in the musculoskeletal expenditure component unless osteoporosis is classified in the underlying hospital data as the principal diagnosis.

In this report, expenditure was assigned to arthritis and other musculoskeletal conditions when the principal diagnosis was between ICD-10-AM codes M00 and M99. The codes used for specific conditions are listed in Table 2.2. It should be noted that grouping a large number of diseases for analytical purposes, as has been done with 'other' musculoskeletal conditions, has the potential to mask expenditure patterns for individual diseases within this group.

**Table 2.2: ICD-10-AM codes used for arthritis and other musculoskeletal conditions**

<b>Condition</b>	<b>ICD-10-AM codes</b>
Osteoarthritis	M15–19
Rheumatoid arthritis	M05–06; M08
Back problems	M46.4; M46.9; M47; M48.0–48.2; M48.8–48.9; M50; M51; M53; M54
Osteoporosis	M80–82
'Other' musculoskeletal conditions	Remaining of above unallocated M00–M99 codes
<b>All musculoskeletal conditions</b>	<b>M00–M99 (the above disease codes are subcomponents of the group)</b>

Expenditure on Highly Specialised Drugs in hospitals has not been included in the AIHW Disease Expenditure Database.

### **Out-of-hospital medical expenses and prescription pharmaceuticals**

The prevention, management and treatment of arthritis and other musculoskeletal conditions beyond hospital settings cannot be examined in detail because there is very little or no information about primary health care activity in relation to arthritis and other musculoskeletal conditions. Except for data collected about GP activity through the BEACH survey, there is very little information on primary health care activity (such as public and private allied health services, state-funded community health services, pharmacy, ambulance and tele-health services) or specialist consultations. Similarly, while prescription pharmaceutical data can be used in some specific circumstances to better understand disease management, it is limited because it lacks information about the diagnosis for which the medication was prescribed.

Expenditure estimates for out-of-hospital medical expenses and prescription pharmaceuticals presented in this report are derived using the BEACH survey in conjunction with data from other sources including the MBS, PBS, RPBS, and script volumes for private and under co-payment drugs. (Under co-payment drugs are those pharmaceuticals listed in the PBS or RPBS, the total costs of which are equal to or less than the statutory patient contribution for the class of patient concerned.) The BEACH data were collected by the Family Medicine Research Centre of the University of Sydney under a previous collaboration with the AIHW. BEACH is a sample survey of GPs and their encounters with patients. It is subject to the inherent limitations of a survey methodology, including questions about how representative the survey is of the target population. Hence, results based on BEACH analysis should be interpreted cautiously.

For out-of-hospital medical expenses, the BEACH survey data were aggregated over 3 years to ensure the sample size was sufficiently large to perform the analysis required. The aggregated data were used to estimate the proportion of GP encounters in which a musculoskeletal condition was a 'problem managed'. This proportion was then applied to the MBS data for the reference year. Based on this method, expenditure can be allocated for GP visits and referrals to medical specialists, pathology and imaging, referred to throughout this report as out-of-hospital medical expenses.

For prescription pharmaceuticals, the BEACH survey data were aggregated over 3 years to allocate expenditure on prescription drugs to each disease group, based on the problems managed in the GP encounter that related to the prescribing of a particular drug. The Anatomical Therapeutic Chemical Classification System codes were mapped to codes for prescription drugs used in the BEACH survey. Relevant proportions were applied to data from the PBS and the RPBS, which describe pharmaceuticals for which benefits have been paid or are payable. Also included are the costs for under co-payment prescriptions and private prescriptions. (As indicated above, under co-payment prescriptions are those pharmaceuticals listed in the PBS or RPBS, the total costs of which are equal to or less than the statutory patient contribution for the class of patient concerned. Private prescriptions are those pharmaceuticals dispensed through private prescriptions that do not fulfil the criteria for payment or benefit under the PBS or RPBS.)

The method for distributing prescription medicines expenditure by disease relies entirely on general practice prescription data. For diseases where a considerable proportion of prescriptions are made by medical specialists, this may not accurately reflect prescription medicine expenditure because it assumes that prescribing patterns for GPs and medical specialists are the same.

### **Per person expenditure**

All per person calculations of expenditure in this report have been derived using the whole Australian population as at 30 December 2008 as the denominator (ABS 2013). This method has been adopted to align with other related expenditure reporting (for example, AIHW 2014a) and to avoid reliance on self-reported prevalence data from the Australian Bureau of Statistics (ABS) National Health Survey (NHS) for specific musculoskeletal diseases.

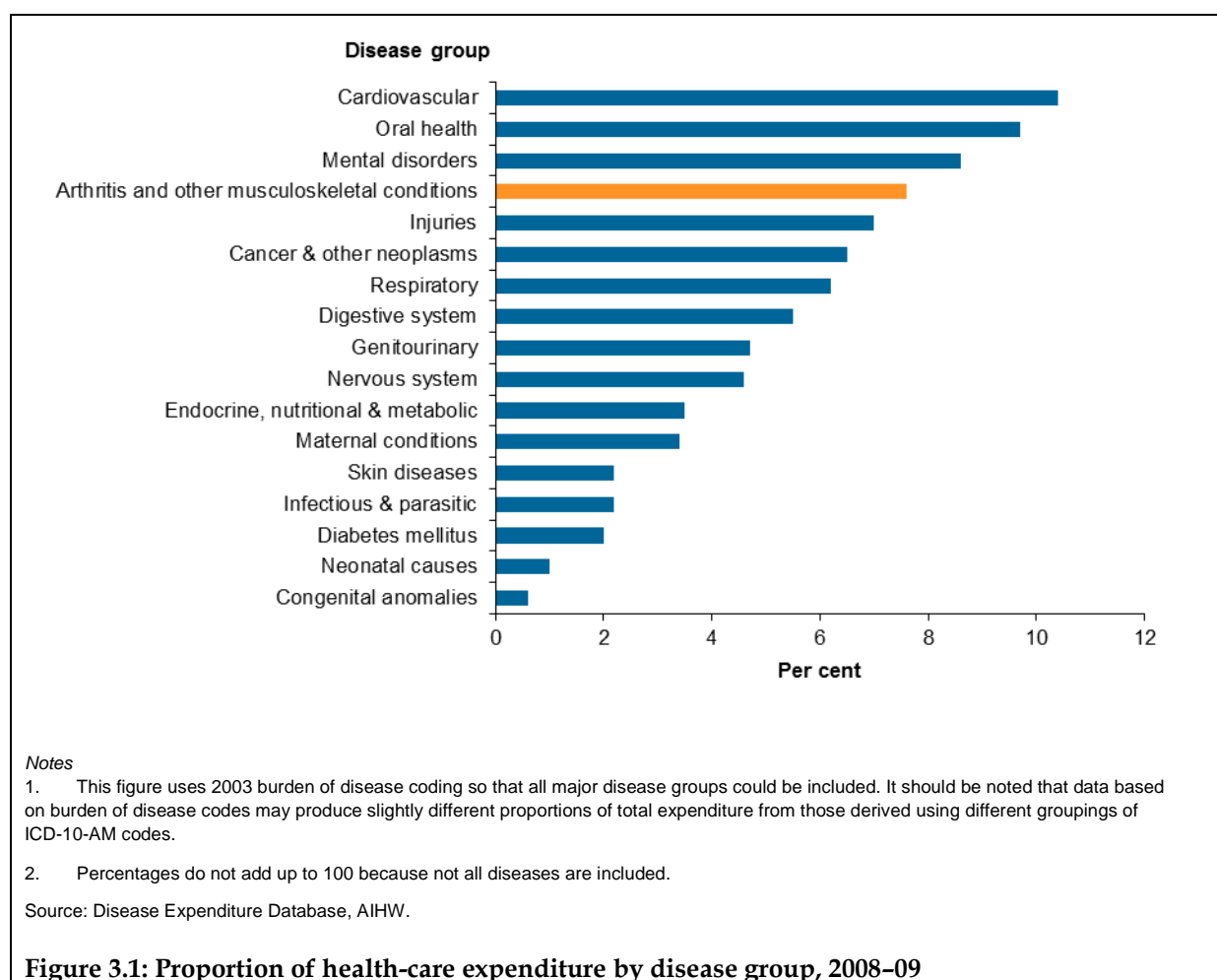
This approach results in much lower per person costs than would have been the case if the numbers of people who had the disease (prevalence data) had been used. The method used here, however, does provide a valid measure of per capita expenditure that can be used to compare both individual diseases and results over time.

### 3 How much is spent on arthritis and other musculoskeletal conditions in Australia?

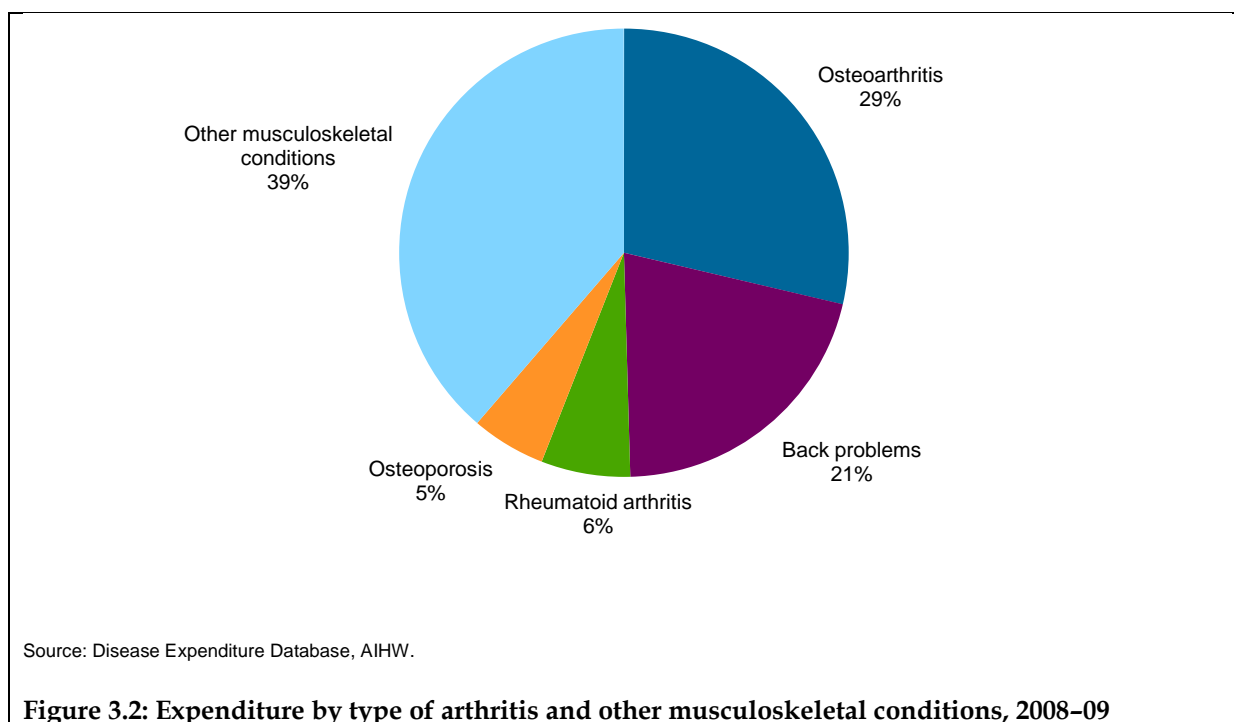
#### Overall expenditure

In 2008–09, arthritis and other musculoskeletal conditions accounted for 8.7% of estimated health-care expenditure allocated to disease groups in Australia – that is, \$5,690 million of the \$65,129 million spent for all diseases allocated to hospital admitted patient services, out-of-hospital medical services and prescription pharmaceuticals. This is the fourth highest disease group in terms of national expenditure (Figure 3.1).

Cardiovascular disease accounted for the highest proportion of health-care expenditure in 2008–09 followed by oral health and mental disorders (Figure 3.1).



Of the estimated health-care expenditure for arthritis and other musculoskeletal conditions in 2008–09, osteoarthritis accounted for 29%, back problems 21%, rheumatoid arthritis 6% and osteoporosis 5%. The remaining expenditure (39%) was distributed across the broad range of ‘other’ musculoskeletal conditions (Figure 3.2).



## Expenditure by health-care sector

Estimated health-care expenditure on arthritis and other musculoskeletal conditions in 2008-09 consisted of:

- 54% on hospital admitted patient services (\$3,091 million)
- 30% on out-of-hospital medical expenses (includes GP and specialist consultations, imaging, pathology and other diagnostic services) (\$1,677 million)
- 16% on prescription pharmaceuticals (\$922 million) (Table 3.1).

**Table 3.1: Arthritis and other musculoskeletal conditions and all disease expenditure by health-care sector, 2008-09 (\$ million)**

Health-care sector	Arthritis and other musculoskeletal conditions <sup>(a)</sup>		All diseases	
	\$m	%	\$m	%
Hospital admitted patient services <sup>(b)</sup>	3,091	54.3	38,675	59.4
Out-of-hospital medical expenses <sup>(c)</sup>	1,677	29.5	15,871	24.4
Prescription pharmaceuticals <sup>(d)</sup>	922	16.2	10,583	16.2
<b>Total allocated expenditure</b>	<b>5,690</b>	<b>100.0</b>	<b>65,129</b>	<b>100.0</b>

(a) Includes musculoskeletal conditions coded in the ICD-10-AM as M.

(b) Expenditure for hospital admitted patient services for arthritis and other musculoskeletal conditions includes only cases where the principal diagnosis by ICD-10-AM was between M00 and M99.

(c) Out-of-hospital medical expenses and prescription pharmaceuticals rely on sample survey data that can vary from year to year.

(d) Includes all medicines for which a prescription is needed, including PBS/RPBS benefit-paid prescriptions plus private prescriptions and under co-payment prescriptions. Excludes over-the-counter pharmaceuticals.

Source: Disease Expenditure Database, AIHW.

## Hospital admitted patient services

In 2008–09, hospital admitted patient services accounted for 54% of estimated health-care expenditure on arthritis and other musculoskeletal conditions. Of the \$3,091 million spent on these services, the greatest proportion was for osteoarthritis (41%), followed by ‘other’ musculoskeletal conditions (38%), back problems (18%), osteoporosis and rheumatoid arthritis (each 1%) (Table 3.2).

Expenditure on hospital admitted patient services was based on admitted patients only and therefore excludes closely related expenditure on hospital emergency department or outpatient clinic services. Treatment in hospitals represents a significant component of care for some musculoskeletal conditions (for example, rheumatoid arthritis) (AIHW 2010).

**Table 3.2: Expenditure by health-care sectors, type of arthritis and other musculoskeletal conditions, 2008–09 (\$ million)**

Type of condition	Hospital admitted patient services		Out-of-hospital medical expenses		Prescription pharmaceuticals		Total expenditure (\$m)	Per cent of total expenditure for musculoskeletal conditions
	\$m	%	\$m	%	\$m	%		
Osteoarthritis	1,256	40.6	282	16.8	99	10.7	1,637	28.8
Rheumatoid arthritis	44	1.4	37	2.4	275	29.8	355	6.2
Back problems	560	18.1	465	27.7	153	16.6	1,177	20.7
Osteoporosis	43	1.4	68	4.1	194	21.0	306	5.4
Other musculo-skeletal conditions	1,188	38.4	825	49.2	201	21.8	2,214	38.9
<b>All arthritis and other musculo-skeletal conditions</b>	<b>3,091</b>	<b>100.0</b>	<b>1,677</b>	<b>100.0</b>	<b>922</b>	<b>100.0</b>	<b>5,690</b>	<b>100.0</b>

Note: Components may not sum to the total due to rounding.

Source: Disease Expenditure Database, AIHW.

## Out-of-hospital medical expenses

Out-of hospital medical expenses accounted for \$1,677 million or 30% of estimated health-care expenditure on arthritis and other musculoskeletal conditions in 2008–09. The largest proportion of these expenses was for ‘other’ musculoskeletal conditions (49%), followed by back problems (28%), osteoarthritis (17%), osteoporosis (4%) and rheumatoid arthritis (2%) (Table 3.2).

Arthritis and other musculoskeletal conditions are mainly managed in primary health care, sometimes by a multidisciplinary team of clinicians and allied health professionals (mainly for osteoarthritis and rheumatoid arthritis) (Arthritis Australia 2014a; RACGP 2009a). These conditions are believed to be one of the most commonly managed problems in general practice, with survey data suggesting that musculoskeletal conditions were managed by GPs in approximately 18 per 100 GP–patient encounters in 2012–13 (Britt et al. 2013). Of these, 2.9 per 100 GP–patient encounters were for back problems, 2.8 for osteoarthritis, 0.8 for osteoporosis and 0.5 for rheumatoid arthritis. The remaining 11% were for other diverse musculoskeletal conditions, such as sprains, fractures and injuries.

The estimates presented here are likely to underestimate out-of-hospital medical expenses for these conditions quite markedly. This is due to the current lack of national information about non-GP primary health care activity and associated expenditure (for example, about private allied health and state/territory-funded community health activity).

## Prescription pharmaceuticals

Prescription pharmaceuticals accounted for \$922 million or 16% of the estimated health-care expenditure for arthritis and other musculoskeletal conditions in 2008–09. Rheumatoid arthritis accounted for the largest proportion of this (30%) followed by ‘other’ musculoskeletal conditions (22%), osteoporosis (21%), back problems (17%) and osteoarthritis (11%) (Table 3.2).

Medications, both prescribed and over-the-counter, are widely used to treat and manage arthritis and other musculoskeletal conditions. The most common prescribed pharmaceutical medications – non-steroidal anti-inflammatory drugs (NSAIDs) – offer relief from inflammation, reduce swelling and increase mobility. Table 3.3 lists the most common medications prescribed by GPs for arthritis and other musculoskeletal conditions in 2012–13.

**Table 3.3: Common medications prescribed by GPs for arthritis and other musculoskeletal conditions, 2012–13**

Type of medication	Per cent of all prescribed medications	Rate per 100 encounters
Anti-inflammatory and anti-rheumatic products, non-steroidal	3.5	3.0 (2.8–3.1)
Meloxicam	1.0	0.8 (0.7–0.9)
Diclofenac	0.7	0.6 (0.5–0.7)
Celicoxib	0.7	0.6 (0.5–0.6)
Anti-gout preparations	0.7	0.5 (0.5–0.6)
Drugs affecting bone structure and mineralisation	0.6	0.5 (0.4–0.6)
<b>Total musculoskeletal system prescriptions</b>	<b>5.0</b>	<b>4.2 (3.9–4.4)</b>

Source: Britt et al. 2013.

Australian guidelines also recommend intra-articular corticosteroid injections for short-term treatment of hip and knee osteoarthritis (Arthritis Australia 2014b; RACGP 2009b). Due to data limitations, expenditure on these injections is captured only where they are provided as part of an admitted patient hospital stay although a small amount of this treatment is delivered in primary care settings by specially trained GPs.

For rheumatoid arthritis, newer types of disease-modifying anti-rheumatic drugs (DMARDs) called biologic disease-modifying anti-rheumatic drugs (bDMARDs) play an important role in altering the disease’s progression (AIHW 2013). These pharmaceuticals can be prescribed by rheumatologists only under strict eligibility criteria. Expenditure on these medications is not fully captured in the disease expenditure estimates due to a lack of data on the prescribing patterns of specialists.

The most common pharmaceuticals for managing osteoporosis are bisphosphonates, analgesics and synthetic hormones (AIHW 2011). Bisphosphonates, also known as anti-resorptive medicines, reduce the likelihood of adverse outcomes of osteoporosis, such as

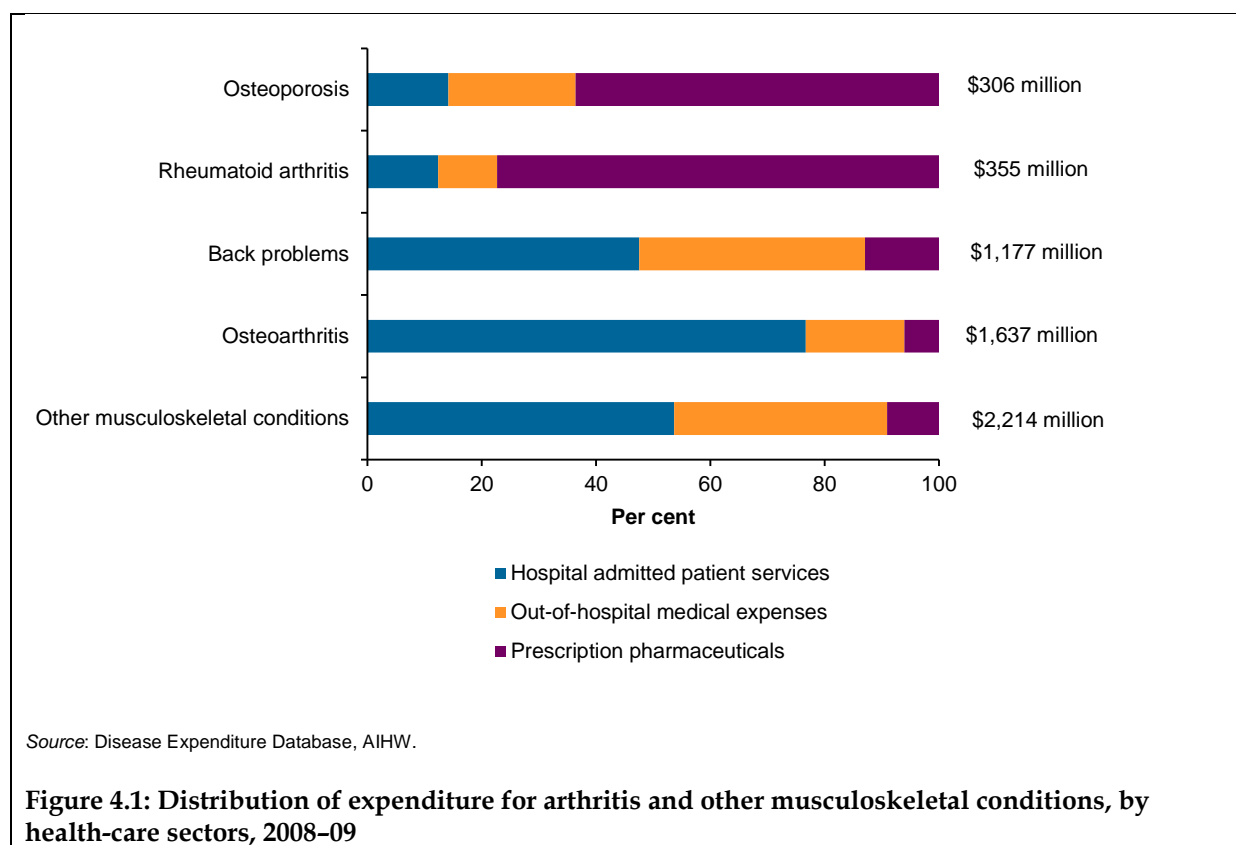
fragility fractures and associated morbidity, disability and mortality, by slowing further loss of bone mineral density (National Osteoporosis Foundation 2012).

Non-prescription medications and supplements such as paracetamol, glucosamine and fish oil are also commonly used in managing osteoarthritis and other musculoskeletal conditions. Information about these expenses is not captured in the expenditure data used in this report.

Overall, estimates for pharmaceutical expenditure on these conditions are therefore an underestimate of the real costs involved.

## 4 How does expenditure vary by type of musculoskeletal condition?

Because of the diverse nature of arthritis and musculoskeletal conditions, treatment and management vary markedly across their different types. This is reflected in the patterns of expenditure across health-care sectors for each type of arthritis and other musculoskeletal condition (Figure 4.1).



### Osteoarthritis

In 2008–09, \$1,637 million was spent on osteoarthritis, with hospital admitted patient services accounting for the largest proportion (77%) of health-care expenditure (Table C3, Appendix C). A large proportion of this expenditure is likely to be for:

- joint replacement surgery associated with severe osteoarthritis that has not responded to other treatment and management such as medication and exercise
- ‘arthroscopy’ performed in the early stages of osteoarthritis for temporary symptom relief and to diagnose the reason for the pain and damage to the joint.

For example, according to the AIHW NHMD, in 2008–09, there were 88,157 hospitalisations with a principal diagnosis of osteoarthritis during which 49,893 joint replacements (30,406 knee replacements and 19,487 hip replacements) and 21,456 ‘knee arthroscopies’ (arthroscopic procedures of the knee) were performed. (See Appendix A for further details of procedure types.)

The number of total joint replacements for people with a principal diagnosis of osteoarthritis increased over the 10 years to 2011–12 (AIHW 2014b). However, the rate of knee arthroscopies for people with osteoarthritis appears to have remained relatively stable at the national level over this period.

Knee arthroscopy is a very common orthopaedic procedure. Although the efficacy of this procedure for people with osteoarthritis has previously been questioned (Laupattarakasem et al. 2008; Moseley et al. 2002), there are reports of its increasing use over time in the United Kingdom and United States (Hawker et al. 2008; Kim et al. 2011). There have been mixed findings about trends over time in the use of this procedure in various Australian jurisdictions, settings and diagnosis groups. While rates of the procedure declined between 2000 and 2009 in Victoria, this decline was not apparent for people with osteoarthritis (Bohensky et al. 2012). A study of New South Wales patients found that overall procedure rates for knee arthroscopy did not decline between 2000 and 2008 (although there was a decline in the rates performed in public hospitals). This study also found that, for the patient group of people aged 65 or more, use of knee arthroscopy was associated with a sizeable reduction in total knee arthroplasty (replacement) within 24 months of the knee arthroscopy (Harris et al. 2013).

Out-of-hospital medical expenses accounted for 17% of health-care expenditure for osteoarthritis in 2008–09 and prescription pharmaceuticals, 6%.

## Back problems

Of the \$1,177 million health-care expenditure attributable to back problems in 2008–09, 48% was for hospital admitted patient services, reflecting that hospital treatment and management of back problems are common (Table C3, Appendix C). According to the NHMD, in 2008–09, there were 87,272 hospitalisations with a principal diagnosis of back problems.

Out-of-hospital medical expenses accounted for 39% of the health-care expenditure for back problems (\$464 million) and prescription pharmaceuticals for 13% (\$153 million) in 2008–09. As with other musculoskeletal conditions predominantly managed outside hospital settings, these figures are likely to markedly underestimate the real expenditure on back problems. This underestimation is due to the substantial use of over-the-counter pain relief medications and the use of allied health services such as physiotherapy, for which expenditure estimates cannot be generated or allocated to disease groups.

## Rheumatoid arthritis

In 2008–09, 12% of the health-care expenditure for rheumatoid arthritis (\$44 million) was attributable to hospital admitted patient services (Table C3, Appendix C). This is because most of the treatment for rheumatoid arthritis is conducted in non-admitted patient settings such as hospital outpatient clinics and a range of other specialist and allied health services that patients receive without being formally admitted to hospital. People with rheumatoid arthritis may receive hospital care when their symptoms cannot be managed by medications and primary care interventions. According to the NHMD, in 2008–09, there were 9,000 hospitalisations with a principal diagnosis of rheumatoid arthritis.

In 2008–09, out-of-hospital medical expenses accounted for 10% (\$37 million) of expenditure on rheumatoid arthritis. This is likely to underestimate the full expenditure in this area given

data gaps. In particular, Australian guidelines recommend treatment and management of rheumatoid arthritis by health-care professionals working within multidisciplinary teams, such as rheumatologists, physiotherapists, nurses, occupational therapists, podiatrists, dietitians, psychologists, pharmacists and community health workers (RACGP 2009a). Limited information is available on the activity or expenditure associated with much of this activity.

The majority of expenditure on rheumatoid arthritis is for prescription pharmaceuticals (\$275 million, accounting for 77% of the health-care expenditure in 2008–09). While a large proportion of this expenditure is likely to be on bDMARDs, these medications are prescribed only by specialists and are not separately identified in the AIHW Disease Expenditure Database (where they are grouped under a broader category of ‘anti-inflammatory and anti-rheumatic products’ based on GP-prescribing behaviour). Based on raw PBS/RPBS data, in 2008–09, approximately 79,000 units of bDMARDs were dispensed and almost \$143 million in benefits were paid (AIHW 2013).

## Osteoporosis

Health-care expenditure for hospital admitted patient services accounted for a small proportion (14%) of the total expenditure on osteoporosis (\$44 million) in 2008–09 (Table C3, Appendix C). Services provided by hospitals are not commonly sought for treating and managing osteoporosis itself, although its consequences, such as hip fractures, often are.

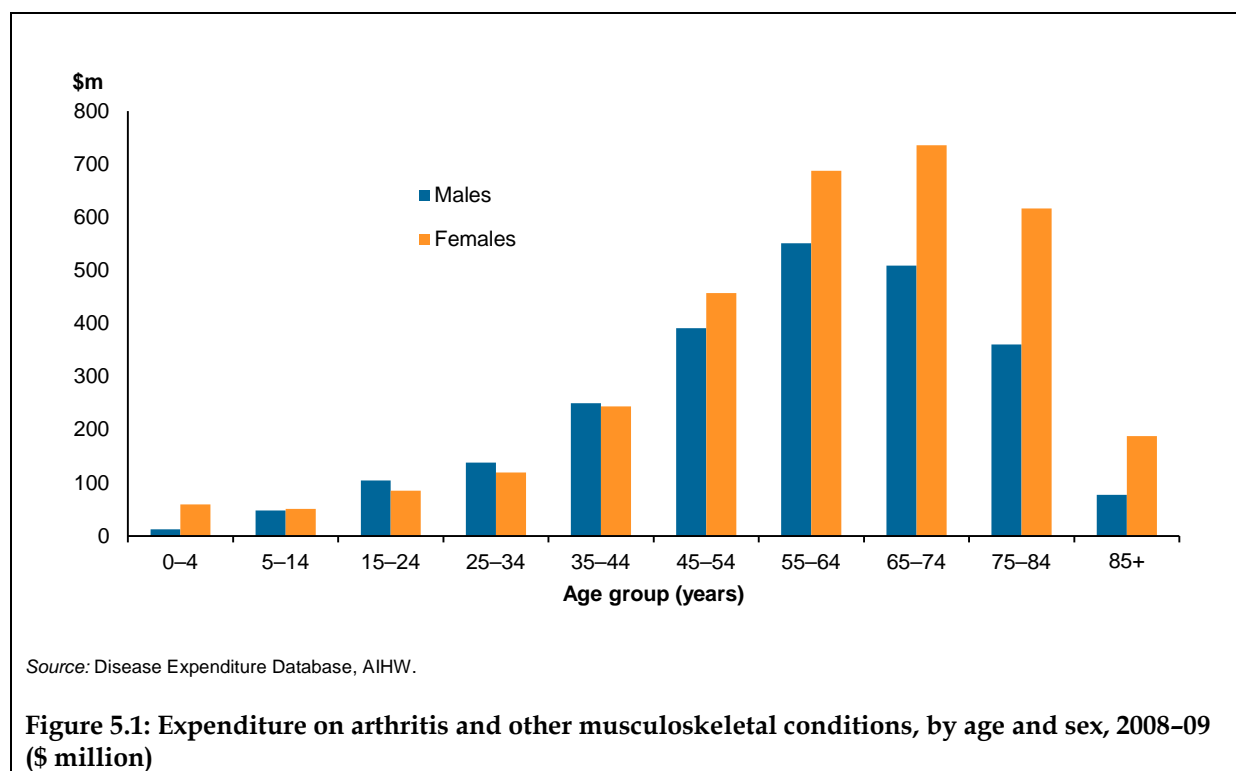
Expenditure for hospital admitted patient services for osteoporosis presented here is likely to be a substantial underestimate. This is because hospital expenditure in the AIHW Disease Expenditure Database is allocated on the basis of principal diagnosis only and therefore excludes the broader group of hospitalised fractures (including minimal trauma fractures). According to the NHMD, in 2008–09 there were 65,821 ‘osteoporosis-related’ hospitalisations for persons aged 50 and over. Of these, 6,732 hospitalisations were for a principal diagnosis of osteoporosis (therefore captured here) and 59,089 for a principal diagnosis of minimal trauma fracture. It is not possible to confirm if all the 59,089 hospitalisations were among people with osteoporosis. There is some evidence that many of these fractures would have occurred in people without osteoporosis (Nguyen et al. 2007). However, it is possible that the hospitalisation expenditure estimates presented here reflect as few as 10% of all osteoporosis-related hospitalisations.

Out-of-hospital medical expenses accounted for 22% (\$68 million) of health-care expenditure on osteoporosis in 2008–09. This is likely to be a marked underestimate because it does not capture the use of community-based medical specialists (such as orthopaedic surgeons and endocrinologists) and allied health services (such as physiotherapy and occupational therapy) following hip fractures.

In 2008–09, the majority (63%) of health-care expenditure for osteoporosis was for prescription pharmaceuticals. Pharmaceutical medicines are normally used in managing osteoporosis to increase bone mineral density (for example, anti-resorptive medications known as bisphosphonates), to manage symptoms such as pain and inflammation, and to reduce the risk of fractures. While we do not have precise estimates of the expenditure on most of these types of pharmaceuticals, it is known, based on PBS/RPBS data, that in 2008–09, approximately 1,500,000 units of bisphosphonates (alendronate and risedronate) were dispensed and almost \$63 million in benefits paid (Department of Human Services 2013).

## 5 How does expenditure vary by age and sex?

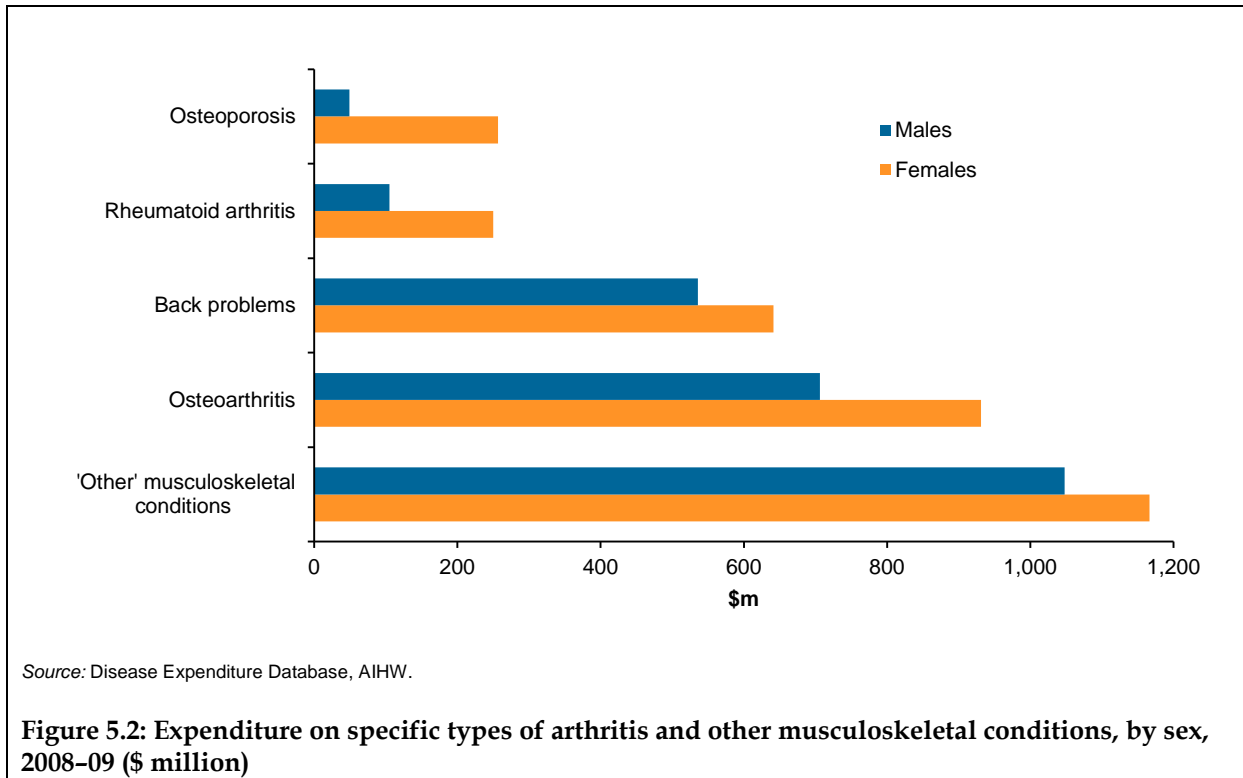
In 2008–09, total allocated health-care expenditure on arthritis and other musculoskeletal conditions was relatively low in younger age groups. It became progressively higher with each older age group from the age of 35, lowering in those aged 75 and over (Figure 5.1). Expenditure on arthritis and musculoskeletal conditions was higher for females (\$3,245 million or 57% of total expenditure) than for males (\$2,444 million or 43%), largely reflecting the higher prevalence of arthritis among females (54%) than males (46% males) (ABS 2012).



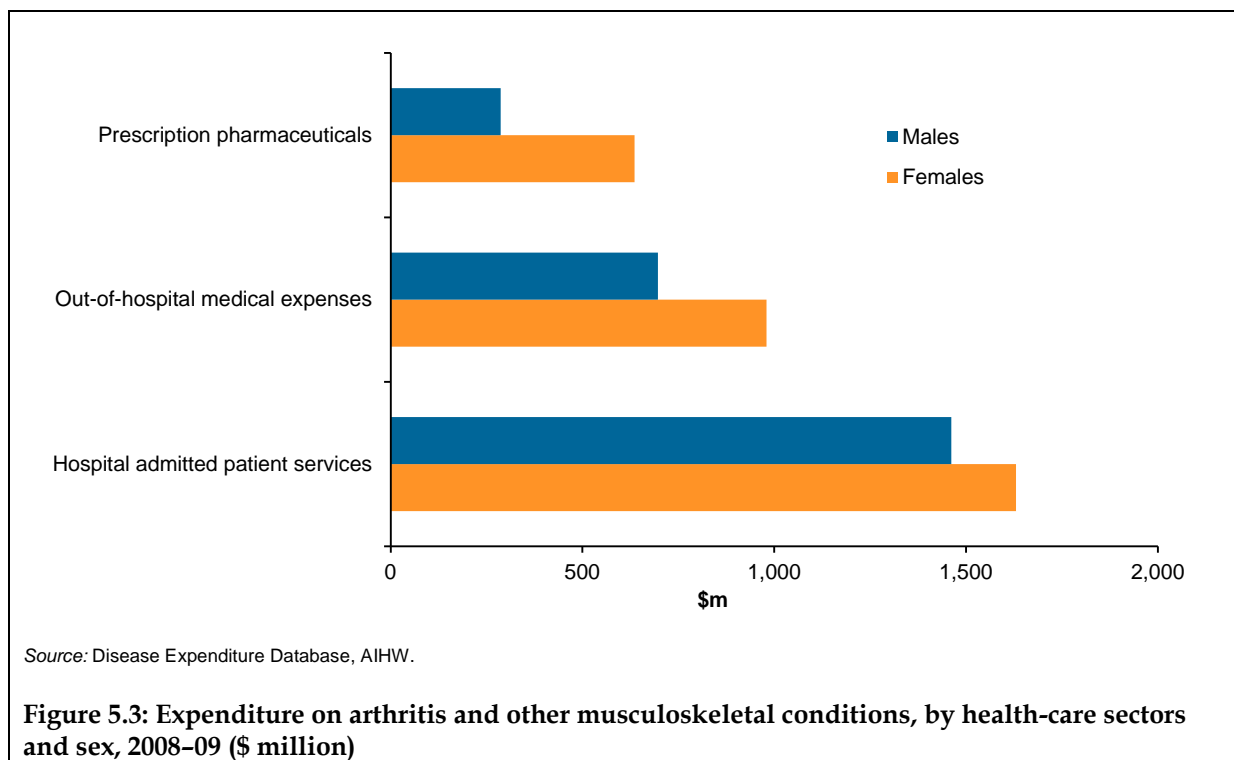
Overall expenditure was higher for females than males for all groups of musculoskeletal conditions shown in Figure 5.2, but the collective group ‘other’ musculoskeletal conditions could mask variations in individual diseases. The greatest disparity was noted for expenditure on osteoporosis: expenditure for females was 5 times as high as that for males (\$257 million for females and \$49 million for males). This aligns reasonably closely with the self-reported prevalence of osteoporosis for females (81%), which is more than 4 times as high as that for males (19%) (ABS 2012). Results based on bone mineral testing show similar sex differences, with one study finding that rates were nearly 4 times as high in females as in males aged 50 or over (23% of females and 6% of males) and about 3 times as high in females as in males aged 70 and over (43% of females and 13% of males) (Henry et al. 2011).

Prevalence alone does not account for the full 5-fold difference in uptake of pharmaceuticals; it may also be affected by other factors such as consumer awareness and doctor-diagnosing practices. For example, use of bisphosphonates is recognised as one of a range of treatments for post-menopausal women in terms of preventing fracture and improving quality of life

(Christenson et al. 2012). It is also noted that, despite high-level evidence for efficacy, safety and effectiveness, fewer Australian males with osteoporosis take specific osteoporosis targeted treatment (RACGP 2010). Per person expenditure across all arthritis and other musculoskeletal conditions was also higher for females (\$301 per person) than males (\$229 per person) and highest for people aged 75–84 (\$1,007 per person) (Table C12, Appendix C).



The greatest difference in the overall health-care expenditure for arthritis and other musculoskeletal conditions between the sexes was for prescription pharmaceuticals, where more than twice as much was spent on females (\$635 million) than on males (\$286 million). Expenditure on out-of-hospital medical expenses and admitted patient services was 41% and 12% higher, respectively, for females than for males (Figure 5.3) (Table C6, Appendix C).



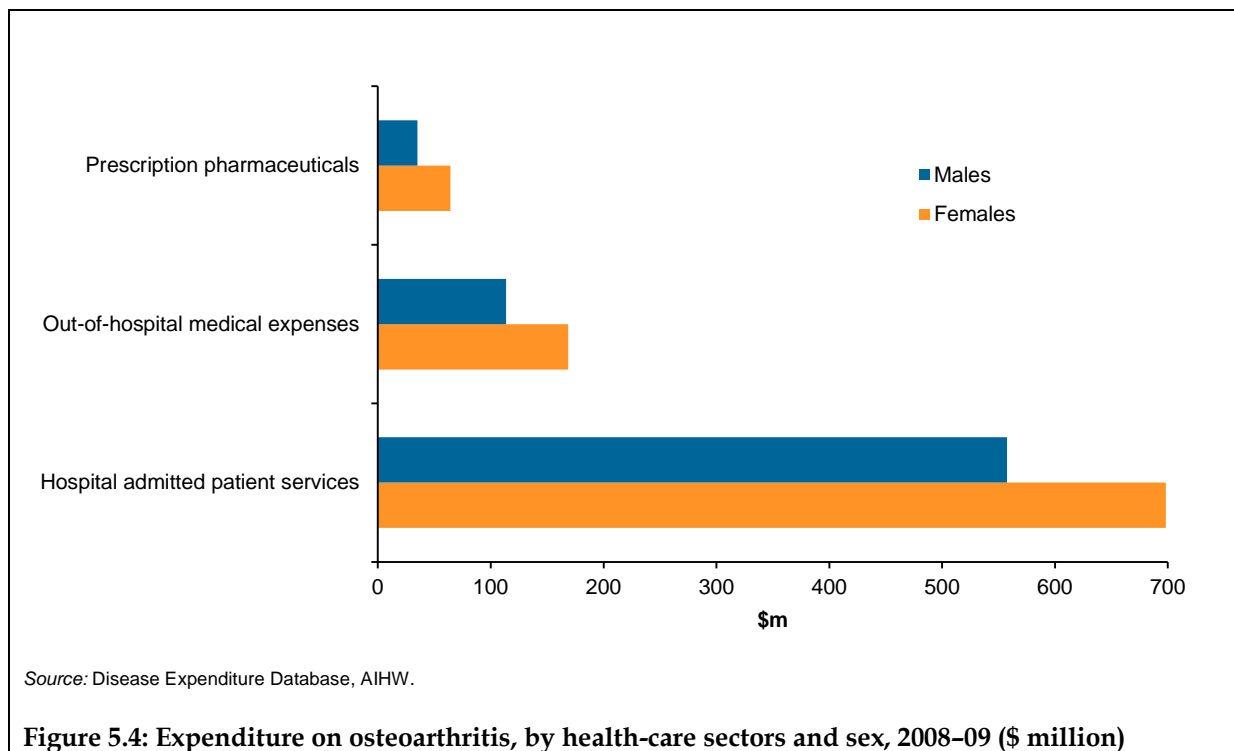
## Osteoarthritis

There was more expenditure on females than males with osteoarthritis, as would be expected given the higher prevalence of the condition in females (66% in females and 34% in males). In 2008-09, \$931 million (57% of the estimated expenditure allocated to osteoarthritis) was spent overall on females compared with \$706 million (43%) on males. The expenditure on males is high relative to their overall prevalence (that is, 43% of expenditure compared with 34% prevalence) which may suggest males with osteoarthritis are more likely to receive more costly procedures such as joint replacement surgery. There is some evidence that physicians were more likely to recommend total knee replacement for male patients with osteoarthritis than female patients (Borkhoff et al. 2008). However, females were, overall, more likely to undergo a joint replacement procedure for osteoarthritis given their higher prevalence of this condition, although there are some age groups and joint replacement types for which males have a higher rate (AIHW 2014b).

Osteoarthritis is a condition that predominantly affects people aged 45 and over. Hence, it is not surprising that this is where most of the expenditure occurred (\$1,587 million or 97%). Expenditure was highest in the 65-74 age group (\$538 million) (Table C7, Appendix C).

Per person expenditure for osteoarthritis was also higher for females than males and highest in the elderly aged 75-84 (\$414) (Table C12, Appendix C). For both sexes, per person expenditure became progressively higher with each older age group up to age 84 (\$414), lowering in those aged 85 or over (\$219). This is most likely because, as this condition progresses, interventions become progressively more costly and likely to involve hospitalisation.

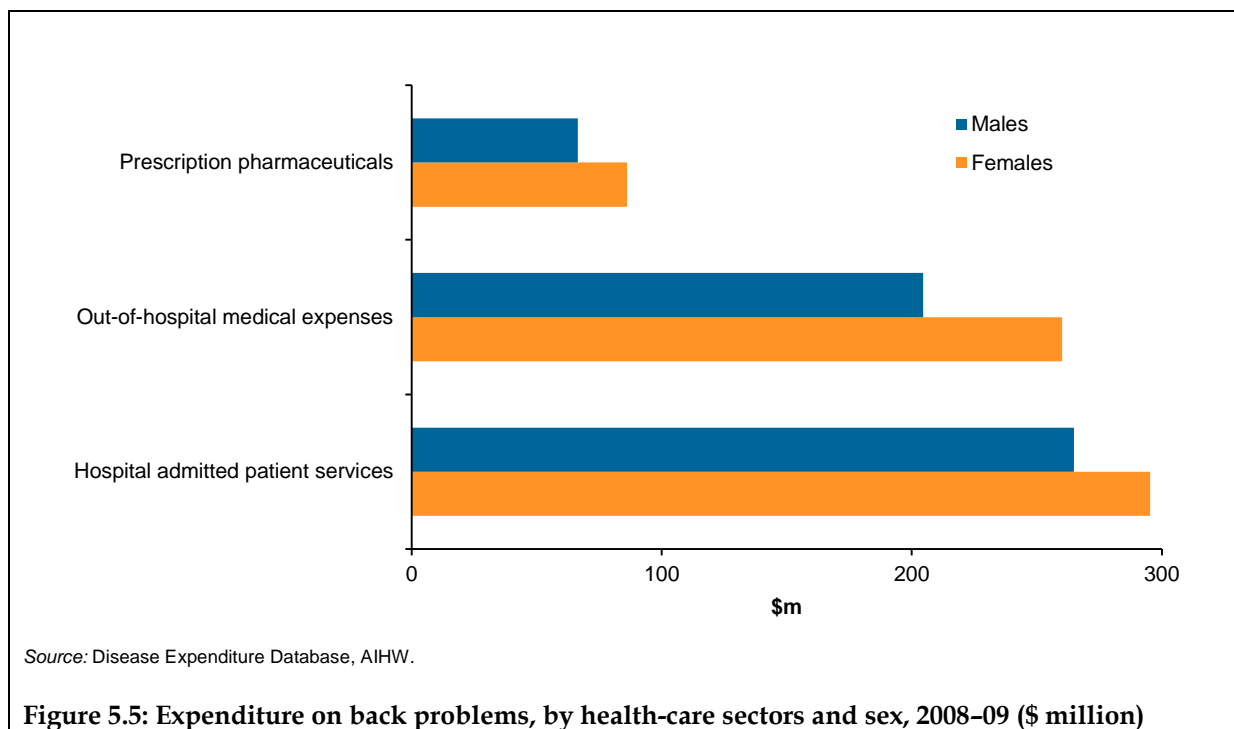
More was spent on females than males with osteoarthritis across each health-care sector (Figure 5.4).



## Back problems

The total allocated health-care expenditure on back problems for females was 1.2 times that for males (that is 20% more was spent on females than males). Per person expenditure was progressively higher with each age group through to the age group 55-64 (\$236 million), before declining with each subsequent age group to \$57 million for those aged 85 or over (Table C8, Appendix C).

Per person expenditure on back problems was \$55 in 2008-09. More was spent on females on average (\$60 per person) than on males (\$50), with more spent on females for all age groups above 0-4 (Table C12, Appendix C). Although overall spending on the most elderly age groups was lower than for some younger age groups, people aged 75-84 had the highest estimated per person expenditure (Table C12, Appendix C). More was spent on females than males across each health-care sector (Figure 5.5; Table C8, Appendix C).

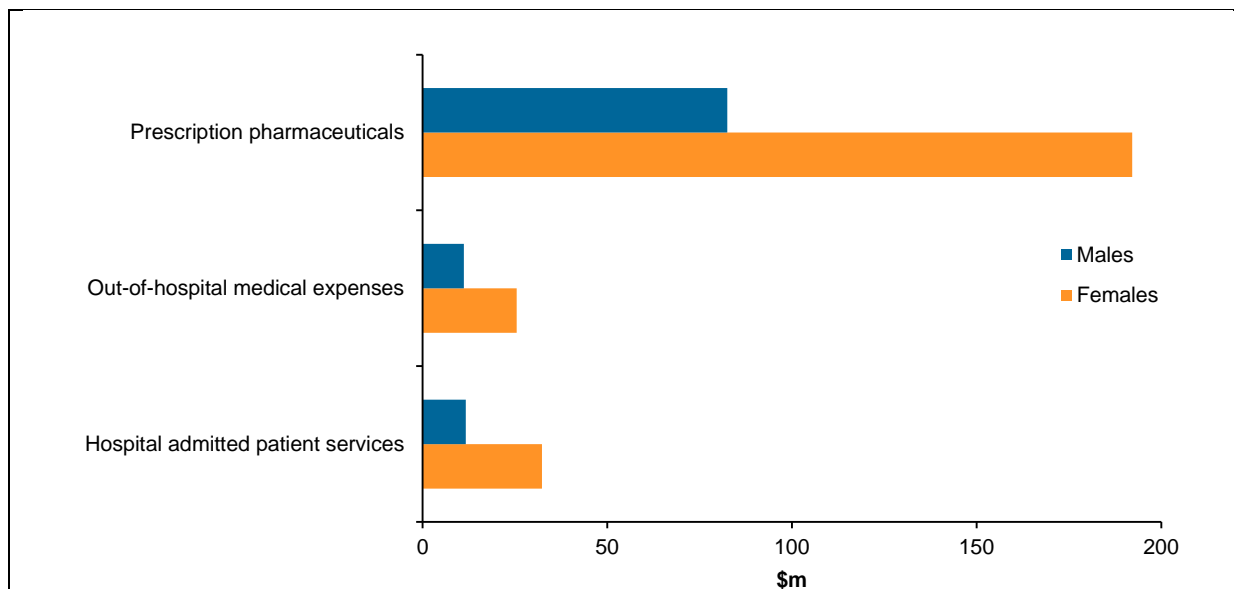


## Rheumatoid arthritis

The total allocated health-care expenditure for rheumatoid arthritis was higher for females (\$250 million or 70%) than males (\$105 million or 30%) (Table C9, Appendix C), as would be expected given the higher prevalence of rheumatoid arthritis in females (64% for females versus 36% for males) (ABS 2012). The highest expenditure for females was for those aged 65-74 (\$76 million), and for males those aged 55-64 (\$34 million).

Expenditure per person was higher from the 45-54 age group upward, especially in females. This trend corresponds with age groups commonly associated with the onset of the disease and the fact that females tend to develop rheumatoid arthritis more often and earlier than males (ABS 2012). The greatest amount was spent on females aged 65-74 (\$98 million) and males aged 55-64 (\$29 million) (Table C12, Appendix C).

More was spent on females than males with rheumatoid arthritis across each health-care sector. This was especially true for prescription pharmaceuticals, where over twice as much (\$192 million) was spent on females than on males (\$82 million). Expenditure on admitted patient services and out-of-hospital expenses for females was almost twice as high as for males (Figure 5.6; Table C9, Appendix C).



Source: Disease Expenditure Database, AIHW.

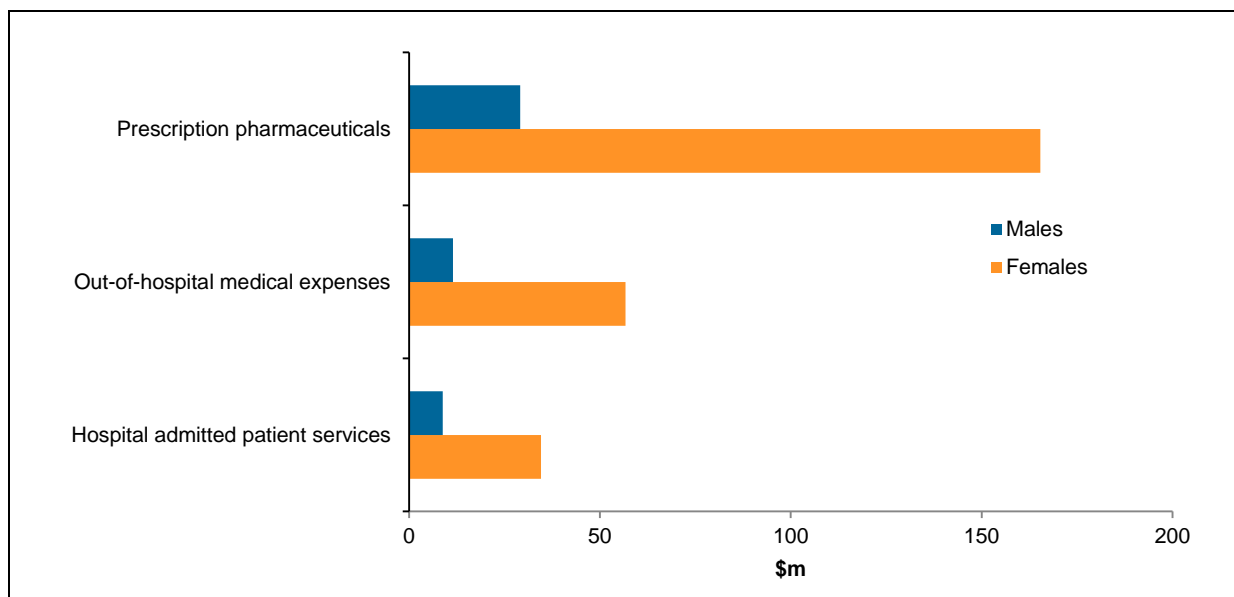
**Figure 5.6: Expenditure on rheumatoid arthritis, by health-care sectors and sex, 2008-09 (\$ million)**

## Osteoporosis

In 2008-09, total allocated expenditure for osteoporosis was \$49 million for males and \$257 million for females (Table C10, Appendix C). Expenditure in each age group was progressively higher, more so for females than males, showing a similar pattern to that for rheumatoid arthritis. While less expenditure was reported for those aged 85 or over, expenditure for females (\$39 million) was almost 5 times that for males (\$8 million) in this age group.

Expenditure per person by age and sex showed a slightly different pattern, although more was spent on females (\$24 per person) than on males (\$5). Per person expenditure was highest in females aged 75-84 (\$168) and males aged 85 or over (\$65) (Table C12, Appendix C).

Most of the difference in expenditure for osteoporosis between males and females is related to prescription pharmaceuticals (Figure 5.7). In 2008-09, the amount spent on prescription pharmaceuticals for females with osteoporosis was over 5 times as high as that spent for males (\$165 million and \$29 million, respectively). Expenditure on hospital admitted patient services was 4 times as high, and out-of-hospital expenses 5 times as high, for females than for males (Table C10, Appendix C).



Source: Disease Expenditure Database, AIHW.

**Figure 5.7: Expenditure on osteoporosis, by health-care sectors and sex, 2008-09 (\$ million)**

## 6 Are expenditure patterns changing over time?

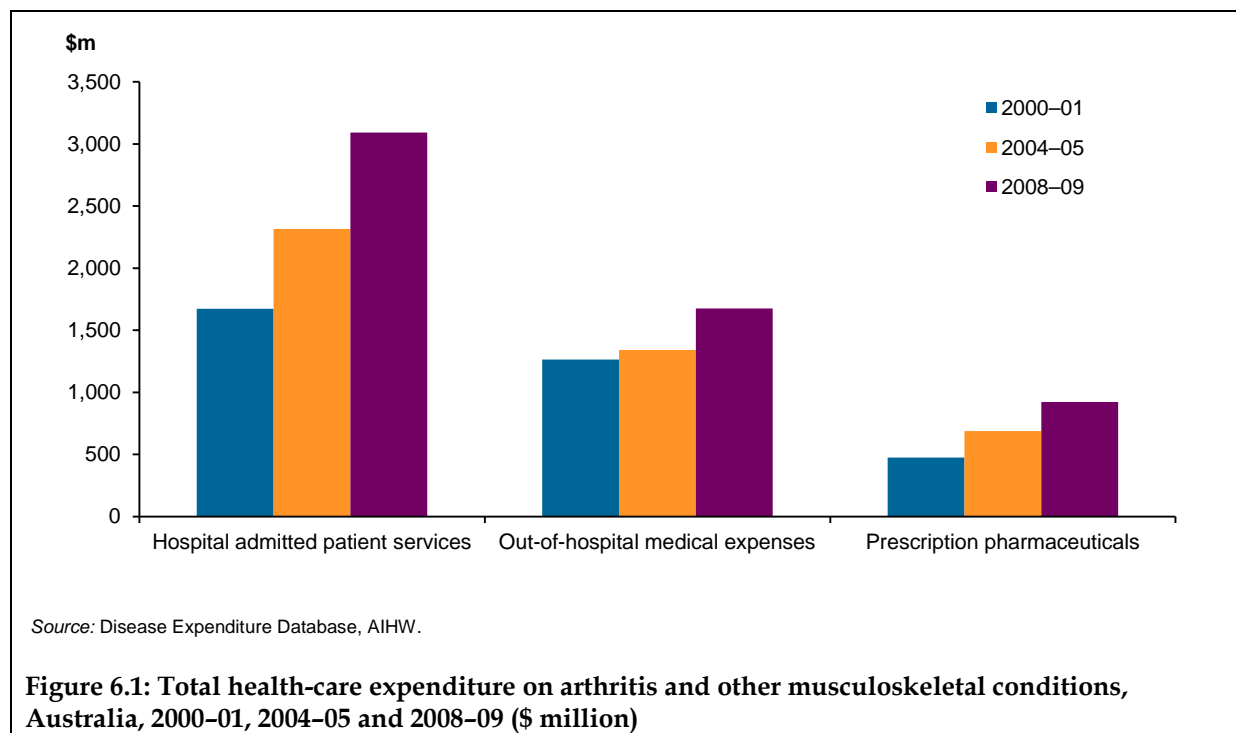
This chapter describes changes in the patterns of health-care expenditure between 2000–01, 2004–05 and 2008–09, adjusting for inflation – that is, using constant prices.

From 2000–01 to 2008–09, total health system expenditure on arthritis and other musculoskeletal conditions increased by 67% from \$3,411 million to \$5,690 million (constant prices) (Table C13, Appendix C). This compares with a total increase of 52% for all chronic diseases – from \$42,915 million in 2000–01 to \$65,129 million in 2008–09. Over the same period, total health-care expenditure for arthritis and other musculoskeletal conditions remained at about 9% of total allocated expenditure for all diseases (Table C13, Appendix C).

Expenditure on hospital admitted patient services was the dominant component of expenditure at all three time points, increasing from \$1,673 million in 2000–01, to \$2,316 million in 2004–05 and to \$3,091 million in 2008–09 (Figure 6.1).

Out-of-hospital expenses also increased steadily across the three time points from \$1,264 million in 2000–01, to \$1,341 million in 2004–05 and to \$1,677 million in 2008–09.

Expenditure on prescription pharmaceuticals was the lowest component in all three years, with a steady increase in expenditure – from \$475 million in 2000–01, to \$687 million in 2004–05 and to \$922 million in 2008–09.



Further examination of time series trends is not currently possible due to data limitations, particularly in relation to out-of-hospital and pharmaceutical expenses (see Chapter 2 for details).

## 7 Discussion

Arthritis and other musculoskeletal conditions (such as back problems, osteoporosis and many other conditions) are a major cause of pain and disability, placing a high economic and personal burden on the community.

In 2008-09, estimated health-care expenditure allocated to arthritis and other musculoskeletal conditions in Australia totalled \$5,690 million; it was the fourth most expensive disease group, accounting for 8.7% of total health-care expenditure allocated to disease groups (\$65,129 million). Osteoarthritis accounted for 29% of the estimated health-care expenditure, back problems 21%, rheumatoid arthritis 6%, and osteoporosis 5%. 'Other' musculoskeletal conditions (a large group of conditions) accounted for 39% of the total expenditure.

### Health-care expenditure by health-care sector

Estimated health-care expenditure on hospital admitted patients accounted for the highest proportion of expenditure on arthritis and other musculoskeletal conditions (54% or \$3,091 million), followed by out-of-hospital medical expenses (30% or \$1,677 million) and prescription pharmaceuticals (16% or \$922 million).

The pattern of expenditure across health-care sectors varied markedly across the various musculoskeletal conditions. For example, the majority of estimated expenditure for rheumatoid arthritis and osteoporosis was on pharmaceuticals (77% and 63%, respectively) and the largest proportion of osteoarthritis-related expenditure was on admitted patient hospital services (77%).

### Health-care expenditure by various musculoskeletal conditions

The patterns of expenditure across health-care sectors largely reflect what is known about the different impacts of these musculoskeletal conditions and the interventions undertaken to prevent, diagnose, treat and manage them. For example, the relatively high expenditure on admitted patient hospital services for osteoarthritis relates largely to the use of joint replacement and other forms of surgery (for example, arthroscopy) in its management.

In contrast, the relative dominance of expenditure on prescription pharmaceuticals for rheumatoid arthritis and osteoporosis relates to the availability of anti-inflammatory/anti-rheumatic and anti-resorptive drugs, respectively. The relative dominance of expenditure on prescription pharmaceuticals for rheumatoid arthritis is even more notable given that it represents an underestimate of the full expenditure in this area.

Expenditure on bDMARDs is not separately or comprehensively captured in the estimates presented here (because they are prescribed exclusively by medical specialists and the data presented here are modelled based on GP-prescribing practices). It is known that expenditure on these medications accounted for \$143 million in benefits paid through the PBS and RPBS in 2008-09.

The relatively small level of hospital expenditure for osteoporosis are also affected by the relatively narrow definition of osteoporosis-related hospitalisations used here, which focuses only on hospitalisations with a principal diagnosis of osteoporosis. Expenditure for a

proportion of the much larger group of hospitalisations for minimal trauma fractures may also have been related to osteoporosis. However, quantifying this proportion accurately is currently challenging.

## Health-care expenditure by sex and age

Total allocated health-care expenditure for musculoskeletal conditions is greater for females (\$3,245 million overall and \$301 per female) than males (\$2,444 million overall and \$229 per male), with sex differences for specific musculoskeletal grouping reflecting known differences in the age of onset and prevalence for females and males. There is lower than expected expenditure on osteoporosis pharmaceutical treatments, such as bisphosphonates, for males relative to females, given the prevalence of this condition in men and women.

Overall estimated expenditure for arthritis and other musculoskeletal conditions was higher in the older age groups, increasing with age from \$172 million for children aged 0–14 to \$494 million for people aged 35–44 and \$1,245 million for those aged 65–74. It then tapered off for people aged 75 or over. This is broadly consistent with prevalence estimates of these conditions (AIHW 2014b), and also with the likelihood that, as these conditions progress, treatment options move toward the more expensive end of the management continuum, including hospitalisation.

## Comparisons with other health-care expenditure estimates

The results presented in this report are considerably lower than the findings of two recent studies conducted in Australia, which look at a much broader concept of the economic implications of arthritis and other musculoskeletal conditions on individuals, families and society. One study, conducted by Arthritis and Osteoporosis Victoria (2013), estimated the total cost of arthritis and other musculoskeletal conditions in Australia to be \$55,063 million in 2012. Of this total cost, \$20,868 million was the overall financial cost (which includes health costs and productivity costs); another \$34,194 million was the burden of disease cost.

Another study, conducted by Osteoporosis Australia, estimated the direct and indirect cost of osteoporosis/osteopenia in Australia in 2012 to be \$2,754 million (Watts et al. 2013). Of the overall costs, \$2,589 million are direct costs and \$165 million included costs from productivity losses associated with fractures due to hospitalisation (acute and rehabilitation).

The estimates are not comparable with those presented here for a number of reasons. In addition to direct health-care costs, the above-mentioned studies included detailed estimates of non-direct health-care costs such as productivity costs (for example, reduced employment, lost superannuation, presenteeism (attending work while sick), absenteeism and premature death), carer costs, community non-health services costs (such as home help, Meals on Wheels) and informal community care costs. The estimates are also based on a different time period to that presented here. In relation to the Osteoporosis Australia study, a much broader group of fractures (both those requiring hospitalisation and other fractures) was also used in estimating the costs of osteoporosis.

## Conclusion

Arthritis and other musculoskeletal conditions generate substantial health-care costs in Australia. Although the estimates presented here have some limitations, they provide valuable information about how the levels of expenditure on musculoskeletal conditions compare with expenditure on other health conditions and how they are distributed across different health care sectors, age and sex groups. The estimates also highlight how these broad patterns of expenditure have varied over time.

# Appendix A: Data sources

## AIHW Disease Expenditure Database

The Disease Expenditure Database contains estimates of health-care expenditure by disease category, age group and sex for admitted patient hospital services, out-of-hospital medical expenses and prescription pharmaceuticals (details are provided in Chapter 2). Also see the data quality statement at Appendix B.

## 2011–12 ABS National Health Survey

The 2011–12 ABS NHS is part of the broader 2011–13 ABS Australian Health Survey that includes a nationally representative sample of 35,000 people from the general population as well as a specific survey of 13,250 Aboriginal and Torres Strait Islander people. The content of the Australian Health Survey covers topics such as nutrition, physical activity, and biomedical measures (the National Nutrition and Physical Activity Survey and the National Health Measures Survey).

Previous NHS surveys were conducted in 2007–08, 2004–05, 2001, 1995, 1989–90, 1983 and 1977. The survey is community based and does not include information from people living in nursing homes or otherwise institutionalised.

Data available from the NHS include self-reports of various forms of arthritis, disc disorders, sciatica, back pain/problems not elsewhere classified, osteoporosis and other diseases of the musculoskeletal system and connective tissues. The survey also collects information about health services and medicine use, as well as any other health-related action taken to manage these conditions.

In this report, data from the 2011–12 NHS have been used to provide information on the prevalence of arthritis and other musculoskeletal conditions in the Australian population, psychological distress, and self-assessed health status.

While the NHS provides a vast array of nationally-representative data, some limitations need to be considered; namely, the self-reported sourcing of some data, and the cross-sectional nature of the survey.

The analysis in this report relies upon the quality of the data available. Much of the data collected by the NHS are self-reported by respondents and, therefore rely heavily on the respondents' knowing and providing accurate information. In some cases, the survey relies on the respondents' ability to recall their behaviours, such as physical activity or alcohol consumed in the week before the interview. The NHS is designed to prompt respondents so that the most accurate information is collected, but there may be reasons why the information may be compromised.

More information on the data quality of this survey can be found in the following ABS publications: Australian Health Survey: user's guide 2011–13  
<<http://www.abs.gov.au/ausstats/abs@.nsf/mf/4363.0.55.001>>.

## AIHW National Hospital Morbidity Database

The NHMD is a compilation of episode-level records from admitted patient morbidity data collection systems in Australian hospitals.

The data supplied are based on the National Minimum Data Sets (NMDSs) for Admitted patient care and include demographic, administrative and length of stay data, as well as data on the diagnoses of the patients, the procedures they underwent in hospital and external causes of injury and poisoning.

The purpose of the NMDS for Admitted patient care is to collect information about care provided to admitted patients in Australian hospitals. The scope of the NMDS is episodes of care for admitted patients in all public and private acute and psychiatric hospitals, free-standing day hospital facilities and alcohol and drug treatment centres in Australia. Hospitals operated by the Australian Defence Force or corrections authorities and in Australia's off-shore territories are not in scope, but some are included.

The reference period for this data set is 2011–12. The data set includes records for admitted patient separations between 1 July 2011 and 30 June 2012.

The data quality statement for this 2011–12 NHMD is at the following web site:  
<<http://meteor.aihw.gov.au/content/index.phtml/itemId/529483>>.

Metadata information for the NMDSs that are the basis for the AIHW National Hospital Morbidity Databases is published in the AIHW's online metadata repository – METeOR – and the National Health Data Dictionary. METeOR and the National Health Data Dictionary can be accessed, respectively, via the following AIHW websites:

<<http://meteor.aihw.gov.au/content/index.phtml/itemId/181162>>  
<<http://www.aihw.gov.au/publication-detail/?id=6442468385>>.

**Table A1: Codes used in identifying total joint replacement and arthroscopic procedures of the knee for people with a principal diagnosis of osteoarthritis**

<b>Procedure</b>	<b>Codes</b>
<b>Total joint replacement</b>	
Primary total knee replacement	4951800, 4951900, 4952100, 4952101, 4952102, 4952103, 4952400, 4952401, 4953401
Primary total hip replacement	4931800, 4931900
<b>Arthroscopic procedures of the knee</b>	
Patellofemoral stabilisation	4950301
Osteoplasty of knee	4950305
Arthroscopic reconstruction of knee	4953900
Arthroscopy of knee	4955700
Arthroscopic biopsy of knee	4955701
Arthroscopic excision of meniscal margin or plica of knee	4955702
Arthroscopic debridement of knee	4955800
Arthroscopic chondroplasty of knee	4955801
Arthroscopic osteoplasty of knee	4955802
Arthroscopic chondroplasty knee with multiple drilling or implant	4955900
Arthroscopic removal of loose body, knee	4956000
Arthroscopic trimming ligament of knee	4956001
Arthroscopic lateral release of knee	4956002
Arthroscopic meniscectomy of knee	4956003
Arthroscopic lateral release of knee with debridement, osteoplasty or chondroplasty	4956100
Arthroscopic meniscectomy of knee with debridement, osteoplasty or chondroplasty	4956101
Arthroscopic lateral release of knee with chondroplasty and multiple drilling or implant	4956200
Arthroscopic meniscectomy of knee with chondroplasty and multiple drilling or implant	4956201
Arthroscopic removal of loose body, knee with chondroplasty and multiple drilling or implant	4956202
Arthroscopic repair of meniscus of knee	4956300
Arthroscopic synovectomy of knee	4956600

Sources: Bohensky et al. 2012; AIHW 2008.

# Appendix B: Data quality statement

## Disease expenditure database 2008–09

### Summary of key data quality issues

- The Disease Expenditure Database contains estimates of expenditure by disease category, age group and sex for each of the following areas of expenditure: admitted patient hospital services, out-of-hospital medical services, prescription pharmaceuticals, optometrical and dental services, community mental health services and public health cancer screening.
- Estimates are derived from combining information from the NHMD, the NPHEd, the Health Expenditure Database, the NHCDC and the BEACH survey.
- The database contains a conservative estimate of total expenditure and equates to around 70% of total recurrent health expenditure.

### Description

The estimates of expenditure in the Disease Expenditure Database are as explained above. Definitions for admitted patient hospital services, out of-hospital medical services and prescription pharmaceuticals are as follows:

- Admitted patient hospital costs refer to the cost of services for admitted patients in both public and private acute hospitals and psychiatric hospitals, as well as expenditure on medical services provided to private admitted patients in hospitals.
- Out-of-hospital medical expenses refer to the cost for services provided by, or on behalf of, registered medical practitioners who are funded by the MBS, Department of Veterans' Affairs, compulsory motor vehicle third-party insurance, workers' compensation insurance, private health insurance funds, Australian Government premium rebates allocated to medical services, MBS co-payments and other out-of-pocket payments. They also include non-MBS medical services (such as the provision of vaccines for overseas travel) as well as some expenditure by the Australian Government under funding arrangements that are alternatives to the fees for service. They exclude medical services provided to public admitted patients in public hospitals and medical services provided to public patients at outpatient clinics in public hospitals. Also excluded are the costs for medical services provided to private admitted patients in hospitals, which are counted as part of admitted patient costs.
- Prescription pharmaceuticals refer to the cost of pharmaceuticals listed in the schedule of the pharmaceuticals under the PBS and the RPBS for which pharmaceutical benefits have been paid or are payable. Also included are the costs for under co-payment prescriptions and private prescriptions. Under co-payment prescriptions are those pharmaceuticals listed in the PBS or RPBS, the total costs of which are equal to or less than the statutory patient contribution for the class of patient concerned, while private prescriptions are those pharmaceuticals dispensed through private prescriptions that do not fulfil the criteria for payment or benefit under the PBS or RPBS.

Estimates are derived from combining information from the NHMD, the NPHEd, the NHCDC and the Health Expenditure Database.

Proportions derived from the BEACH survey relating to 2007 to 2009 are also used in compiling the estimates for out-of-hospital medical services and prescription

pharmaceuticals. The BEACH data were collected by the Family Medicine Research Centre of the University of Sydney in collaboration with the AIHW.

It is not possible to allocate all expenditure on health goods and services by disease. Expenditure that was not able to be allocated by disease includes capital expenditure as well as expenditure for non-admitted patient hospital services, over-the-counter drugs, other health practitioner services (except optometry), community health services expenditure (except community mental health), expenditure on public health programs (except cancer screening programs), health administration, health aids and appliances, and patient transport (ambulance).

### **Institutional environment**

The AIHW is a major national agency set up by the Australian Government under the *Australian Institute of Health and Welfare Act 1987* (Cwlth) to provide reliable, regular and relevant information and statistics on Australia's health and welfare. It is an independent statutory authority established in 1987, governed by a management board, and accountable to the Australian Parliament through the Health and Ageing portfolio.

The AIHW aims to improve the health and wellbeing of Australians through better health and welfare information and statistics. It collects and reports information on a wide range of topics and issues, ranging from health and welfare expenditure, hospitals, disease and injury, and mental health, to ageing, homelessness, disability and child protection.

The Institute also plays a role in developing and maintaining national metadata standards. This work contributes to improving the quality and consistency of national health and welfare statistics. The Institute works closely with governments and non-government organisations to achieve greater adherence to these standards in administrative data collections to promote national consistency and comparability of data and reporting.

One of the AIHW's main functions is to work with the states and territories to improve the quality of administrative data and, where possible, to compile national data sets based on data from each jurisdiction, to analyse these data sets and disseminate information and statistics.

Compliance with both the AIHW Act and the *Privacy Act 1988* (Cwlth) ensures that the data collections managed by the AIHW are kept securely and under the strictest conditions with respect to privacy and confidentiality.

For further information, see the AIHW website <<http://www.aihw.gov.au/>>.

The BEACH survey data for 2007–08 and 2008–09 were collected by the Family Medicine Research Centre of the University of Sydney in collaboration with the AIHW. Data for the Disease Expenditure Database were derived from data from the NHMD, NPHEd and Health Expenditure Database as well as survey-based data.

### **Timeliness**

The reference period for this data set is 2008–09. The Disease Expenditure Database can be updated only once the NHMD, NPHEd, NHCDC and Health Expenditure Databases have all been updated for the relevant financial year, which is currently a minimum of 15 months after the end of the financial year.

The AIHW first published 2008–09 data from the Disease Expenditure Database in *Australia's health 2012* in June 2012.

## Accessibility

The AIHW provides a variety of products that draw upon the Disease Expenditure Database 2008–09. Published products currently available on the AIHW website include:

- *Australia's health 2012*
- *Dementia in Australia*
- *Incontinence in Australia: prevalence, experience and cost.*

Users can request data not available online or in reports via the Expenditure and Economics Unit on (02) 6244 1119 or via email to <expenditure@aihw.gov.au>. Requests that take longer than half an hour to compile are charged for on a cost-recovery basis.

## Interpretability

Supporting information on the quality and use of the Disease Expenditure Database are published in *Health system expenditure on disease and injury in Australia, 2004–05 (technical notes)*.

Most important to note is that the Disease Expenditure Database estimates:

- are a conservative estimate based on around 70% of total recurrent health expenditure
- are only one measure of the size of the disease burden on the community (that is, the 'size of the problem')
- are not the same as loss of health due to disease
- should not be regarded as how much would be saved if a specific disease or all diseases were prevented
- are not an estimate of the total economic impact of diseases in the Australian community. This is because the estimates do not include costs that are not accrued by the health system, such as travel costs of patients, costs associated with the social and economic burden on carers and family, and costs incurred due to lost quality and quantity of life.

## Relevance

Disease expenditure estimates provide a broad picture of the use of health system resources classified by disease group, as well as a reference source for planners and researchers interested in costs and use patterns for particular disease groups.

The Disease Expenditure Database contains a conservative estimate based on around 70% of total recurrent health expenditure.

It is not possible to allocate all expenditure on health goods and services by disease. Expenditure that could not be allocated by disease includes capital expenditure as well as expenditure for non-admitted patient hospital services, over-the-counter drugs, other health practitioner services (except optometry), community health services expenditure (except community mental health), expenditure on public health programs (except cancer screening programs), health administration, health aids and appliances, and patient transport (ambulance).

Readers need to bear in mind that cost-of-illness data provide only estimates of the impact of a disease on health system expenditures. The estimates of the cost of treating and/or preventing a disease cannot be used to indicate the loss of health due to that disease.

Care should be taken not to interpret expenditure associated with disease treatment as simply an estimate of the savings that would result from prevention of disease. Conversion of the opportunity cost – or the benefits forgone – of resources being devoted to disease treatment into expenditure savings involves a number of additional considerations. See, for example, AIHW: Mathers et al. 1998.

### **Accuracy**

Apart from hospital admitted patient services data, the method for estimating disease expenditure is generally a ‘top-down’ approach, where total expenditure across the health system is estimated and then allocated to the relevant conditions. This method yields consistency, good coverage, and totals that add up to known expenditures. However, it is not as sensitive or accurate for any specific disease as a detailed ‘bottom-up’ analysis of actual costs incurred by patients with that disease. In most cases, a bottom-up analysis is not possible due to a lack of available data.

Both out-of-hospital medical services and prescription pharmaceuticals expenditure estimates draw upon proportions derived from BEACH surveys for 2007 to 2009. In each BEACH survey, the vocationally registered GPs and all general practice registrars who claimed a minimum of 375 general practice A1 Medicare items in the most recently available 3 months make up the population from which a sample is drawn (Britt et al. 2009). GPs are randomly selected from this population and approached for participation in the survey. Each BEACH survey includes a sample of 1,000 recognised practising GPs across the country (about 6% of all recognised practising GPs) completing details for 100 consecutive GP encounters. Each BEACH survey contains details of about 100,000 encounters between GPs and patients (about a 0.1% sample of all general practice encounters) (Britt et al. 2009). For further information regarding data collection methods in BEACH surveys, refer to the *General practice activity in Australia 2008–09* report (Britt et al. 2009). In light of these sampling methods used, time series comparisons of expenditure estimates for out-of-hospital medical services and prescription pharmaceuticals need to be treated with caution. Refer to the data quality statements for the NHMD, NPHED and the Health Expenditure Database for further information on the accuracy of the data within these databases.

### **Coherence**

To ensure consistency between the Disease Expenditure Database and associated burden of disease projects, the disease groups used in the 2008–09 disease expenditure estimates were based on the 176 diseases that were published in the Australian burden of disease studies (AIHW: Mathers et al. 1999; Begg et al. 2007). Extra categories were added to provide a more comprehensive list of diseases and the two categories ‘Symptoms, signs and ill-defined conditions’ and ‘Other contact with health services’ were included to cover some health service expenditures that cannot be allocated by disease.

The methodologies used to estimate expenditures for admitted patient hospital services have remained unchanged between 2004–05 and 2008–09. Hence, time series comparisons for admitted patient hospital services are possible.

While the methodologies used to estimate expenditures for out-of-hospital medical services and prescription pharmaceuticals have also remained unchanged between 2004–05 and 2008–09, the use of data based on the BEACH survey in the methodologies has meant that time series comparisons for these areas of expenditure should be made with caution.

Comparisons over time for optometrical and dental services, community mental health services and public health cancer screening can be made with more confidence.

### **Implementation date**

6 February 2012.

### **Link to the data quality statement**

The data quality statement for the Disease Expenditure Database 2008–09 is at:  
<<http://meteor.aihw.gov.au/content/index.phtml/itemId/512599>>.

### **Source and reference attributes**

AIHW (Australian Institute of Health and Welfare): Mathers et al. 1998. Disease costing methodology used in the disease costs and impact study 1993–94. Cat. no. HWE 7. Canberra: AIHW.

AIHW: Mathers C et al. 1999. The burden of disease and injury in Australia. Cat. no. PHW 17. Canberra: AIHW.

Begg S, Vos T, Barker B, Stevenson C, Stanley L & Lopez AD 2007. The burden of disease and injury in Australia 2003. AIHW cat. no. PHE 82. Canberra: AIHW.

Britt H, Miller GC, Charles J, Henderson J, Bayram C, Pan Y et al. 2009. General practice activity in Australia 2008–09. General practice series no. 25. Cat. no. GEP 25. Canberra: AIHW.

# Appendix C: Detailed statistical tables

Table C1: Prevalence of arthritis and other musculoskeletal conditions, by age group, 2011–12

Age group (years)	Osteoarthritis		Rheumatoid arthritis		Back problems		Osteoporosis	
	No. ('000)	%	No. ('000)	%	No. ('000)	%	No. ('000)	%
0–15	n.p.	0.0	5.8	0.1*	39.0	0.9	n.p.	0.0
16–34	47.2	0.8	23.1	0.4**	602.5	10.1	13.7	0.2**
35–64	898.1	10.3	243.7	2.8	1,730.7	19.8	289.3	3.3
65–79	642.1	28.8	127.5	5.7	511.6	23.0	273.2	12.3
80 or over	242.0	34.9	40.1	5.8	118.4	17.1	147.3	21.2
<b>All ages</b>	<b>1,821.5</b>	<b>8.0</b>	<b>444.9</b>	<b>1.9</b>	<b>3,003.8</b>	<b>13.2</b>	<b>728.2</b>	<b>3.1</b>

n.p. Not publishable because of small numbers and very high relative standard errors.

\* Estimate is subject to sampling variability too high for practical purposes (relative standard error greater than 50%).

\*\* Estimate is subject to high standard errors (relative standard error of 25–50%) and should be used with caution.

#### Notes

- Cells in this table have been randomly adjusted to avoid the release of confidential data. Discrepancies may occur between sums of the component items and totals.
- See Figure 1.1.
- Prevalence for all ages was age-standardised to Australian population as at 30 June 2001.

Source: ABS Australian Health Survey 2011–12.

Table C2: Expenditure by type of arthritis and other musculoskeletal conditions, 2008–09 (\$ million)

Condition	\$m	%
Osteoarthritis	1,637	28.8
Rheumatoid arthritis	355	6.2
Back problems	1,177	20.7
Osteoporosis	306	5.4
Other	2,214	38.9
<b>Total musculoskeletal conditions</b>	<b>5,690</b>	<b>100.0</b>

Note: See Figure 3.2.

Source: Disease Expenditure Database, AIHW.

**Table C3: Distribution of expenditure for arthritis and other musculoskeletal conditions, by health-care sectors, 2008–09 (\$ million)**

Health-care sector	Osteoarthritis		Rheumatoid arthritis		Back problems		Osteoporosis		Other musculoskeletal conditions	
	\$m	%	\$m	%	\$m	%	\$m	%	\$m	%
Hospital admitted patient services	1,256	76.7	44	12.4	560	47.6	44	14.4	1,188	53.6
Out-of-hospital medical expenses	282	17.2	37	10.4	464	39.4	68	22.2	825	37.3
Prescription pharmaceuticals	99	6.0	274	77.2	153	13.0	194	63.4	201	9.1
<b>Total expenditure</b>	<b>1,637</b>	<b>100.0</b>	<b>355</b>	<b>100.0</b>	<b>1,177</b>	<b>100.0</b>	<b>306</b>	<b>100.0</b>	<b>2,214</b>	<b>100.0</b>

Note: See Figure 4.1.

Source: Disease Expenditure Database, AIHW.

**Table C4: Expenditure on arthritis and other musculoskeletal conditions, by age and sex, 2008–09 (\$ million)**

Age group (years)	Males	Females	Persons
	\$m		
0–4	13	60	72
5–14	48	51	100
15–24	105	86	190
25–34	139	119	258
35–44	250	244	494
45–54	391	457	88
55–64	551	687	1,238
65–74	509	736	1,245
75–84	361	617	978
85+	78	188	266
<b>All ages</b>	<b>2,444</b>	<b>3,245</b>	<b>5,690</b>

Note: See Figure 5.1.

Source: Disease Expenditure Database, AIHW.

**Table C5: Expenditure on specific types of arthritis and other musculoskeletal conditions, by sex, 2008–09 (\$ million)**

Condition	Males	Females	Persons
	\$m		
Osteoarthritis	706	931	1,637
Rheumatoid arthritis	105	250	355
Back problems	536	642	1,177
Osteoporosis	49	257	306
Other musculoskeletal conditions	1,048	1,165	2,214
<b>All musculoskeletal conditions</b>	<b>2,444</b>	<b>3,245</b>	<b>5,690</b>

Components may not sum to the total due to rounding.

Note: See Figure 5.2.

Source: Disease Expenditure Database, AIHW.

**Table C6: Expenditure for arthritis and other musculoskeletal conditions, by health-care sectors, age and sex, 2008–09 (\$m)(\$ million)**

Age group (years)	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total males	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total females	Total persons
	<b>Males</b>				<b>Females</b>				
0–4	8.9	2.2	1.6	12.7	7.6	7.2	44.9	59.7	72.4
5–14	31.0	16.7	0.8	48.5	33.7	12.7	4.8	51.2	99.7
15–24	69.8	30.6	4.2	104.5	46.3	35.7	3.6	85.6	190.2
25–34	85.8	45.4	7.4	138.6	53.1	52.1	14.3	119.5	258.1
35–44	135.8	91.7	22.7	250.2	100.5	113.1	30.3	243.9	494.0
45–54	203.3	125.2	62.6	391.2	190.2	181.3	85.8	457.2	848.5
55–64	316.7	155.9	78.3	550.9	340.4	228.8	118.1	687.3	1,238.3
65–74	327.6	134.2	47.4	509.2	398.0	184.1	153.6	735.7	1,245.0
75–84	227.0	84.0	49.8	360.8	348.2	129.8	138.7	616.8	977.6
85+	55.4	10.8	11.6	77.8	111.7	35.3	41.2	188.2	266.0
<b>Total</b>	<b>1,461.2</b>	<b>696.8</b>	<b>286.4</b>	<b>2,444.5</b>	<b>1,629.9</b>	<b>979.9</b>	<b>635.4</b>	<b>3,245.2</b>	<b>5,689.7</b>

Note: See Figure 5.3.

Source: Disease Expenditure Database, AIHW.

**Table C7: Expenditure for osteoarthritis by health-care sectors, age and sex, 2008–09 (\$ million)**

Age group (years)	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total males	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total females	Total persons
	<b>Males</b>				<b>Females</b>				
0–4	0.0	0.0	0.1	0.1	0.0	0.0	0.7	0.7	0.8
5–14	0.0	0.0	0.0	0.0	0.1	0.3	0.0	0.0	0.4
15–24	1.0	0.4	0.1	1.5	0.5	1.1	0.1	1.7	3.4
25–34	3.3	1.3	0.2	4.8	2.0	0.9	0.5	3.6	8.2
35–44	14.2	5.4	1.2	20.8	9.8	5.3	1.7	16.8	37.7
45–54	53.5	15.0	3.9	72.4	54.9	21.2	4.9	81.1	153.4
55–64	150.3	28.4	8.4	187.1	171.6	43.6	13.1	228.3	415.5
65–74	191.8	34.8	9.8	236.4	234.0	49.4	17.9	301.3	537.7
75–84	123.6	25.1	9.2	158.1	189.1	36.7	18.0	243.8	401.8
85+	19.8	3.0	2.1	24.8	36.3	10.0	7.5	53.8	78.7
<b>Total</b>	<b>557.7</b>	<b>113.5</b>	<b>35.0</b>	<b>706.2</b>	<b>698.3</b>	<b>168.5</b>	<b>64.4</b>	<b>931.2</b>	<b>1,637.4</b>

Note: See Figure 5.4.

Source: Disease Expenditure Database, AIHW.

**Table C8: Expenditure for back problems, by health-care sector, age and sex, 2008–09 (\$ million)**

Age group (years)	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total males	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total females	Total persons
	<b>Males</b>				<b>Females</b>				
0–4	0.4	0.3	0.8	1.5	0.3	0.0	0.5	0.9	2.4
5–14	0.6	1.6	0.0	2.2	0.9	1.4	0.0	2.4	4.6
15–24	3.8	7.7	0.9	12.5	4.3	8.5	1.0	13.9	26.3
25–34	17.7	14.6	3.9	36.2	14.4	21.0	4.7	40.1	76.3
35–44	40.1	31.3	10.8	82.3	33.9	38.7	10.0	82.6	164.9
45–54	49.6	45.6	16.8	112.0	46.9	54.8	17.1	118.9	230.9
55–64	53.4	45.2	14.3	112.9	52.5	54.0	16.2	122.6	235.5
65–74	48.3	34.7	8.9	91.9	57.2	44.1	15.8	117.1	209.0
75–84	38.7	19.9	7.9	66.5	59.4	29.4	15.6	104.5	171.0
85+	12.3	3.5	2.1	17.9	25.4	8.1	5.1	38.6	56.5
<b>Total</b>	<b>264.9</b>	<b>204.5</b>	<b>66.5</b>	<b>535.9</b>	<b>295.3</b>	<b>260.1</b>	<b>86.1</b>	<b>641.5</b>	<b>1,177.4</b>

Note: See Figure 5.5.

Source: Disease Expenditure Database, AIHW.

**Table C9: Expenditure for rheumatoid arthritis, by health-care sectors, age and sex, 2008–09 (\$ million)**

Age group (years)	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total males	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total females	Total persons
	<b>Males</b>				<b>Females</b>				
0–4	0.1	0.0	0.1	0.1	0.5	0.0	0.6	1.1	1.2
5–14	0.7	0.3	0.5	1.5	1.1	0.1	4.5	5.8	7.2
15–24	0.4	0.3	2.0	2.8	0.8	0.6	0.6	2.0	4.8
25–34	0.3	0.1	0.0	0.4	1.0	1.3	4.9	7.3	7.7
35–44	0.9	1.1	2.8	4.8	1.9	1.2	7.9	11.1	15.9
45–54	1.5	1.6	30.4	33.5	4.7	4.5	40.4	49.6	83.1
55–64	3.0	4.0	27.4	34.4	8.1	7.8	43.4	59.3	93.8
65–74	2.8	2.0	9.6	14.4	7.5	5.3	62.9	75.7	90.2
75–84	1.6	1.6	8.8	11.9	5.5	4.1	24.8	34.4	46.3
85+	0.2	0.3	0.8	1.4	1.1	0.5	2.2	3.8	5.2
<b>Total</b>	<b>11.7</b>	<b>11.2</b>	<b>82.5</b>	<b>105.3</b>	<b>32.3</b>	<b>25.4</b>	<b>192.2</b>	<b>249.9</b>	<b>355.2</b>

Note: See Figure 5.6.

Source: Disease Expenditure Database, AIHW.

**Table C10: Expenditure for osteoporosis, by health-care sectors, age and sex, 2008–09 (\$ million)**

Age group (years)	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total males	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total females	Total persons
	<b>Males</b>				<b>Females</b>				
0–4	0.0	0.0	0.2	0.2	0.0	0.0	0.9	0.9	1.1
5–14	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.1	0.2
15–24	0.1	0.0	0.0	0.1	0.1	0.2	0.6	0.9	1.0
25–34	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.5	0.6
35–44	0.3	0.3	0.5	1.1	0.3	0.8	0.8	1.9	3.0
45–54	0.6	0.7	1.4	2.7	0.7	2.6	8.3	11.6	14.3
55–64	1.1	1.7	2.4	5.2	2.0	17.5	27.4	46.9	52.1
65–74	1.5	3.5	8.6	13.6	5.0	15.4	43.2	63.6	77.3
75–84	2.8	4.3	11.2	18.3	14.0	14.1	63.0	91.1	109.4
85+	2.3	0.8	4.8	7.9	12.2	5.9	21.0	39.1	47.0
<b>Total</b>	<b>8.8</b>	<b>11.5</b>	<b>29.1</b>	<b>49.4</b>	<b>34.5</b>	<b>56.7</b>	<b>165.4</b>	<b>256.6</b>	<b>306.0</b>

Note: See Figure 5.7.

Source: Disease Expenditure Database, AIHW.

**Table C11: Expenditure for other musculoskeletal conditions, by health-care sectors, age and sex, 2008–09 (\$ million)**

Age group (years)	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total males	Admitted patient costs	Out-of-hospital medical expenses	Prescription medicines	Total females	Total persons
	<b>Males</b>				<b>Females</b>				
0–4	8.4	1.9	0.5	10.8	6.8	7.1	42.2	56.1	66.9
5–14	29.6	14.8	0.2	44.6	31.5	11.0	0.2	42.7	87.3
15–24	64.3	22.1	1.2	87.6	40.5	25.3	1.3	67.2	154.7
25–34	64.3	29.3	3.3	97.0	35.6	28.7	4.0	68.2	165.2
35–44	80.2	53.6	7.3	141.2	54.7	66.9	9.9	131.5	272.7
45–54	98.2	62.3	10.2	170.7	82.9	98.2	15.0	196.1	366.8
55–64	108.9	76.7	25.8	211.3	106.3	105.9	17.9	230.1	441.4
65–74	83.2	59.2	10.5	152.9	94.3	69.8	13.9	178.0	330.9
75–84	60.2	33.1	12.7	106.0	80.2	45.5	17.4	143.1	249.1
85+	20.8	3.1	1.7	25.7	36.7	10.8	5.4	53.0	78.7
<b>Total</b>	<b>618.2</b>	<b>356.1</b>	<b>73.4</b>	<b>1,047.6</b>	<b>569.5</b>	<b>469.2</b>	<b>127.4</b>	<b>1,165.1</b>	<b>2,213.7</b>

Source: Disease Expenditure Database, AIHW.

**Table C12: Health-care expenditure per person for different arthritis and other musculoskeletal conditions, by age and sex, 2008–09 (\$ million)**

Sex	Age group (years)	All arthritis and other musculo-skeletal conditions	Osteo-arthritis	Rheumatoid arthritis	Back problems	Osteo-porosis	Other musculo-skeletal conditions
<b>Male</b>	0–4	17.6	0.1	0.2	2.1	0.3	15.0
	5–14	34.7	0.0	1.1	1.6	0.1	31.9
	15–24	67.6	1.0	1.8	8.1	0.1	56.7
	25–34	91.5	3.2	0.3	23.9	0.1	64.0
	35–44	162.3	13.5	3.1	53.4	0.7	91.6
	45–54	266.5	49.3	22.8	76.3	1.8	116.3
	55–64	457.1	155.2	28.6	93.6	4.3	175.3
	65–74	684.0	317.5	19.4	123.4	18.3	205.4
	75–84	839.0	367.4	27.8	154.7	42.6	246.6
	85+	645.5	206.9	11.3	148.8	65.3	213.2
	<b>Total</b>	<b>228.7</b>	<b>66.1</b>	<b>9.9</b>	<b>50.1</b>	<b>4.6</b>	<b>98.0</b>
<b>Female</b>	0–4	87.2	1.0	1.6	1.3	1.3	82.0
	5–14	38.6	0.3	4.3	1.8	0.1	32.2
	15–24	58.6	1.2	1.4	9.5	0.6	45.9
	25–34	80.0	2.3	4.9	26.8	0.3	45.7
	35–44	156.0	10.8	7.1	52.8	1.2	84.1
	45–54	306.2	54.3	33.2	79.6	7.8	131.4
	55–64	567.5	188.5	49.0	101.2	38.7	190.0
	65–74	953.8	390.6	98.2	151.8	82.5	230.7
	75–84	1141.0	451.0	63.6	193.2	168.4	264.7
	85+	787.6	225.0	15.8	161.5	163.7	221.7
	<b>Total</b>	<b>300.9</b>	<b>86.3</b>	<b>23.2</b>	<b>59.5</b>	<b>23.8</b>	<b>108.1</b>
<b>Persons</b>	0–4	51.5	0.6	0.9	1.7	0.8	47.6
	5–14	36.6	0.1	2.6	1.7	0.1	32.0
	15–24	63.2	1.1	1.6	8.8	0.3	51.4
	25–34	85.8	2.7	2.6	25.4	0.2	54.9
	35–44	159.1	12.1	5.1	53.1	1.0	87.8
	45–54	286.5	51.8	28.1	78.0	4.8	123.9
	55–64	512.4	171.9	38.8	97.4	21.6	182.7
	65–74	821.3	354.7	59.5	137.9	51.0	218.3
	75–84	1007.2	414.0	47.7	176.2	112.7	256.7
	85+	740.0	219.0	14.3	157.2	130.7	218.8
	<b>Total</b>	<b>264.9</b>	<b>76.2</b>	<b>16.5</b>	<b>54.8</b>	<b>14.2</b>	<b>103.1</b>

Source: Disease Expenditure Database, AIHW.

**Table C13: Allocated health-care expenditure in current and constant prices, Australia, by year (\$ million)**

Year	Total expenditure	Total expenditure	Expenditure on arthritis and other musculoskeletal conditions	Arthritis and other musculoskeletal conditions as % of total expenditure
	(current prices)	(2008–09 prices)	(2008–09 prices)	(2008–09 prices)
2000–01	33,882	42,915	3,411	7.9
2004–05	44,265	49,756	4,345	8.7
2008–09	65,129	65,129	5,690	8.7

*Note:* Only includes expenditure for hospital admitted patients, out-of-hospital medical expenses and prescription pharmaceuticals.

*Source:* Disease Expenditure Database, AIHW.

**Table C14: Constant price estimates, arthritis and other musculoskeletal conditions, by health-care sectors, 2000–01, 2004–05 and 2008–09 (\$ million)**

Health-care sector	2000–01	2004–05	2008–09
	\$m		
Hospital admitted patient services	1,673	2,316	3,091
Out-of-hospital medical expenses	1,264	1,341	1,677
Prescription pharmaceuticals	475	687	922
<b>Total expenditure allocated for arthritis and other musculoskeletal conditions</b>	<b>3,411</b>	<b>4,345</b>	<b>5,690</b>

*Note:* See Figure 6.1.

*Source:* Disease Expenditure Database, AIHW.

# Glossary

**allied health practitioners:** For the purpose of this report, allied health practitioners are those registered under the National Registration Accreditation Scheme. They include professionals working in psychology, pharmacy, physiotherapy, occupational therapy, radiography, optometry, chiropractor, Chinese medicine, podiatry, osteopathy and Aboriginal and Torres Strait Islander health practitioners.

**allocated health-care expenditure:** The spending on health goods and services that can be allocated by a specific disease type. Unless otherwise specified, 'expenditure' in this report refers to allocated health-care expenditure.

**arthritis:** A group of disorders in which there is inflammation of the joints, which can become stiff, painful, swollen or deformed. The two main types of arthritis are osteoarthritis and rheumatoid arthritis.

**biologic disease-modifying anti rheumatic drugs:** bDMARDs help to reduce the symptoms of rheumatoid arthritis by targeting the body's own immune system, to slow down the inflammation process and stop the progression of joint damage. Such medications are injected or given intravenously.

**capital expenditure:** Spending (expenditure) on large-scale fixed assets (for example, new buildings and equipment with a useful life extending over a number of years).

**constant prices:** Dollar amounts for different years that are adjusted to reflect the prices in a chosen reference year. This provides a way of comparing spending over time on an equal value-for-value basis without the distorting effects of inflation. The comparison will reflect only the changes in the amount of goods and services purchased – changes in the 'buying power' – not the changes in prices of these goods and services caused by inflation.

**current prices:** Dollar amounts reported for a particular year, unadjusted for inflation. Changes in current price expenditures reflect changes in both price and volume.

**disease-modifying anti-rheumatic drugs:** DMARDs help to prevent joint and cartilage damage and may produce major improvement in rheumatoid arthritis patients.

**hospital admitted patient:** A patient who undergoes a hospital's formal admission process to receive treatment and/or care. This treatment and/or care is/are provided over a period of time and can occur in hospital and/or in the person's home (for hospital-in-the-home patients).

**Hospitalisation:** Hospitalisation is synonymous with admission and separation; that is, it is an episode of hospital care that starts with the formal admission process and ends with the formal separation process.

**inflammation:** Local response to injury or infection, marked by local redness, heat, swelling and pain. Can also occur when there is no clear external cause and the body reacts against itself, as in auto-immune diseases.

**International Classification of Diseases:** The World Health Organization's internationally accepted classification of death and disease. The 10th revision (ICD-10) is currently in use.

ICD-10-AM is the Australian modification of ICD-10, used for diagnoses recorded for patients admitted to hospitals.

**minimal trauma fracture:** Refers to a type of pathological fracture that occurs as a result of a fall from standing height or less.

**musculoskeletal:** Relating to the muscles, joints and bones.

**non-admitted patient:** A patient who receives care from a recognised non-admitted patient service/clinic of a hospital, including emergency departments and outpatient clinics.

**non-steroidal anti-inflammatory drugs:** NSAIDS are drugs that reduce pain and inflammation.

**out-of-hospital medical expenses:** The cost for services provided by, or on behalf of, registered medical practitioners to non-admitted patients. These expenses include the cost of consultations and services such as imaging, pathology and diagnostic services.

**out-of-pocket costs:** The total costs incurred by individuals for health-care services over and above any refunds from Medicare and private health insurance funds.

**Pharmaceutical Benefits Scheme:** A national, government-funded scheme that subsidises the cost of a wide range of pharmaceutical drugs for all Australians to help them afford standard medications.

**prescription pharmaceuticals:** Medicines available only on the prescription of a registered medical or dental practitioner and available only from pharmacies.

**prevalence:** The number or proportion (of cases, instances, and so forth) in a population at a given time.

**principal diagnosis:** The diagnosis listed in hospital records to describe the problem that was chiefly responsible for hospitalisation.

**recurrent spending:** Spending (expenditure) on goods and services that are used during the year (for example, salaries). It may be contrasted with capital spending. See 'capital spending' above.

**Repatriation Pharmaceutical Benefits Scheme:** This scheme assists eligible veterans (with recognised war or service-related disabilities) and their dependants for both pharmaceuticals listed on the PBS and a supplementary repatriation list, at the same cost as for patients entitled to the concessional payment under the PBS.

**Separation:** The formal process where a hospital records the completion of an episode of treatment and/or care for an admitted patient. In this report, it is described by the term 'hospitalisation'. See 'hospitalisation' above.

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## Related publications

The following AIHW publications relating to arthritis and musculoskeletal conditions might also be of interest:

- AIHW 2014a. Arthritis and other musculoskeletal conditions across the life stages. Arthritis series no. 18. Cat. no. PHE 173. Canberra: AIHW.
- AIHW 2014b. Data sources for monitoring arthritis and other musculoskeletal conditions. Arthritis series no. 19. Cat. no. PHE 175. Canberra: AIHW.
- AIHW 2013a. A snapshot of juvenile arthritis. AIHW bulletin no. 113. Cat. no. AUS 168. Canberra: AIHW
- AIHW 2013b. A snapshot of rheumatoid arthritis. AIHW bulletin 116. Cat. no. AUS 171. Canberra: AIHW
- AIHW 2011. A snapshot of osteoporosis in Australia 2011. Arthritis series no. 15. Cat. no. PHE 137. Canberra: AIHW
- AIHW 2011. Use of antiresorptive agents for osteoporosis management. Cat. no. PHE 148. Canberra: AIHW.
- AIHW 2010a. Medication use for arthritis and osteoporosis. Arthritis series no. 11. Cat. no. PHE 121. Canberra: AIHW.
- AIHW 2010b. When musculoskeletal conditions and mental disorders occur together. Cat. no. AUS 129. Canberra: AIHW.
- AIHW 2010c. A snapshot of arthritis in Australia 2010. Arthritis series no. 13. Cat. no. PHE 126. Canberra: AIHW.
- AIHW 2010d. Use of health services for arthritis and osteoporosis. Arthritis series no. 14. Cat. no. PHE 130. Canberra: AIHW.

### Web-based products:

- AIHW 2014. Arthritis, osteoporosis and other musculoskeletal conditions. <<http://www.aihw.gov.au/arthritis-and-musculoskeletal-conditions>>
- AIHW 2014. A snapshot of osteoarthritis. <<http://www.aihw.gov.au/back-problems>>
- AIHW 2014. A snapshot of back problems. <<http://www.aihw.gov.au/osteoarthritis>>

Arthritis and other musculoskeletal conditions are substantial contributors to health-care expenditure in Australia. In 2008–09, estimated health-care expenditure allocated to these conditions totalled \$5,690 million—the 4th most expensive disease group, accounting for 8.7% of total health-care expenditure allocated to disease groups.

This report is the latest in a series on arthritis and other musculoskeletal conditions expenditure. The key objectives of this report are to describe the distribution of health-care expenditure by health-care sector for the major musculoskeletal conditions: osteoarthritis, rheumatoid arthritis, back problems and osteoporosis.