Australian Government
Australian Institute of Health and Welfare

Medication use for ankylosing spondylitis, psoriatic arthritis, and juvenile arthritis 2016–17

AIHW

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Summary

Arthritis and other musculoskeletal conditions are common chronic conditions affecting the bones, muscles and connective tissues. There are various treatment and management options for musculoskeletal conditions, including pharmacological and non-pharmacological interventions.

Medications are used to treat and manage musculoskeletal conditions, by reducing pain and inflammation, improving mobility and slowing disease progression. This report focuses on medications commonly used for the specific musculoskeletal conditions of ankylosing spondylitis, psoriatic arthritis, and juvenile arthritis. These conditions were selected because there are several medications listed on the Pharmaceutical Benefits Scheme (PBS) that should only be prescribed to treat these conditions.

The report further assesses the feasibility of using PBS data to estimate the prevalence of juvenile arthritis.

Medication use for ankylosing spondylitis

In 2016–17, 81,500 prescriptions for medications specific to the treatment of ankylosing spondylitis were dispensed. The majority of these prescriptions (44%) were for adalimumab.

In 2016–17, $124.6 million was spent on these medications. This included $122.5 million of benefits paid by the Australian Government, and $2.2 million of patient contributions (out-of-pocket costs).

The number of patients dispensed these medications differed by age and sex, being most commonly dispensed to males (65% compared with 35% females) and people aged 40–49.

Medication use for psoriatic arthritis

In 2016–17, 141,000 prescriptions for medications specific to the treatment of psoriatic arthritis were dispensed. The majority of these prescriptions (45%) were for leflunomide.

In 2016–17, $120.3 million was spent on these medications. This included $117.4 million of benefits paid by the Australian Government, and $2.9 million of patient contributions (out-of-pocket costs).

The number of patients dispensed these medications differed by age and sex, being most commonly dispensed to females (62% compared with 38% males) and people aged 50–69.

Using PBS data to estimate prevalence of juvenile arthritis might be feasible

The number of children living with juvenile arthritis is difficult to estimate reliably using large population surveys because it is a rare condition found in a subset of the population (children aged under 16).

Analysis of de-identified unit record PBS data produced an estimate of up to 5,400 children living with juvenile arthritis in 2016–17, who were prescribed medication from the PBS.

Further analysis using linked data is recommended

Additional analysis using linked data would be valuable to validate methods used for this report and to investigate more complex research questions, including outcomes. Further analysis is recommended to provide a more comprehensive picture of medication use for musculoskeletal conditions.

1 Introduction

1.1 Purpose of this report

This report aims to explore how Pharmaceutical Benefits Scheme (PBS) data can be used to provide insight into the pharmacological treatment of musculoskeletal conditions. It also looks at whether PBS data can be used to estimate the prevalence of specific musculoskeletal conditions.

Musculoskeletal conditions are long-term conditions of the bones, muscles and connective tissues. Arthritis and other musculoskeletal conditions are highly prevalent, affecting an estimated 7 million (29%) Australians, based on self-reported data from the 2017–18 National Health Survey (ABS 2018).

In 2015, musculoskeletal conditions contributed 13% of the total burden of disease and injury in Australia, ranking as the third leading contributor to the total burden after cancer and cardiovascular diseases (AIHW 2019a).

This report focuses on medications commonly used for 3 specific musculoskeletal conditions: ankylosing spondylitis, psoriatic arthritis and juvenile arthritis (see Box 1.1 for description).

Ankylosing spondylitis and psoriatic arthritis were chosen for this exploratory report because there are several PBS listings of medications that should only be prescribed for the treatment of these conditions, using Authority prescriptions (see Box 1.2). So it is assumed that specific item codes of these medications are being prescribed for these conditions only.

Juvenile arthritis was chosen to test whether inclusion criteria could be used to provide an estimate of juvenile arthritis prevalence in Australia. There are limited data on the prevalence of juvenile arthritis because it is an uncommon condition.

Box 1.1: Musculoskeletal conditions covered in this report

Ankylosing spondylitis: A condition that mainly affects the spine, where the joints of the neck, back and pelvis become inflamed, causing pain and stiffness. Other parts of the body can also be affected by ankylosing spondylitis, including hips, shoulders, eyes, skin, bowel and lungs (Arthritis Australia 2015a).

Psoriatic arthritis: A condition that causes inflammation of the joints, causing them to become painful, stiff and swollen. People with psoriatic arthritis are usually also affected by the skin disease psoriasis (Arthritis Australia 2015b).

Juvenile arthritis: A general name for several different types of arthritis in people aged under 16. In this report, the term ‘children’ will be used to describe people aged under 16.

1.2 Pharmaceutical Benefits Scheme

The PBS provides timely, reliable and affordable access to medications for Australians, as part of the broader National Medicines Policy. The Australian Government subsidises the costs of prescriptions on the PBS schedule, which contains medications for most medical conditions (DoH 2018). The amount subsidised by the Australian Government is referred to as ‘benefits paid’, and the co-payment paid by patients is referred to as ‘patient contributions’.

To prescribe a PBS-listed medication, health professionals must match a patient’s condition with criteria listed in the PBS Schedule. If a patient does not meet the restriction criteria outlined in

the PBS Schedule, a non-PBS prescription must be prescribed (DHS 2017). Prescriptions for eligible war veteran patients are recorded on the Repatriation Pharmaceutical Benefit Scheme (RPBS), instead of the PBS.

There are 3 broad categories of pharmaceutical benefits: Unrestricted, Restricted and Authority required (see Box 1.2). Unrestricted or Restricted items can be prescribed on a standard PBS prescription. Authority required and Authority required (streamlined) items must be prescribed using a PBS authority prescription or an approved PBS hospital prescription (DHS 2017).

The analysis presented in this report on medications dispensed for ankylosing spondylitis and psoriatic arthritis include only PBS item codes that are Authority required prescriptions for the respective condition.

Box 1.2: Categories of pharmaceutical benefits

Unrestricted	Items that can be prescribed through the PBS or RPBS without restrictions on therapeutic use.
Restricted	Items that can be prescribed through the PBS or RPBS only if the prescriber is satisfied that the patient's clinical condition matched the therapeutic uses listed in the Schedule.
Authority required	Authority required: restricted items that require authority approval from the Department of Human Services (DHS) (for the PBS) or the Department of Veteran's Affairs (for the RPBS). Authority required (streamlined): restricted items that do not require approval from the DHS or the Department of Veteran's Affairs, but must have the relevant streamlined authority code included on the prescription.

Source: DHS 2017.

1.3 Management of musculoskeletal conditions

Multidisciplinary management of musculoskeletal conditions

Treatment for, and management of, musculoskeletal conditions is mostly aimed at controlling pain, improving functioning and improving health-related quality of life. These conditions are predominantly managed in primary health-care settings by various health professionals, with a combination of medication, physical therapy, self-management education and, where necessary, referral to specialist care.

Management options for musculoskeletal conditions vary depending on the type of condition, and include both pharmacological and non-pharmacological treatments.

Non-pharmacological treatments for musculoskeletal conditions can involve allied health professionals such as physiotherapists, occupational therapists, podiatrists, ophthalmologists, Indigenous health workers and community nurses, who might provide support in multiple areas of life based on the individual's needs (RACGP 2009).

Medications play an important role in treating and managing many musculoskeletal conditions. Medications are used to reduce pain and inflammation, improve mobility and slow disease progression.

In 2015, prescription pharmaceuticals accounted for 16% ($2 billion) of Australian Government health-care spending on arthritis and musculoskeletal conditions.

Out-of-hospital medical expenses—such as general practitioner and specialist consultations, allied and other health services, imaging, pathology and dental consultations—were even more costly, accounting for 22% ($2.7 billion) of Australian Government musculoskeletal health-care spending (AIHW 2019b).

Hospital services accounted for the remaining spending on arthritis and musculoskeletal conditions. This included public admitted patients, outpatients and emergency department spending and private hospital services.

Although a multidisciplinary approach is recommended to treat and manage musculoskeletal conditions, the focus of this report is on pharmacological treatments (see Box 1.3).

Box 1.3: Medications available for treating arthritis

Non-steroidal anti-inflammatory drugs (NSAIDs) relieve the symptoms of inflammation or pain by reducing the production of prostaglandins. Prostaglandins are chemicals released by damaged cells that cause inflammation, sensitise nerve endings and can lead to pain. There are many different NSAIDs, which may be bought over-the-counter, such as ibuprofen and aspirin, or might require a prescription, such as ketoprofen (for example, Orudis) (ARA 2017).

Disease-modifying anti-rheumatic drugs (DMARDs) are commonly used to treat rheumatoid arthritis, ankylosing spondylitis, psoriatic arthritis and juvenile arthritis. Immunosuppressants are a common type of DMARD that work by decreasing the activity of the immune system, to reduce inflammation of the joints and associated pain and swelling (ARA 2019a).

Biological disease-modifying anti-rheumatic drugs (bDMARDs) are a specific type of DMARD that are manufactured from living organisms. They work by blocking the action of cytokines, and are broadly classed as cytokine modulators. Cytokines are signalling molecules excreted by cells in the immune system, skin and connective tissue that regulate inflammatory responses. Some cytokines promote inflammation and, when present at increased and unregulated levels, can lead to chronic inflammation and joint damage. bDMARDs are used to slow down rheumatic disease progression by reducing the damage to the joints, so they are disease modifying (ARA 2019a).

The most common type of bDMARDs are TNF-alpha antagonists, which work by binding to the cytokine TNF-alpha and inhibiting its activity (ARA 2019b). TNF-alpha antagonists include adalimumab, certolizumab pegol, etanercept, golimumab and infliximab.

Pharmacological treatment pathway for arthritis

NSAIDs are commonly used to treat pain and stiffness caused by inflammation of the joints experienced with arthritis. NSAIDs can be taken as needed to treat short-term symptoms, or they can be taken regularly to manage persistent symptoms (ARA 2017). NSAIDs are often the first medication used to manage arthritis.

If NSAIDs do not provide sufficient relief, other medications such as DMARDs or bDMARDs are prescribed, if appropriate.

The PBS has criteria for initiating bDMARD prescriptions for ankylosing spondylitis, psoriatic arthritis and juvenile arthritis. Patients with ankylosing spondylitis must fail to respond to at least 2 NSAIDs, combined with appropriate exercise regimes, for 3 months before beginning PBS-subsidised bDMARD treatment (DoH 2016a).

For patients diagnosed with psoriatic arthritis and juvenile arthritis, initial treatment with DMARDs must fail before bDMARDs are given (DHS 2019; DOH 2015). More information about additional restrictions and considerations applied to bDMARD prescription is available at www.pbs.gov.au/.

The use of DMARDs and bDMARDs has increased in Australia over the past decade. Over this period, the cost of conventional DMARDs decreased, while the cost of bDMARDs increased substantially (Donges et al. 2017).

The next section provides information on the conditions covered in this report, including treatment and management. More information on musculoskeletal conditions is available at https://www.aihw.gov.au/reports-data/health-conditions-disability-deaths/chronic-musculoskeletal-conditions/overview.

Management of ankylosing spondylitis

Ankylosing spondylitis is an inflammatory condition that mainly affects the spine, causing pain and stiffness. The sacroiliac joints (that connect the base of the spine to the pelvis) are commonly affected in people with ankylosing spondylitis, though other joints such as the hips and shoulders can also be affected (Arthritis Australia 2015a).

Pharmaceutical management of ankylosing spondylitis includes NSAIDs and bDMARDs. The condition should be closely monitored by general practitioners to ensure that any change in the patient's condition is immediately investigated by a rheumatologist. Education and exercise also play a vital role in managing the condition (Golder & Schachna 2016).

Management of psoriatic arthritis

Psoriatic arthritis is a condition that causes inflammation of the joints, causing them to become painful, stiff and swollen. This condition can affect any joint in the body, and people with psoriatic arthritis are usually also affected by the skin disease psoriasis (Arthritis Australia 2015b).

Treatments for psoriatic arthritis include pharmaceuticals such as NSAIDs, DMARDs and bDMARDs. Lifestyle modifications such as increased physical activity, a healthy diet and correct management of joints can also ease symptoms (Arthritis Australia 2015b).

Management of juvenile arthritis

Juvenile arthritis—also known as juvenile idiopathic arthritis—refers to all types of arthritis occurring in children aged under 16. Indications of juvenile arthritis can include swelling, pain, heat or redness in joints, lasting for at least 6 weeks. There is no cure for juvenile arthritis, though there are many successful approaches to treat and manage the condition (Arthritis Australia 2015c).

If not treated properly, juvenile arthritis can affect a child's growth and development, causing joint damage, growth abnormalities and permanent disability (AIHW 2016a).

While diagnostic investigations are being undertaken to determine a diagnosis of juvenile arthritis, it is recommended that general practitioners prescribe either simple analgesics or NSAIDs as the initial drug of choice to reduce inflammation and associated pain.

If symptoms are not resolved after 4 weeks, a referral to a rheumatologist is recommended. Once a diagnosis of juvenile arthritis has been confirmed by a rheumatologist, other drugs such as DMARDS, bDMARDs and corticosteroids can be administered if symptoms are not eased with initial therapy.

Many non-pharmacological interventions are also recommended, including monitoring diet to ensure adequate calcium and vitamin D, exercise programs and splints and foot orthotics (RACGP 2009).

Ongoing monitoring of juvenile arthritis also involves multidisciplinary care, including physiotherapy, monitoring of patient and their family's mental health and management of comorbidities that might arise.

1.4 Data source—Pharmaceutical Benefits Scheme

PBS data contain details of medicines prescriptions dispensed under the PBS and processed by DHS. Access to the PBS data was provided by the Department of Health, through the Enterprise Data Warehouse.

At the time of analysis, the latest data were for 2016–17. The PBS data used for analysis include PBS under co-payment data (that is, data for dispensed medications that were paid for entirely by the patient, with no benefits paid by the Australian Government).

Eligible war veteran prescriptions recorded on the RPBS are also included in the data source. The data source excludes some PBS programs that are subject to alternative arrangements (Section 100) where patient level details are not available—for example, medicines supplied under special arrangements to eligible Aboriginal Health Services in remote areas of Australia.

1.5 Analysis methods

The classes of medications included for analysis were:

- DMARDs
- bDMARDs
- NSAIDs.

Analysis was based at the PBS item code level, and on the date of supply. The full list of medications and PBS item codes included in the analysis for each condition are shown at Appendix A.

The analysis for ankylosing spondylitis and psoriatic arthritis included only specific PBS item codes that require authority prescriptions for treatment of the respective condition. Records with missing patient details were excluded.

PBS data were used to explore medication use for juvenile arthritis. Data were restricted to include only children aged under 16 at the date of supply, and to 2016–17, the latest available year. Records with missing patient details were excluded. Analysis included all PBS-listed medications, and investigated the type and number of medications prescribed by a rheumatologist that were dispensed to children in 2016–17.

The analysis to explore whether PBS data can be used to estimate the prevalence of juvenile arthritis included only specific NSAIDs, DMARDs and bDMARDS based on PBS item codes (see Table A3). Certain PBS item codes that are known to be used for other conditions, such as chemotherapy medications, were excluded.

The NSAIDs included in the analysis (indomethacin, diclofenac, piroxicam, meloxicam, ibuprofen, naproxen, celecoxib) are those used for paediatric rheumatological diseases (Rheumatology Expert Group 2017). Certain PBS item codes for cyclosporin and methotrexate were only included if the relevant authority code was recorded, or if prescribed by a rheumatologist.

Four inclusion criteria, developed by the AIHW in consultation with external stakeholders, were tested to estimate the number of children taking medications often used for juvenile arthritis (Box 1.4).

Box 1.4: Inclusion criteria for medications often used for juvenile arthritis

Criterion 1: Children (aged under 16) who were dispensed more than 1 script for NSAID medications within 6 months in 2017

Analysis for criterion 1 counted the number of children who were dispensed any type of NSAID more than once within a 6-month period.

Additional analysis was tested to count children with more than 3 NSAID prescriptions in a 12-month period, which resulted in a lower count of children.

A 6-month period was chosen for the final results. This is because NSAIDs usually only have a short-term role as initial treatment for juvenile arthritis while longer-term treatments are arranged (Rheumatology Expert Group 2017).

More than 1 NSAID dispensed was chosen as a generous measure of regular use, which was considered appropriate because dispensing of a medication does not necessarily reflect actual use. For instance, a child might have extra previously prescribed medications at home and does not need a repeat prescription for some time, or might be taking additional NSAIDs bought over-the-counter.

Each child regularly taking NSAIDs was only counted once.

Criterion 2: Children who were dispensed more than 1 script for DMARD medications (including bDMARDs) within 12 months in 2017

Analysis for criterion 2 counted the number of children dispensed any type of DMARD more than once within a 12-month period. bDMARDs were included as overall DMARDs, to capture the number of children taking all types of DMARDs.

Unlike NSAIDs which are usually taken orally daily or more, DMARDs are often administered subcutaneously or intravenously and might be taken up to 4 weeks apart. For this reason, a generous criterion of more than 1 DMARD over a 12-month period was used for analysis of children using DMARDs.

Each child taking more than 1 DMARD was only counted once.

Criterion 3: Children who met both criteria 1 and 2

Analysis for criterion 3 combined the results from criteria 1 and 2, only for children that met *both* criteria 1 and 2.

Each child was then counted once.

Criterion 4: Children who met either criteria 1 or 2

Analysis for criterion 4 combined the results from criteria 1 and 2, including all children who met *either* criteria.

Each child was then counted once.

1.6 Data limitations and information gaps

The following data limitations and information gaps mean that the estimates in the report are likely to underestimate the true level of medication use.

Data presented are a proxy measure. Although the medications in this report are commonly prescribed for musculoskeletal conditions, it is not certain the medication is being dispensed for the specific musculoskeletal condition.

Dispensing does not necessarily reflect actual use. PBS claims data provide a record of what medications have been supplied, but there is no way to know whether, how or by whom the medications are being used. There is no reliable comprehensive national primary care data source on prescriptions and their indication.

There are certain medications, patients and situations where dispensing is not recorded in the PBS, including:

- medications that are not on the PBS, where the patient must cover the full cost
- medications dispensed over-the-counter, such as ibuprofen, which can be used to ease discomfort associated with musculoskeletal conditions
- patients who do not hold a current Medicare card, such as those from countries that do not have a Reciprocal Health Care Agreement with Australia (DoH 2016b).

2 Results

2.1 Medication use for ankylosing spondylitis

Results presented in this section are based on analysis of specific PBS item codes for bDMARDs that should only be prescribed to treat ankylosing spondylitis (see Table A1). Other medications used to treat ankylosing spondylitis, such as NSAIDs, are not included in this analysis because they are also used for various other conditions, and there is no way to tell what the medications are being prescribed for.

In 2016–17, more than 81,500 prescriptions for bDMARDs specific to the treatment of ankylosing spondylitis were dispensed. Adalimumab (44%) was the most commonly prescribed, followed by etanercept (21%) and golimumab (20%) (Table 2.1).

Table 2.1: bDMARD prescriptions for ankylosing spondylitis, by drug type, 2016–17

Drug type	Number	%
Adalimumab	35,487	43.5
Etanercept	16,757	20.6
Golimumab	16,443	20.2
Infliximab	5,588	6.9
Secukinumab	4,295	5.3
Certolizumab pegol	2,943	3.6
Total	**81,513**	**100.0**

Source: AIHW analysis of PBS/RPBS data.

In 2016–17, $124.6 million was spent on bDMARD medications specific to the treatment of ankylosing spondylitis—$122.5 million (98%) paid by the Australian Government and $2.2 million (2%) patient contributions (Table 2.2).

The greatest benefits paid and patient contributions were for adalimumab prescriptions (43%), followed by etanercept (21%) and golimumab (18%).

Table 2.2: Benefits paid and patient contributions for ankylosing spondylitis, by drug type, 2016–17

			Total	
Drug type	**Benefit ($)**	**Patient contribution ($)**	**Amount ($)**	**%**
Adalimumab	52,053,769.4	978,673.7	53,032,443.1	42.6
Etanercept	25,715,020.4	450,333.1	26,165,353.5	21.0
Golimumab	22,437,645.0	432,793.1	22,870,438.1	18.4
Infliximab	15,772,392.4	164,088.4	15,936,480.8	12.8
Certolizumab pegol	3,895,809.1	71,918.3	3,967,727.4	3.2
Secukinumab	2,588,924.2	54,925.9	2,643,850.1	2.1
Total	**122,463,560.5**	**2,152,733**	**124,616,293**	**100.0**

Source: AIHW analysis of PBS data.

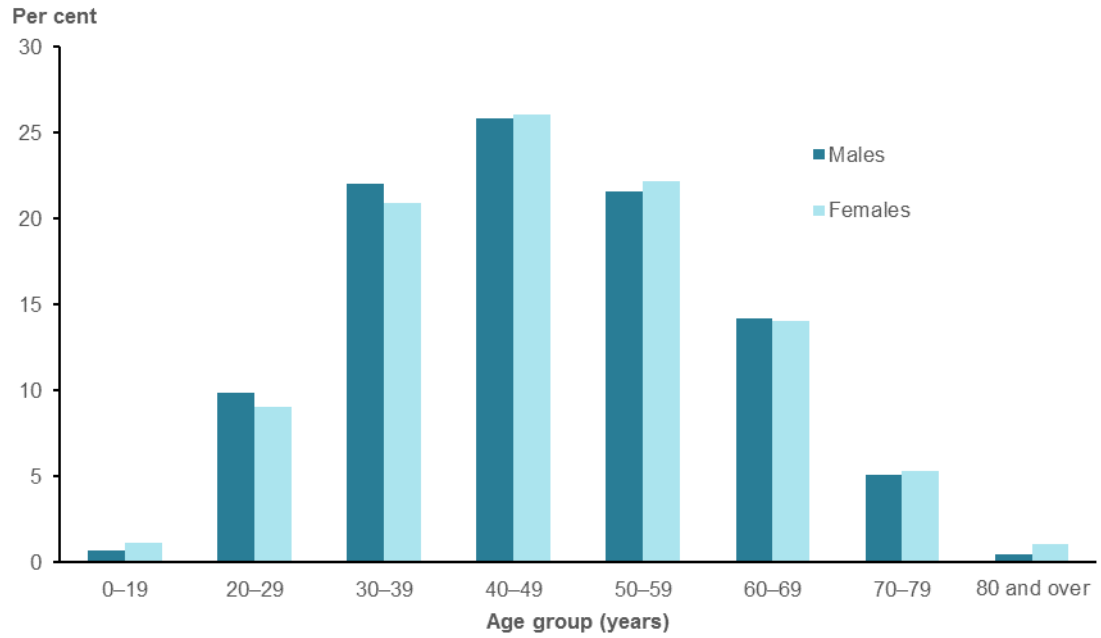
Further analysis was completed to explore the differences in the number of patients being dispensed bDMARDs specific to the treatment of ankylosing spondylitis, by age and sex.

These results might give an indication of the prevalence of ankylosing spondylitis, and how it differs by age and sex. However, as other medications not included in the analysis can also be used to treat ankylosing spondylitis, this is likely an underestimate of the true prevalence of ankylosing spondylitis.

In 2016–17, almost 9,000 patients were dispensed bDMARDs specific to the treatment of ankylosing spondylitis.

The number of patients being dispensed these medications differed by age and sex. More males (65%) than females (35%) were supplied these medications. The supply of these medications was higher in those aged 30–59, and highest in those aged 40–49 (26%) (Figure 2.1).

Figure 2.1: Patients who were dispensed ankylosing spondylitis-specific bDMARDs, by sex and age, 2016–17



Source: AIHW analysis of PBS data; Table B1.

2.2 Medication use for psoriatic arthritis

Results presented in this section are based on analysis of specific PBS item codes for bDMARDs and the DMARD leflunomide that should only be prescribed to treat psoriatic arthritis (see Table A2). Other medications that can be used to treat psoriatic arthritis are not included in this analysis because some are used for various other conditions, and there is no way to tell what the medications are being prescribed for.

In 2016–17, more than 141,000 prescriptions for medications specific to the treatment of psoriatic arthritis were dispensed.

Leflunomide (45%) was the most commonly prescribed, followed by adalimumab (23%) and etanercept (11%) (Table 2.3).

Table 2.3: Prescriptions for psoriatic arthritis-specific medications, by drug type, 2016–17

Drug type	Number	%
Leflunomide	64,090	45.4
Adalimumab	32,375	22.9
Etanercept	15,228	10.8
Secukinumab	11,452	8.1
Golimumab	11,352	8.0
Certolizumab pegol	2,874	2.0
Infliximab	2,163	1.5
Ustekinumab	1,648	1.2
Total	**141,182**	**100.0**

Source: AIHW analysis of PBS data**.**

In 2016–17, $120.3 million was spent on medications specific to the treatment of psoriatic arthritis—$117.4 million (98%) paid by the Australian Government and $2.9 million (2%) patient contributions (Table 2.4). The greatest benefits paid and patient contributions were for adalimumab prescriptions (41%), followed by etanercept (20%) and golimumab (13%).

Interestingly, leflunomide had the lowest benefits paid, but the highest proportion of all prescriptions supplied for psoriatic arthritis (45%).

Table 2.4: Benefits paid and patient contributions for psoriatic arthritis medications, by drug type, 2016–17

			Total	
Drug type	**Benefit ($)**	**Patient contribution ($)**	**Amount ($)**	**%**
Adalimumab	48,479,105.6	851,016.7	49,330,122.3	41.0
Etanercept	23,274,641.7	397,426.8	23,672,068.5	19.7
Golimumab	15,506,161.5	274,471.2	15,780,632.7	13.1
Secukinumab	10,888,547.1	130,181.1	11,018,728.2	9.2
Ustekinumab	7,361,291.5	38,745.8	7,400,037.3	6.2
Infliximab	6,277,890.3	56,989.8	6,334,880.1	5.3
Certolizumab pegol	4,059,228.5	73,203.7	4,132,432.2	3.4
Leflunomide	1,566,753.8	1,056,099.0	2,622,852.7	2.2
Total	**117,413,619.9**	**2,878,134.1**	**120,291,754**	**100.0**

Source: AIHW analysis of PBS data.

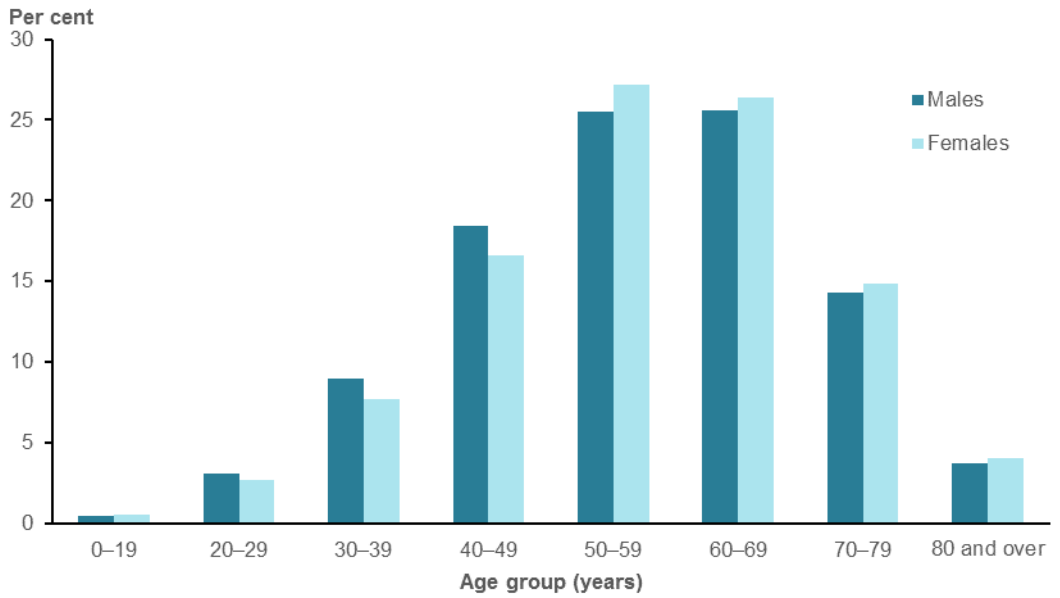
Further analysis was completed to explore the differences in the number of patients being dispensed medications specific to the treatment of psoriatic arthritis, by age and sex.

These results might give an indication of the prevalence of psoriatic arthritis, and how it differs by age and sex. However, as other medications not included in the analysis can also be used to treat psoriatic arthritis, this is likely an underestimate of the true prevalence of psoriatic arthritis.

In 2016–17, more than 22,100 patients were dispensed medications specific to the treatment of psoriatic arthritis.

More females (62%) than males (38%) were supplied these medications. The supply of medications increased with age from 1% for people aged 0–19 to 53% for those aged 50–69, before declining to 15% for people aged 70–79 and 4% for those aged 80 and over (Figure 2.2).

Figure 2.2: Patients who were dispensed psoriatic arthritis-specific medications, by sex and age, 2016–17



Source: AIHW analysis of PBS data; Table B2.

2.3 Medication use for juvenile arthritis

Which medications are children prescribed by a rheumatologist?

Early referral to a rheumatologist is recommended for children with diagnosed or suspected juvenile arthritis whose symptoms persist beyond 4 weeks. This enables an early aggressive intervention with the use of DMARDs to reduce long-term joint damage and disability (RACGP 2009). Analysis of PBS data investigated what medications are being prescribed by a rheumatologist to children.

In 2016–17, over 2,100 PBS-listed rheumatologist-prescribed medications were dispensed to children (Table 2.5).

As expected, the most common rheumatologist prescribed medications included bDMARDs, DMARDs and NSAIDs.

Adalimumab was the most commonly dispensed medication, accounting for 15% of all rheumatologist prescribed medications. The 5 most commonly prescribed medications (adalimumab, methotrexate, naproxen, etanercept and piroxicam, respectively) accounted for almost half (42%) of all rheumatologist-prescribed medications. The remaining 58% was made up of many different medications, each accounting for less than 5% of all medications prescribed.

Table 2.5: Rheumatologist-prescribed medications dispensed to children, by drug type, 2016–17

Drug type	Number	%
Adalimumab	329	15.3
Methotrexate	173	8.1
Naproxen	150	7.0
Etanercept	128	6.0
Piroxicam	121	5.6
Omeprazole	86	4.0
Prednisolone	73	3.4
Amoxicillin	55	2.6
Celecoxib	53	2.5
Cefalexin	50	2.3
Other	928	43.2
Total	**2,146**	**100.0**

Source: AIHW analysis of PBS data.

How many children are prescribed medications for juvenile arthritis?

It is difficult to estimate the prevalence of juvenile arthritis because it is so uncommon.

Based on self-reported data from the Australian Bureau of Statistics 2017–18 National Health Survey, juvenile arthritis is estimated to affect at least 1 child in every 1,000 aged 0–15 (ABS 2018).

However these estimates have a high margin of error, and should be interpreted with caution. Other sources agree that the estimated prevalence of juvenile arthritis in Australia is 1 in 1,000 children (Arthritis Australia 2015c; Rheumatology Expert Group 2017).

Exploratory analysis of PBS data investigated the number of children (aged under 16 at date of dispensing) being dispensed NSAIDs and DMARDs in 2016–17. For this analysis, bDMARDs were included as overall DMARDs, to capture the number of children taking all types of DMARDs.

Four inclusion criteria, as described in Box 1.4, were tested to explore whether dispensing patterns of NSAIDs and/or DMARDs could provide a proxy estimate of prevalence of juvenile arthritis (Figure 2.3).

Figure 2.3: Inclusion criteria for medications often used for juvenile arthritis

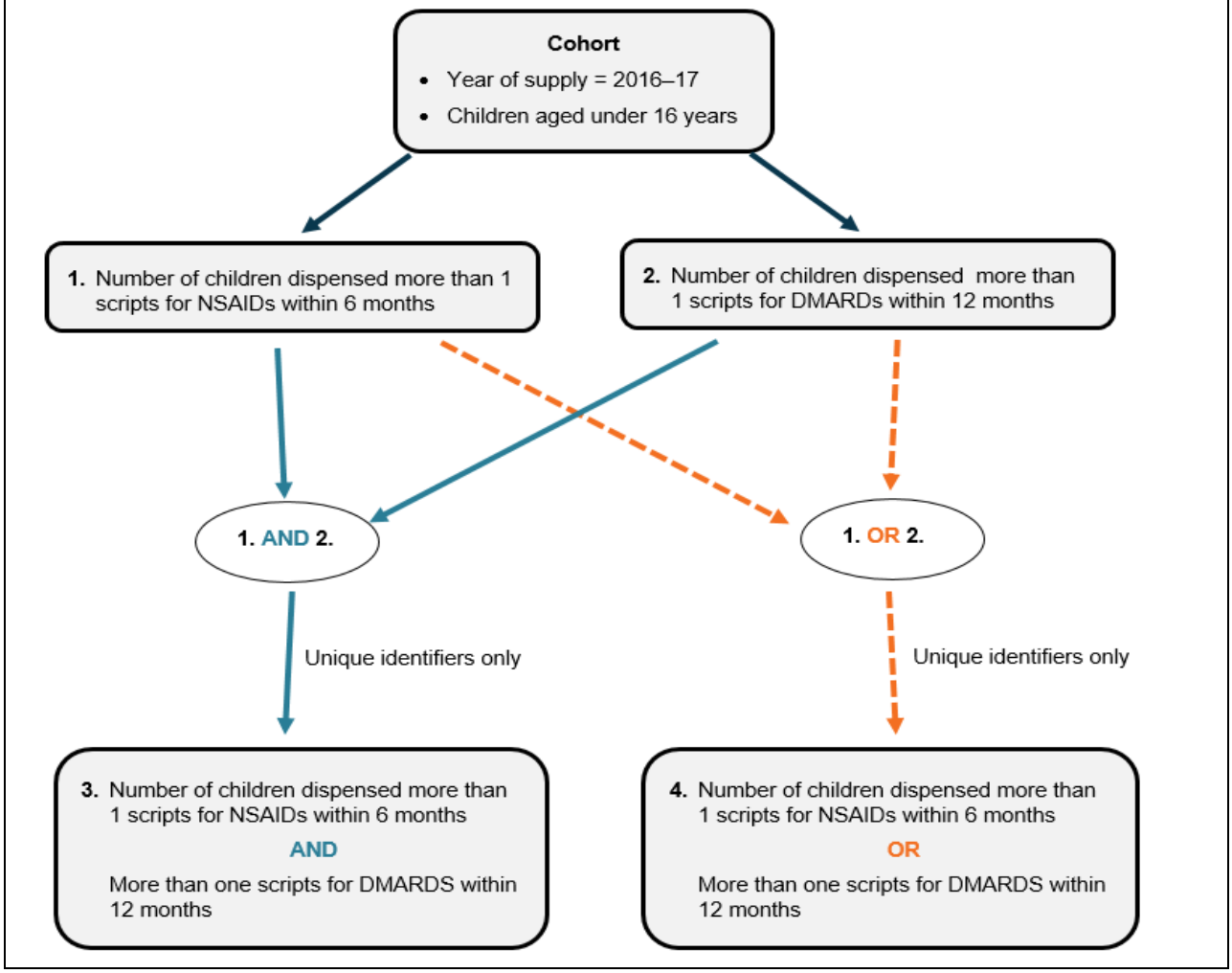


Table 2.6 shows the number of children counted under each inclusion criteria.

Table 2.6: Children who were dispensed NSAIDs and DMARDs prescriptions, 2016–17

Criterion	Dispensing rule	Number
1.	More than 1 scripts dispensed for NSAIDs within 6 months	2,546
2.	More than 1 scripts dispensed for DMARDs (including bDMARDs) within 12 months	3,082
3.	More than 1 scripts dispensed for NSAIDs within 6 months AND more than than 1 script dispensed for DMARDs (including bDMARDs) within 12 months	233
4.	More than 1 scripts dispensed for NSAIDs within 6 months OR more than 1 script dispensed for DMARDs (including bDMARDs) within 12 months	5,395

Note: The same child might be counted under multiple rules.

Source: AIHW analysis of PBS data.

A greater number of children were dispensed DMARDs (3,082 children) than NSAIDs (2,546).

Criterion 4—the number of children being dispensed NSAIDs or DMARDs—resulted in a count of 5,395 children. This is likely to be an underestimate of the true prevalence of juvenile arthritis because lower-dose NSAIDs bought over-the-counter (such as ibuprofen) are not included in the PBS data set, so are excluded from this analysis.

3 Discussion

3.1 Key findings

Medication use for ankylosing spondylitis and psoriatic arthritis

These results show that a large number of medications are used to treat ankylosing spondylitis, psoriatic arthritis and juvenile arthritis. Adalimumab was the most commonly dispensed bDMARD for both ankylosing spondylitis and psoriatic arthritis.

The costs for the medications analysed in this report were high. The high cost of bDMARDs is to be expected, as they are expensive to manufacture due to the need for living organisms.

Previous analysis has shown that bDMARDs are high-expenditure drugs. In 2013–14, out of all medications dispensed under the PBS and RPBS, adalimumab had the third highest Australian Government spending (more than $250 million), and etanercept had the sixth highest expenditure (about $150 million) (AIHW 2016b). These expensive medications are often used to treat ankylosing spondylitis, psoriatic arthritis and juvenile arthritis, if other treatment options are inadequate.

The number of patients being dispensed the medications analysed in this report differed by age and sex. These results alone cannot provide a valid prevalence estimate, as other medications and non-pharmacological treatments might also be used to manage these conditions, but they do provide an insight into which population groups are more commonly being treated for the conditions.

The results suggest that ankylosing spondylitis is more common in males (65% compared with 35% females), and in those aged 40–49. Conversely, the results suggest that psoriatic arthritis is more common in females (62% compared with 38% males), and in those aged 50–69.

Feasibility of using PBS data to estimate prevalence of juvenile arthritis

The results using PBS data to estimate prevalence of juvenile arthritis suggest that the true prevalence of juvenile arthritis might be higher than previously estimated using self-reported data. Further analysis using data linkage to other data sources (such as MBS data) would be valuable to validate assumptions.

3.2 Future work

Future work could explore whether PBS data could be used to estimate the prevalence of other musculoskeletal conditions, such as osteoporosis, rheumatoid arthritis and gout. Data linkage between PBS data and other data sources—such as MBS, hospitalisation and mortality data—would be valuable to validate the assumptions made when analysing PBS data alone.

Data linkage could also provide the opportunity to investigate additional research questions about prevalence, diagnosis, treatment and management (both pharmacological and non-pharmacological interventions) and outcome measures.

Appendix A: Medications analysed

Table A1: Medications used in analysis for ankylosing spondylitis

Class of medicine	Medication name	ATC code	PBS item codes included
bDMARDs	Adalimumab	L04AB04	09077R
			09078T
			09103D
			09104E
	Certolizumab pegol	L04AB05	10137M
			10897M
			10904X
			11318Q
			11319R
			11320T
	Etanercept	L04AB01	08778B
			08779C
			09085E
			09086F
			09455P
			09456Q
	Golimumab	L04AB06	03434R
			03435T
			03436W
			03437X
	Infliximab	L04AB02	05753T
			06448J
	Secukinumab	L04AC10	10890E
			10893H
			10906B

Table A2: Medications used in analysis for psoriatic arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
DMARDs	Leflunomide	L04AA13	05449T
			05450W
bDMARDs	Adalimumab	L04AB04	09033K
			09034L
			09101B
			09102C
	Certolizumab pegol	L04AB05	10238W
			10896L
			10909E
			11313Y
			11314B
			11326D
	Etanercept	L04AB01	09035M
			09036N
			09087G
			09088H
			09457R
			09458T
	Golimumab	L04AB06	03430M
			03431N
			03432P
			03433Q
	Infliximab	L04AB02	05756Y
			06496X
	Secukinumab	L04AC10	10894J
			10895K
			10898N
			10899P
			10900Q
			10901R
	Ustekinumab	L04AC05	10767Q
			10774C

Table A3: Medications used in analysis for juvenile arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
DMARDs	Abatacept	L04AA24	11068M
			11092T
			01220F
			01221G
			05605B
			09621J
	Aurothiomalate sodium	M01CB01	02016D
			02017E
			02018F
	Auranofin	M01CB03	01095P
			02022K
	Azathioprine	L04AX01	02687K
			02688L
	Cyclophosphamide	L01AA01	01266P
			10026Q
	Cyclosporin	L04AD01	05632K (6638 authority only)
			05633L (6638 authority only)
			05634M (6638 authority only)
			05635N (6638 authority only)
			05636P (6638 authority only)
			06125J (rheumatologist prescribed only)
			06232B (rheumatologist prescribed only)
			06352H (rheumatologist prescribed only)
			06353J (rheumatologist prescribed only)
			06354K (rheumatologist prescribed only)
			08657P
			08658Q
			08659R
			08660T
			08661W
	Leflunomide	L04AA13	05449T
			05450W
			08374R
			08375T
	Methotrexate	L01BA01	01622J
			01623K
			01818Q
			02272N
			02395C
			02396D
			11268C (7488 authority only)
			11283W (7488 authority only)
			11288D (7488 authority only)
			11295L (7488 authority only)
			11275K (7488 authority only)

(continued)

Table A3 (continued): Medications used in analysis for juvenile arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
	Penicillamine	M01CC01	02721F
			02838J
	Sulfasalazine	A07EC01	02093E
			02096H
			09208P
			09209Q
	Tocilizumab	L04AC07	01419Q
			01423X
			01464C
			01476Q
			01481Y
			01482B
			09657G
			09658H
			09659J
			09671B
			09672C
			09673D
			10056G
			10058J
			10060L
			10064Q
			10068X
			10071C
			10072D
			10073E
			10077J
			10078K
			10079L
			10081N
			10951J
			10954M
	Tofacitinib	L04AA29	10511F
			10517M
bDMARDs	Adalimumab	L04AB04	09033K
			09034L
			09101B
			09102C
			09077R
			09078T
			09103D
			09104E
			05281Y
			05282B
			05283C
			05284D
			08737W

(continued)

Table A3 (continued): Medications used in analysis for juvenile arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
			08741C
			09099X
			09100Y
			09661L
			09662M
			09663N
			09678J
			09679K
			09680L
	Certolizumab pegol	L04AB05	03425G
			10137M
			10238W
			10897M
			10896L
			10904X
			11318Q
			10909E
			11313Y
			11314B
			11326D
			11319R
			11320T
			10892G
			10905Y
			11321W
			11322X
			11325C
	Etanercept	L04AB01	03445H
			03446J
			03447K
			03448L
			03449M
			03450N
			05733R
			05734T
			05735W
			06367D
			08637N
			08638P
			08778B
			08779C
			09035M
			09036N
			09089J
			09090K
			09087G
			09088H
			09085E

(continued)

Table A3 (continued): Medications used in analysis for juvenile arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
			09086F
			09455P
			09456Q
			09457R
			09458T
			09459W
			09460X
			09615C
			09641K
	Golimumab	L04AB06	03426H
			03427J
			03428K
			03429L
			03434R
			03430M
			03431N
			03435T
			03436W
			03432P
			03437X
			03433Q
	Infliximab	L04AB02	04284L
			05757B
			06397Q
			05753T
			06448J
			05756Y
			06496X
	Rituximab	L01XC02	09544H
			09611W
	Secukinumab	L04AC10	10906B
			10893H
			10890E
			10894J
			10895K
			10898N
			10899P
			10900Q
			10901R
	Ustekinumab	L04AC05	10767Q
			10774C

(continued)

Table A3 (continued): Medications used in analysis for juvenile arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
NSAIDs	Celecoxib	M01AH01	04524D
			04525E
			08439E
			08440F
	Diclofenac	M01AB05	01299J
			01300K
			01301L
			01302M
			01331C
			01332D
			05074C
			05075D
			05076E
			05077F
			05078G
			05079H
			05361E
			05362F
			05363G
			05364H
			05365J
			05366K
	Ibuprofen	M01AE01	03190X
			03191Y
			03192B
			03198H
			05121M
			05122N
			05123P
			05124Q
			05367L
			05368M
			05369N
			05370P
	Indometacin	M01AB01	02454E
			02459K
			02757D
			05126T
			05127W
			05128X
			05377B
			05378C
			05379D
			05380E

(continued)

Table A3 (continued): Medications used in analysis for juvenile arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
	Meloxicam	M01AC06	08561N
			08562P
			08887R
			08888T
	Naproxen	M01AE02	01232W
			01236C
			01237D
			01238E
			01614Y
			01615B
			01658G
			01659H
			01662L
			01674D
			01791G
			01792H
			01795L
			01796M
			05172F
			05176K
			05177L
			05178M
			05179N
			05180P
			05181Q
			05182R
			05183T
			05184W
			05185X
			05186Y
			05187B
			05188C
			05345H
			05346J
			05347K
			05348L
			05349M
			05350N
			05351P
			05352Q
			05353R
			05354T
			05397C
			05398D

(continued)

Table A3 (continued): Medications used in analysis for juvenile arthritis

Class of medicine	Medication name	ATC code	PBS item codes included
	Piroxicam	M01AC01	01895R
			01896T
			01897W
			01898X
			05201R
			05202T
			05203W
			05204X

Appendix B: Data tables

Table B1: Patients who were dispensed ankylosing spondylitis-specific bDMARDS, by sex and age, 2016–17

Age group (years)	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–19	41	0.7	38	1.2	79	0.9
20–29	574	9.9	288	9.0	862	9.6
30–39	1,279	22.1	667	20.9	1,946	21.7
40–49	1,498	25.8	831	26.1	2,329	25.9
50–59	1,252	21.6	708	22.2	1,960	21.8
60–69	825	14.2	449	14.1	1,274	14.2
70–79	298	5.1	171	5.4	469	5.2
80+	30	0.5	35	1.1	65	0.7
Total	**5,797**	**64.5**	**3,187**	**35.5**	**8,984**	**100.0**

Note: See Figure 2.1.

Source: AIHW analysis of PBS data.

Table B2: Patients who were dispensed psoriatic arthritis-specific medications, by sex and age, 2016–17

Age group (years)	Males		Females		Persons	
	Number	%	Number	%	Number	%
0–19	38	0.5	74	0.5	112	0.5
20–29	259	3.1	372	2.7	631	2.9
30–39	745	8.9	1,054	7.7	1,799	8.1
40–49	1,535	18.4	2,290	16.6	3,825	17.3
50–59	2,128	25.5	3,746	27.2	5,874	26.6
60–69	2,135	25.6	3,633	26.4	5,768	26.1
70–79	1,190	14.3	2,042	14.8	3,232	14.6
80+	311	3.7	556	4.0	867	3.9
Total	**8,341**	**37.7**	**13,767**	**62.3**	**22,108**	**100.0**

Note: See Figure 2.2.

Source: AIHW analysis of PBS data.

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Abbreviations

AIHW	Australian Institute of Health and Welfare
ATC	Anatomical Therapeutic Chemical
bDMARD	Biological disease-modifying anti-rheumatic drug
DHS	Department of Human Services
DMARD	Disease-modifying anti-rheumatic drug
MBS	Medicare Benefits Schedule
NSAID	Non-steroidal anti-inflammatory drug
PBS	Pharmaceutical Benefits Scheme
RPBS	Repatriation Pharmaceutical Benefit Scheme
TNF-alpha	Tumour Necrosis Factor alpha

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List of figures

This report examines the prescription patterns for medications specific to 3 musculoskeletal conditions: ankylosing spondylitis, psoriatic arthritis and juvenile arthritis. In 2016–17, 225,000 medications specific to the treatment of either ankylosing spondylitis or psoriatic arthritis were dispensed.

Analysis of de-identified unit record PBS data produced an estimate of up to 5,400 children living with juvenile arthritis in 2016–17, who were prescribed medication from the PBS.

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