The Future Burden of Arthritis in Australia: Projections to the year 2040

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Report prepared for Arthritis Australia
February 2024

Foreword

Around 15% of Australians of all ages are currently living with arthritis, one of our most common chronic diseases, and a leading cause of pain and disability. Arthritis is also one of the most costly conditions for our health system, with expenditure of $5.26 billion in 2020-21 for osteoarthritis and rheumatoid arthritis.

It is vitally important that healthcare funders and policymakers have high quality data so that they can plan for the future impact on consumers, the health system and the broader economy. This important new research provides a timely update, projecting that the number of Australians living with arthritis will escalate to 5.39 million in 2040, an increase of 31% or an additional 1,277,811 people. This builds on our landmark 2016 report, *Counting the Costs*, which found that the cost to the government of early retirement due to arthritis was over $1.1 billion a year in extra welfare payments and lost taxation revenue. Lost GDP due to arthritis-related early retirement was $7.2 billion.

Over 2 million people living with arthritis by 2040 will be of working age, and our Millennial generation, currently aged 28-43, will be bearing a significant impact from these conditions. For the first time, we have projections of prevalence of arthritis by gender, with the projected prevalence of osteoarthritis for women almost 80% higher than for men. These data compel us to rethink our approach to arthritis management and prevention for the generations who stand on the precipice of this escalating health challenge.

With an estimated cost of at least $7.77 billion per year to our health system by 2040, we can and must do better. Australians are not currently receiving the best possible care, with major gaps in access to care according to clinical guidelines, which if properly implemented would avoid the need for a proportion of expensive joint replacements. Out-of-pocket healthcare costs are a major burden on consumers, and there is a need for national data to capture these costs more accurately.

Research will be vital in improving prevention and cost-effective treatment of arthritis. We must reverse the chronic underinvestment in arthritis and musculoskeletal research, supporting Australia's world leading researchers to make much needed breakthroughs, and ensuring we do not lose the current and next generation of researchers.

Above all, it is critical that we listen to the voices of people living with arthritis. This new report includes some key reflections on what the findings mean for consumers.

Mr. Jonathan Smithers
Chief Executive Officer, Arthritis Australia

Consumer perspective

For people living with arthritis, the information contained in this report is relevant, timely and impactful. From our lived experience, we understand not just the physical impacts of arthritis, but also the mental health and broader psychosocial effects. This report highlights the scale at which arthritis affects the Australian population and projects its increasing burden through to 2040.

The number of people living with arthritis in Australia is expected to increase across nearly all age groups. The data in this report shine a light on the varied and significant burden of this disease on younger and older adults, as well as children and adolescents. This report also focuses on the excess burden that arthritis places on females, highlighting that across all age groups, osteoarthritis, rheumatoid arthritis and juvenile idiopathic arthritis affect many more females than males. Three key actions can be taken based upon the anticipated growing arthritis burden in the future, as suggested below:

1. ***Appropriate allocation of resources and funding***

There is a need to ensure timely access to high-value arthritis care for growing numbers of people living with these conditions, regardless of where they live (for example, metropolitan, regional or rural locations) or their financial resources. The high burden of arthritis should also be used to advocate for more research funding that translates into practical and meaningfully improved outcomes for people living with arthritis and their support networks.

2. ***Increasing knowledge and awareness***

Arthritis has traditionally been considered an older person's disease, but this report highlights the types of arthritis that disproportionally affect different age groups. Raising public awareness of arthritis conditions, including those that affect younger adults (especially noting that these conditions interfere with work as well as career trajectories) and children and adolescents is key to building better support from health systems and communities. In addition, the disproportionate impacts of arthritis borne by women (which may be compounded by pre-existing socioeconomic disparities, including wage gaps) deserve attention.

3. ***Actively promoting education and inclusion***

Arthritis symptoms such as pain and stiffness can create barriers to participating in everyday tasks, productive working and intimate and social relationships. Understanding that there are people with arthritis in workplaces, educational institutions and social settings can encourage the implementation of inclusive and accessible policies and actions.

Dr Danielle Berkovic
Consumer researcher
Member, Australia and New Zealand Musculoskeletal (ANZMUSC) Clinical Trial Network Consumer Advisory Group

Executive summary

Arthritis is a collective term that comprises more than 100 different diseases affecting the joints. Some forms of arthritis also affect other parts of the body, including the skin, eyes, lungs and the cardiovascular system. A common condition (estimated to affect around 15% of Australians), arthritis is most often associated with pain, stiffness and reduced physical function. It can have significant impacts on many activities of daily living and overall quality of life. Importantly, arthritis affects older people as well as younger people, including children and adolescents.

Understanding how many Australians will likely be living with arthritis in the years ahead is essential for planning future health service needs, including health workforce requirements. Forecasting the future burden of arthritis also provides valuable information for healthcare funders, so that resource allocation can be aligned with anticipated population demand. In 2016, we published a comprehensive report for Arthritis Australia titled '*Counting the cost: The current and future burden of arthritis*' which presented the first ever projections of the burden of arthritis in Australia to the year 2030.[1] The report has been an important and enduring resource for arthritis advocacy and policy development, and for raising public awareness of the growing burden of arthritis. With the emergence of new population-level data in late 2023, it is now time to update our projections to provide a contemporary forecast of the future burden of arthritis. While we recognise that other common musculoskeletal conditions (such as low back pain) have enormous impacts at personal and societal levels, this report focuses on the same conditions covered in our earlier report. It presents our updated projections for the prevalence of arthritis (an umbrella term comprising osteoarthritis (OA), rheumatoid arthritis (RA) and other types of arthritis except gout), as well as OA, RA and juvenile idiopathic arthritis (JIA) in Australia from 2025 to 2040. The updated projections supersede our earlier projections and cannot be directly compared, given the use of newer data sources.

Based on data from the 2022 National Health Survey, we estimate that the number of Australians with arthritis will increase from 4.11 million in 2025 to 5.39 million in 2040. By 2040, the number of people living with OA is expected to increase from 2.35 million to 3.11 million and we forecast that 748,721 people will be living with RA in 2040. There will be an estimated 8,514 children and adolescents with JIA in 2040. In this report we have considered three alternative Australian population growth scenarios (low, medium and high growth scenarios) and we also report separate projections for males and females for the first time. For all projection years, the number of females with arthritis, OA, RA and JIA far exceeds the number of males with these conditions (most notably for OA).

Our conservative projections illustrate the mounting national burden of arthritis in Australia. The expected size of arthritis populations in the upcoming decades underscores the need for greater investment in arthritis prevention, management and research. The findings also highlight the importance of appropriately resourced health services that can capably deliver

timely, high-value care to an increasing number of Australians living with arthritis. For context, our projected numbers for OA and RA would translate to $7.77 billion of health system expenditure in 2040, based on current levels of spending for these conditions. Future modelling of other prevalent and disabling conditions (such as low back pain, neck pain, shoulder pain and gout) will help us to more fully understand the broader burden of musculoskeletal conditions in Australia.

Acknowledgments

This research was supported by funding from Arthritis Australia. We appreciate the support of Louise Hardy and Jonathan Smithers from Arthritis Australia.

Abbreviations

ABS	Australian Bureau of Statistics
AIHW	Australian Institute of Health and Welfare
JIA	Juvenile idiopathic arthritis
OA	Osteoarthritis
RA	Rheumatoid arthritis

Suggested citation

Ackerman I, Gorelik A, Berkovic D and Buchbinder R. The future burden of arthritis in Australia: Projections to the year 2040. Sydney: Arthritis Australia, 2024.

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Introduction

Background

Musculoskeletal conditions are highly prevalent, disabling and costly for individuals and society. While the burden of other musculoskeletal conditions (most notably, low back pain, neck pain and shoulder pain) is also significant, this report focuses specifically on arthritis. Arthritis is an umbrella term for over 100 different diseases, all of which affect the joints. Some types of arthritis also affect other parts of the body. Arthritis is one of the most common health conditions in Australia. It is estimated that around 15% of Australians (almost 3.7 million people) are currently living with arthritis.[2] Risk factors for arthritis are not always modifiable and there is a lack of effective prevention strategies. Arthritis is frequently associated with pain, stiffness and reduced physical function, and can cause difficulties with activities of daily living. It can affect participation in work, social and family roles, with negative impacts on mental wellbeing and quality of life. Many types of arthritis can progress over time, with worsening symptoms and joint damage if the condition is not appropriately managed. Aside from the personal impacts, arthritis also poses a major public health issue for Australia. This is highlighted by health system expenditure data for OA and RA, which are the two most prevalent arthritis conditions affecting adults. New data from the Australian Institute of Health and Welfare (AIHW) show that of the $14.7 billion spent on health care for musculoskeletal conditions in 2020-21, over $5.26 billion was spent on OA and RA.[3] The magnitude of health system spending is markedly higher than for other relatively common conditions such as diabetes, coronary heart disease and stroke.[3] Over $4.29 billion was spent on OA care alone, which includes $3.52 billion of expenditure on private and public hospital admissions, commonly for joint replacement surgery.[3] Over $966 million was spent on RA care, including nearly $757 million on pharmaceuticals such as disease-modifying anti-rheumatic drugs.[3]

The growing impact of arthritis conditions is particularly notable at a global level. In 1990, 4.8% of the world's population (equating to 256 million people) was estimated to have OA.[4] By 2020, this proportion had risen to 7.6% (approximately 595 million people).[4] OA remains a major contributor to disability globally. In 2020, the condition was associated with over 21 million years lived with disability, representing a 134% increase in years lived with disability worldwide since 1990.[4] In Australia specifically, OA is ranked as the 14th highest contributor to disability burden.[5] Our recent analysis of Global of Burden of Disease Study data showed that OA was associated with over 120,000 years lived with disability in Australia in 2019 (an increase of 122% since 1990), with knee OA and hand OA demonstrating the greatest disability burden.[6] For RA, 17.6 million people worldwide were estimated to have the condition in 2020, with an age-standardised prevalence of 0.21% (a 14% increase since 1990).[7] In 2020, RA was associated with 2.34 million years lived with disability and 719,000 years of life lost.[7] While data on JIA (arthritis affecting children and adolescents) are not available from the Global Burden of Disease Study, the most recent estimates from administrative datasets in the United States, United Kingdom, and

Germany indicate that the prevalence of JIA is between 0.1% and 0.4%, although upper age limits vary between studies.[8-10]

Estimating the future prevalence of arthritis provides important information for public and private healthcare funders and policy makers. Understanding how many Australians will likely be living with arthritis in the years ahead is helpful for planning future health service needs, including health workforce requirements. This information can also guide the allocation of financial resources in line with anticipated population demand for health care. To ensure that disease burden estimates are fit for purpose, it is critical that any projections are based on up-to-date population data. In 2016, we published a comprehensive report for Arthritis Australia titled '*Counting the cost: The current and future burden of arthritis*'.[1] This report included the first ever projections of the future burden of arthritis in Australia to the year 2030, based on data from the 2011-12 and 2014-15 National Health Surveys and Australian Bureau of Statistics (ABS) population projections available at that time. The report has been a valuable and enduring resource for consumer information[11] and arthritis advocacy initiatives,[12] and it underpinned the National Strategic Action Plan for Arthritis.[13] Given the release of newer National Health Survey data and updated national population projections (that reflect recent demographic trends in fertility, life expectancy and migration), there is a need to update our earlier projections to provide a contemporary forecast of the future burden of arthritis.

Types of arthritis considered in this report

This report focuses on arthritis as a collection of conditions affecting the joints, and specifically the two most common forms of arthritis in adults (OA and RA) and arthritis conditions among children and adolescents (collectively termed 'JIA'). Our use of the umbrella term 'arthritis' is aligned with the ABS classification and includes OA, RA and 'other arthritis and type unknown'. The following sections provide a brief overview of OA, RA and JIA and available clinical guidelines which provide detailed evidence-based recommendations around disease management.

Osteoarthritis

OA is the most common form of arthritis among adults. According to data from the 2022 National Health Survey, the condition is estimated to affect around 2.1 million Australians.[2] Traditionally OA was considered a degenerative disease of the joints, although an inflammatory component is now recognised.[14,15] OA is characterised by the loss of articular cartilage (cartilage that lines the articular ends of the bones) as well as changes to bone and other joint structures. Symptoms of OA commonly include pain, stiffness and reduced joint range of movement. The condition can also affect mental health, emotional wellbeing and quality of life, with impacts on activities of daily living, work, family roles and social participation. OA can affect any joint but is more common in large weightbearing joints such as the knees and hips, and in the hands and feet. The severity of OA can range from mild disease through to 'end-stage' joint disease that

may require joint replacement surgery. In most cases, a clinical diagnosis of OA can be made based on symptoms and physical examination.[16] Australian and international OA clinical guidelines, as well as the Australian Osteoarthritis of the Knee Clinical Care Standard,[17] recommend education, weight management (including weight loss, where appropriate) and exercise as core management strategies.[16,18-20] Referral for consideration of joint replacement surgery may be indicated where symptoms are no longer responsive to non-surgical management.[17]

Rheumatoid arthritis

RA is the second most common form of arthritis in Australia, estimated to affect around 513,000 people in 2022.[2] RA is an autoimmune condition that can occur in adults of any age. It is an inflammatory arthritis that can affect any joints in the body, although it commonly affects the smaller joints in the hands and feet. As RA is a systemic condition, it can also affect other organs including the eyes, skin, lungs and cardiovascular system. RA is thought to arise when the body's immune system attacks synovial membranes within a joint, causing inflammation and thickening of the synovial tissue. The adjacent bone and articular cartilage can subsequently be affected. As a result, the joint becomes painful, swollen and stiff. The condition can impact activities of daily living, work, family and social roles, and it also has implications for family planning and pregnancy. Early diagnosis and treatment is essential to prevent irreversible joint damage and joint deformity, and to limit disability. Pharmacological management, including the use of conventional, biological and targeted synthetic disease-modifying anti-rheumatic drugs, is the mainstay of RA treatment. Australian Living Guidelines for the pharmacological management of inflammatory arthritis including RA[21] and recent American College of Rheumatology guidelines for the management of RA are available.[22,23] Clinical Care Standards for RA[24] and a consumer care guide (a co-designed resource to support people with RA)[25] have also been recently published.

Juvenile idiopathic arthritis

Juvenile idiopathic arthritis encompasses different forms of inflammatory arthritis in children and adolescents. The term 'idiopathic' means that the cause of the condition is unknown. In this report, we use the term JIA to align with clinical terminology but recognise that the term 'juvenile arthritis' is used in national health datasets published by Australian government agencies. Based on these datasets, the estimated prevalence of JIA in Australia for people aged 0-19 years ranges from 38 to 291 people per 100,000 population, depending on the specific age group.[26] Juvenile idiopathic arthritis is considered about as common as diabetes among children and young adults.[26] The first symptoms of JIA usually appear before the age of 16 and symptoms can fluctuate according to disease activity. Similar to RA, most forms of JIA are thought to be autoimmune disorders, where the immune system attacks the synovial membranes within a joint. While any joint can be affected, the knees, hips, hands and feet are most frequently involved. As JIA is a systemic condition, the eyes, skin and other tissues can also

be affected. Juvenile idiopathic arthritis can be disabling due to severe pain, joint damage and growth abnormalities, and it can impact mental health, emotional wellbeing, quality of life and school attendance.[27] Early diagnosis and effective treatment (which focuses on pharmacological management) are critical to minimise lifelong impacts. Spontaneous remission may occur for some individuals; sometimes JIA can reappear in adulthood (when it may be classified as RA or another form of inflammatory arthritis). Australian Living Guidelines for the management of JIA appraises the latest evidence to guide treatment decisions[28] and recent American College of Rheumatology guidelines are available.[29,30] A consumer care guide (co-designed with families living with JIA) has also been recently published.[31]

Methods

Aim

This research aimed to forecast the future burden of arthritis in Australia to the year 2040, in terms of the number of people living with arthritis (defined as OA, RA and other types of arthritis except gout), OA, RA and JIA. Specifically, it aimed to provide overall, age-specific and sex-specific national projections for these conditions in 2025, 2030, 2035, and 2040.

Research team

The multidisciplinary team comprised research expertise in musculoskeletal epidemiology, biostatistics, health services research and consumer-led research, with clinical expertise in physiotherapy and rheumatology.

Data sources

Detailed information about the data sources used for this research are provided in the following sections.

Prevalence rates

Prevalence rates for total arthritis and for specific arthritis conditions were derived from the National Health Survey, which is conducted by the ABS approximately every three years. Data from the latest iteration (the 2022 National Health Survey) were published in December 2023.[2] The 2022 National Health Survey was conducted from January 2022 to April 2023. It comprised 17,073 participants from 13,095 randomly selected private dwellings across Australia. Data were collected from urban and rural areas in all states and territories, although very remote areas of Australia and discrete Aboriginal and Torres Strait Islander communities were excluded. One adult (aged 18 years and over) and one child (aged 0-17 years) from each dwelling were randomly selected for inclusion in the survey. Adults were interviewed by trained ABS interviewers, including about the selected child. Some older adolescents may have been interviewed with parental consent. A weighting process is used by the ABS to generate estimates for the overall Australian population. The 2022 National Health Survey used the same methods as for the 2017-18 National Health Survey where as part of the arthritis module, participants were asked whether they have or have ever had gout, rheumatism, arthritis, OA, RA or any other type of arthritis.[32,33] If participants identified an arthritis condition other than gout or rheumatism, they were asked whether they had been told by a doctor or nurse that they had the condition. For this research, we sourced national age-specific prevalence rates for total arthritis, OA, and RA for the following age groups: 0-14 years, 15-24 years, 25-34 years, 35-44 years, 45-54 years, 55-64 years, 65-74 years and 75 years and over. Age-specific rates for males, females and persons (the latter category includes non-binary classifications for sex at birth[34]) were obtained. The ABS category of 'total arthritis' (from here on referred to as 'arthritis')

comprises the subcategories of OA and RA plus the subcategory of 'other and type unknown'. Notably this category does not include gout.

The National Health Survey has a known high margin of error for arthritis prevalence among the youngest age groups (0-14 years and 15-24 years).[2] Therefore, prevalence rates for juvenile arthritis were instead sourced from the Australian Institute of Health and Welfare (AIHW).[26] These rates are based on 2021 Census data. In contrast to the National Health Survey, which involves random sampling of households, the Census is compulsory and data are collected for all Australian adults and children. The 2021 Census contained one question on long-term health conditions. This question asked people of all ages if they had ever been told by a doctor or nurse that they had any of ten specified long-term health conditions, including arthritis.[35] Long-term conditions were defined in the Census as those that have lasted or are expected to last for six months or more and were considered to include conditions that are controlled by medication or are in remission.[35] The AIHW acknowledges there are no national data sources in Australia that specifically ask respondents if they have juvenile arthritis.[26] Consequently, individuals with arthritis who are aged 0-24 years are assumed by the AIHW to have 'juvenile arthritis'.[26] The AIHW upper age limit of 24 years reflects that individuals may have active joint disease into young adulthood. The type of juvenile arthritis is not further specified by the AIHW. For this research, we sourced national age-specific prevalence rates for juvenile arthritis for the following age groups: 0-4 years, 5-9 years, 10-14 years and 15-19 years. Prevalence rates for the 20-24 age group were not used for this research, as this older age group does not align with contemporary definitions of JIA. Age-specific rates of juvenile arthritis for males, females and persons were obtained.

Australian population projections

Data on the projected population of Australia for the years 2025, 2030, 2035 and 2040 were obtained from the ABS. The most recent ABS datasets (released in November 2023) provide population projections for Australia from 2022 to 2071.[36] These projections are reported by individual year of age (from 0 to 100 years and over) for males, females and persons. Population projections are based on a set of assumptions around three key components of population change (births, deaths, and migration). We sourced three population projection series for our analyses: the 'low series' (representing the lowest population growth), the 'medium series' (representing medium population growth) and the 'high series' (representing the highest population growth).

Data analysis

All analyses were performed using Stata version 17 (StataCorp, LLC, College Station, TX, USA) and Microsoft Excel (Microsoft, USA). Age-specific prevalence rates for arthritis, OA, RA, and JIA (for males, females and persons) were applied to Australian population projection estimates for the relevant population groups for the years 2025, 2030, 2035 and 2040. The total number of males, females, and persons with each condition was obtained by summing the age-specific projections. For juvenile arthritis, we used an upper age limit of 18 years and applied the juvenile arthritis prevalence rate for the 15-19 age group to population projections for the 15-18 age group. While clinical definitions for JIA commonly refer to people less than 18 years of age (and sometimes less than 16 years), we included people aged 18 years to avoid any potential underestimation due to excluding individuals aged between 17-18 years. For all analyses, we used the ABS 'medium series' population projections as the base case and we rounded up the estimated number of people with each condition in each projection year to the nearest whole number. The ABS 'low series' and 'high series' population projections were used for sensitivity analyses, to understand the potential impact of different population inputs on the projected burden of arthritis, OA, RA and JIA. Given that the 2020-21 National Health Survey was considered a 'break in time series'[34] (it was conducted using different methods during the COVID-19 pandemic and had a relatively low response rate), we did not model any changes in arthritis prevalence over time as part of our projections.

Results

Projections for arthritis

Based on 2022 National Health Survey data and Australian population projections, an estimated 4.11 million people will be living with arthritis in 2025. The number of people with arthritis is expected to increase to 5.39 million in 2040, representing growth of 31% (Figure 1). This equates to an additional 1,277,811 people living with arthritis in Australia by 2040, compared to 2025.

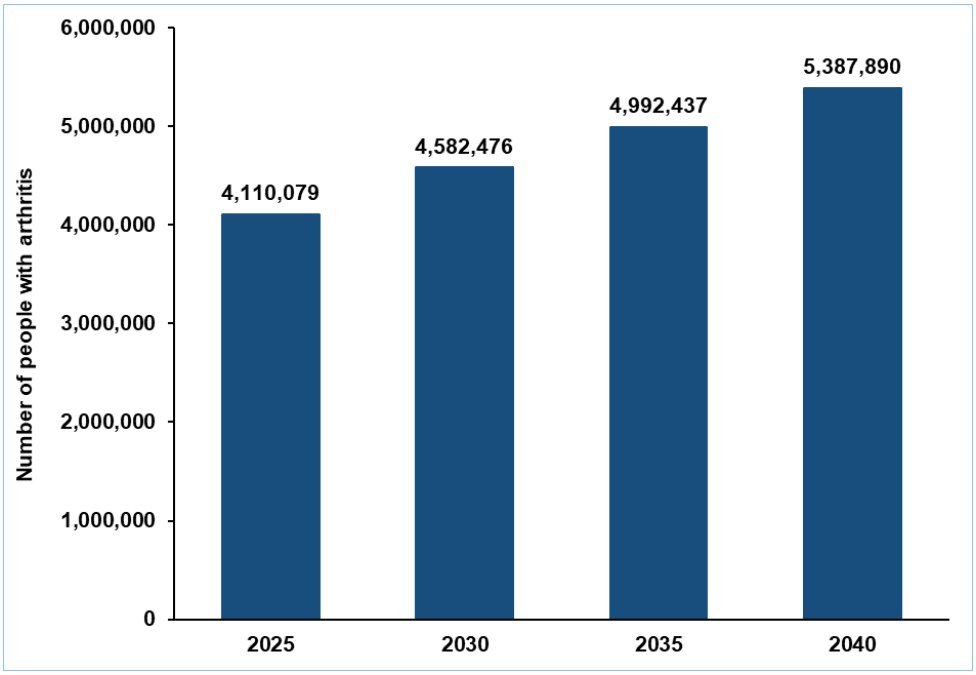


Figure 1. Projected number of Australians with arthritis to the year 2040

In all projection years, the number of people with arthritis is forecast to increase steadily with age, most notably from the age of 45 years onwards (Table 1).

Table 1. Projected national prevalence of arthritis, by age group

Age group	Prevalence	2025	2030	2035	2040
0 - 14	0.1%	4,850	4,909	4,975	5,094
15 - 24	0.6%	20,800	22,739	22,888	22,884
25 - 34	3.3%	125,728	128,450	137,926	145,973
35 - 44	6.4%	248,268	263,848	266,792	269,535
45 - 54	16.2%	540,701	580,973	648,683	684,471
55 - 64	30.5%	958,290	1,002,351	1,027,491	1,099,114
65 - 74	41.7%	1,097,652	1,229,846	1,291,429	1,343,354
75+	48.9%	1,113,790	1,349,360	1,592,253	1,817,465

Overall, the burden of arthritis in Australia is highest in females for all years of the projection period, as shown in Table 2. Over 2.17 million males and over 3.24 million females are forecast to be living with arthritis by 2040.

Table 2. Projected national prevalence of arthritis, by sex and age group

Group	Prevalence	2025	2030	2035	2040
Males					
0 - 14	0.0%	0	0	0	0
15 - 24	0.2%	3,579	3,902	3,922	3,916
25 - 34	3.6%	68,911	71,216	76,824	81,192
35 - 44	5.8%	111,213	117,787	119,940	122,652
45 - 54	14.9%	244,703	262,791	292,966	308,278
55 - 64	25.9%	397,184	414,180	423,415	453,279
65 - 74	33.8%	426,067	477,240	500,719	519,983
75+	41.1%	424,461	513,023	602,151	685,223
Total males		**1,676,118**	**1,860,139**	**2,019,937**	**2,174,523**
Females					
0 - 14	0.1%	2,359	2,391	2,424	2,482
15 - 24	1.1%	18,454	20,228	20,390	20,416
25 - 34	3.3%	60,664	61,256	65,459	69,379
35 - 44	7.1%	139,282	148,520	149,149	148,872
45 - 54	17.9%	303,471	326,239	364,803	385,951
55 - 64	35.5%	570,985	598,973	615,576	658,008
65 - 74	49.1%	673,509	754,824	793,228	826,383
75+	55.4%	689,696	837,203	992,244	1,135,417
Total females		**2,458,420**	**2,749,634**	**3,003,273**	**3,246,908**

Projections for osteoarthritis

In 2025, it is estimated that OA will affect 2.35 million Australians (Figure 2). This equates to 57% of the total arthritis population in 2025, making OA the most prevalent arthritis condition in Australia. The number of Australians living with OA is expected to increase nationally to 3.11 million in the year 2040, representing 32% growth from 2025. This equates to an additional 762,515 people living with OA in Australia by 2040, compared to 2025.

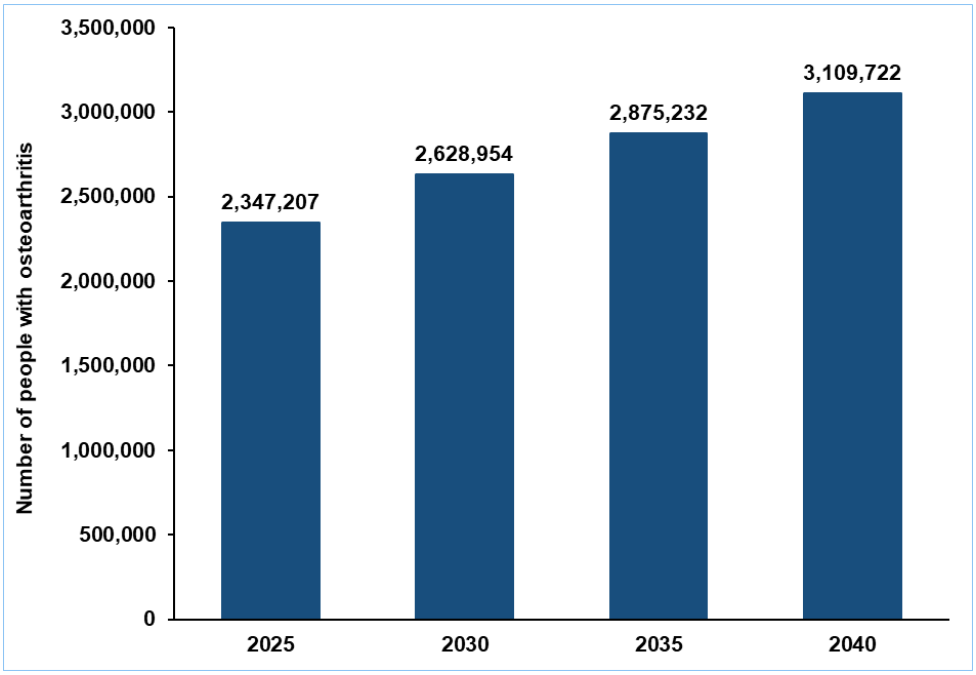


Figure 2. Projected number of Australians with osteoarthritis to the year 2040

The number of people forecast to have OA, by age group, is summarised in Table 3. While the condition is projected to affect a growing number of working-age Australians, an estimated 821,476 people aged 65-74 years and an estimated 1,115,009 people aged 75 years and over are projected to have OA by the year 2040.

Table 3. Projected national prevalence of osteoarthritis, by age group

Age group	Prevalence	2025	2030	2035	2040
0 - 14	0.0%	0	0	0	0
15 - 24	0.0%	0	0	0	0
25 - 34	0.7%	26,670	27,247	29,257	30,964
35 - 44	2.6%	100,859	107,189	108,385	109,499
45 - 54	10.2%	340,442	365,798	408,430	430,964
55 - 64	16.7%	524,703	548,828	562,594	601,810
65 - 74	25.5%	671,226	752,064	789,723	821,476
75+	30.0%	683,307	827,828	976,843	1,115,009

The burden of OA in Australia in females is substantially higher than in males in all years of the projection period (Table 4). By 2040, over 1.12 million males and over 1.99 million females are forecast to be living with OA.

Table 4. Projected national prevalence of osteoarthritis, by sex and age group

Group	Prevalence	2025	2030	2035	2040
Males					
0 - 14	0.0%	0	0	0	0
15 - 24	0.0%	0	0	0	0
25 - 34	1.2%	22,971	23,739	25,608	27,064
35 - 44	2.2%	42,185	44,678	45,495	46,524
45 - 54	7.8%	128,100	137,569	153,365	161,381
55 - 64	12.6%	193,225	201,493	205,986	220,514
65 - 74	17.4%	219,336	245,680	257,767	267,684
75+	23.9%	246,828	298,328	350,156	398,463
Total males		**852,645**	**951,487**	**1,038,377**	**1,121,630**
Females					
0 - 14	0.0%	0	0	0	0
15 - 24	0.0%	0	0	0	0
25 - 34	0.6%	11,375	11,486	12,274	13,009
35 - 44	2.4%	47,082	50,204	50,417	50,323
45 - 54	12.5%	211,921	227,820	254,751	269,519
55 - 64	20.7%	332,941	349,260	358,942	383,684
65 - 74	33.6%	460,894	516,539	542,820	565,509
75+	34.6%	430,749	522,874	619,705	709,123
Total females		**1,494,962**	**1,678,183**	**1,838,909**	**1,991,167**

Projections for rheumatoid arthritis

An estimated 562,378 people will have RA in 2025, representing 14% of the total arthritis population in that year. The number of Australians with RA is projected to increase by 33% to 748,721 people by 2040 (Figure 3). This equates to an additional 186,343 people living with RA in Australia by 2040, compared to 2025.

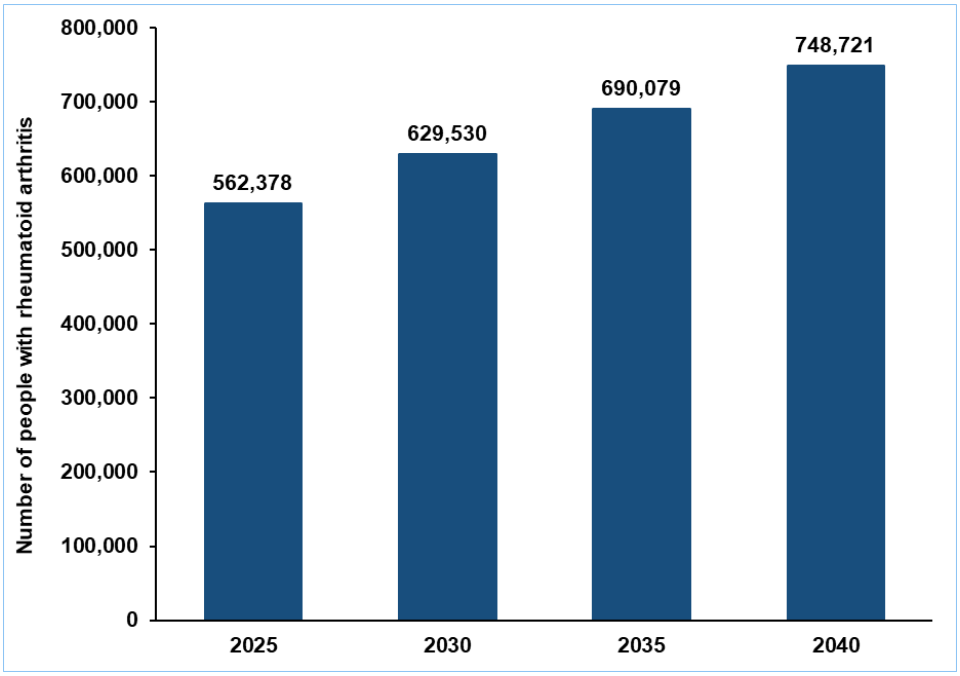


Figure 3. Projected number of Australians with rheumatoid arthritis to the year 2040

The projected burden of RA, by age group, is presented in Table 5. These estimates highlight the growing burden of RA among people of working age (most notably, those aged 45-64 years) as well as older adults.

Table 5. Projected national prevalence of rheumatoid arthritis, by age group

Age group	RA prevalence	2025	2030	2035	2040
0 - 14	0.0%	0	0	0	0
15 - 24	0.0%	0	0	0	0
25 - 34	0.3%	11,430	11,678	12,539	13,271
35 - 44	0.9%	34,913	37,104	37,518	37,904
45 - 54	2.3%	76,767	82,484	92,097	97,178
55 - 64	4.4%	138,246	144,602	148,229	158,561
65 - 74	4.6%	121,084	135,667	142,460	148,188
75+	7.9%	179,938	217,995	257,236	293,619

The burden of RA in Australia is higher among females for all age groups (Table 6). In 2025, there will be an estimated 212,136 males and 362,137 females with RA. By 2040, this is forecast to increase to 280,040 males and 479,828 females with RA.

Table 6. Projected national prevalence of rheumatoid arthritis, by sex and age group

Group	Prevalence	2025	2030	2035	2040
Males					
0 - 14	0.0%	0	0	0	0
15 - 24	0.0%	0	0	0	0
25 - 34	0.4%	7,657	7,913	8,536	9,022
35 - 44	0.3%	5,753	6,093	6,204	6,345
45 - 54	2.0%	32,846	35,274	39,325	41,380
55 - 64	3.6%	55,208	57,570	58,854	63,004
65 - 74	3.7%	46,641	52,243	54,813	56,922
75+	6.2%	64,031	77,391	90,836	103,367
Total males		**212,136**	**236,484**	**258,568**	**280,040**
Females					
0 - 14	0.0%	0	0	0	0
15 - 24	0.0%	0	0	0	0
25 - 34	0.5%	9,479	9,572	10,228	10,841
35 - 44	1.6%	31,388	33,470	33,611	33,549
45 - 54	2.3%	38,994	41,919	46,875	49,592
55 - 64	5.8%	93,288	97,861	100,573	107,506
65 - 74	5.7%	78,188	87,628	92,086	95,935
75+	8.9%	110,800	134,497	159,404	182,405
Total females		**362,137**	**404,947**	**442,777**	**479,828**

Projections for juvenile idiopathic arthritis

Juvenile idiopathic arthritis is estimated to affect 8,201 children and adolescents in 2025 (Figure 4). Based on Australian population projections that predict a reduction in the size of the 15-18 age group, the number of children and adolescents with JIA is estimated to decrease slightly from 2030 to 2035, before increasing again in 2040. When considering the overall projection period, an additional 313 children and adolescents are estimated to be living with JIA in Australia in 2040, compared with 2025.

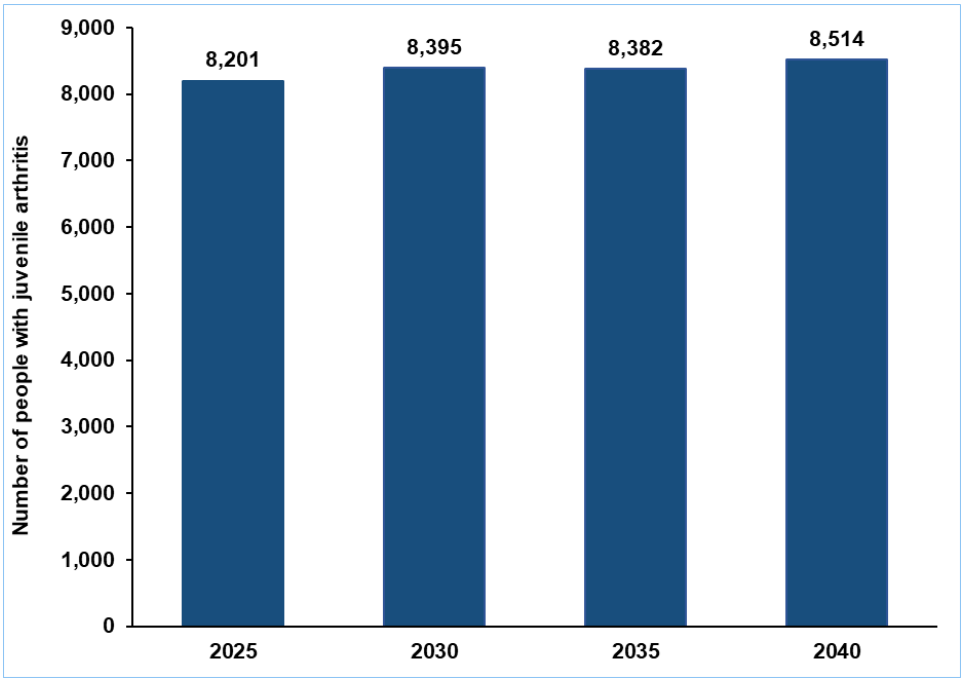


Figure 4. Projected number of Australians with juvenile idiopathic arthritis to the year 2040

For all projection years, the highest burden of JIA is evident in the 10-14 and 15-18 age groups (Table 7).

Table 7. Projected national prevalence of juvenile idiopathic arthritis, by age group

Age group	Rate per 100,000	2025	2030	2035	2040
0 - 4	38	589	600	614	641
5 - 9	75	1,211	1,231	1,240	1,269
10 - 14	143	2,413	2,420	2,440	2,457
15 - 18	291	3,988	4,247	4,088	4,147

As shown in Table 8, female children and adolescents demonstrate the highest burden of JIA in all projection years. By 2040, 3,633 males and 4,893 females are forecast to have JIA.

Table 8. Projected national prevalence of juvenile idiopathic arthritis, by sex and age group

Group	Rate per 100,000	2025	2030	2035	2040
Males					
0 - 4	35	279	284	291	303
5 - 9	63	523	530	535	547
10 - 14	127	1,102	1,104	1,110	1,119
15 - 18	228	1,607	1,668	1,644	1,664
Total males		**3,511**	**3,586**	**3,580**	**3,633**
Females					
0 - 4	42	317	323	331	345
5 - 9	87	683	696	701	717
10 - 14	160	1,313	1,317	1,331	1,340
15 - 18	358	2,384	2,480	2,448	2,491
Total females		**4,697**	**4,816**	**4,811**	**4,893**

Sensitivity analyses

Sensitivity analyses which consider alternative population growth scenarios are fully reported in the Appendix. The results of the sensitivity analysis for arthritis are summarised in Figure 5. Under alternative population growth scenarios, in 2025 the overall arthritis population in Australia is estimated to range from 4.10 million (low population growth scenario) to 4.12 million (high population growth). By 2040, the arthritis population is projected to range in size from 5.30 million to 5.56 million people, depending on the scenario (Table 9).

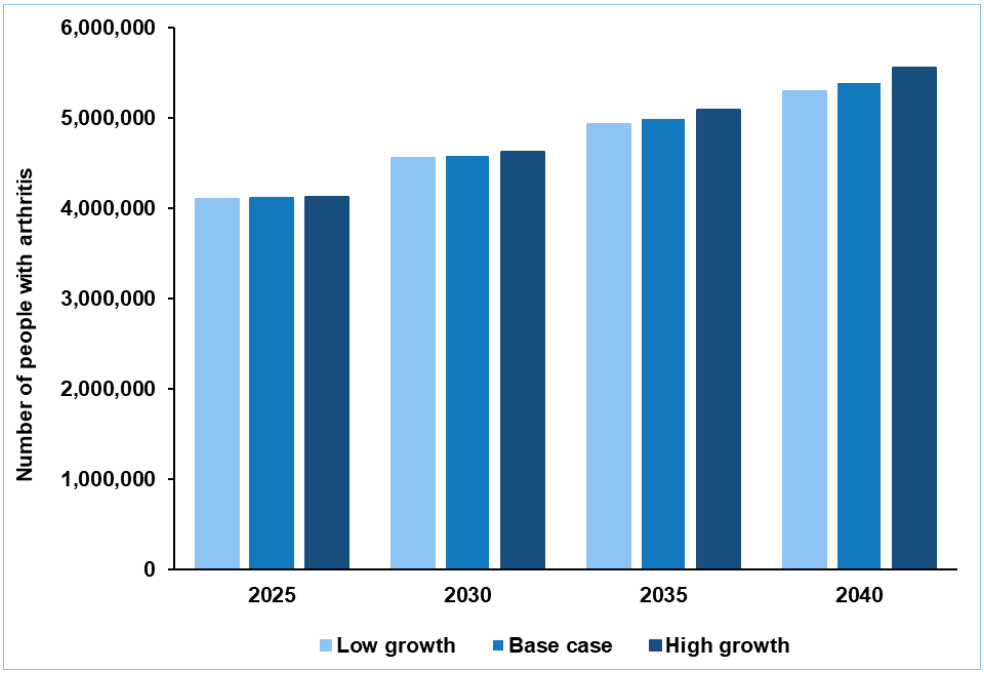


Figure 5. Projections for arthritis, according to population growth scenario

In 2025, the OA population is estimated to range from 2.34 million (low population growth scenario) to 2.35 million people (high population growth). By 2040, the OA population is estimated to range from 3.06 million people to 3.21 million people, depending on the population growth scenario (Table 10).

In 2025, the RA population is estimated to range from 561,097 people (low population growth) to 564,078 people (high population growth). By 2040, the RA population in 2040 is projected to range from 736,910 people to 773,321 people, depending on the scenario (Table 11).

In 2025, the number of children and adolescents with JIA is estimated to range from 8,147 people (low population growth) to 8,268 people (high population growth). By 2040, the JIA population in 2040 is projected to range from 7,789 people (based on an expected decrease in the size of younger age groups in Australia in the ABS 'low series' projections) to 9,293 people under a high population growth scenario (Table 12).

Key messages

- Estimating the future prevalence of arthritis provides important information for healthcare funders and policy makers. These projections can support advocacy efforts, as well as planning for future health service requirements and resource allocation. This is particularly important given that most arthritis conditions are not currently preventable.

- In the base case scenario, the number of Australians living with arthritis is expected to increase from 4.11 million in 2025 to 5.39 million in 2040. This represents an anticipated growth of 31% and equates to an additional 1,277,811 people living with arthritis in Australia by 2040. A high population growth scenario could see the overall arthritis population rise to 5.56 million people by 2040.

- In all projection years, the greatest burden of arthritis will be borne by people of working age (most notably those aged between 45-64 years, with implications for workforce participation and work productivity) and older adults.

- The number of people with OA is expected to increase nationally to 3.11 million in the year 2040, equating to an additional 762,515 people living with OA in Australia. A high population growth scenario could see the number of people with OA rise to 3.21 million people by 2040.

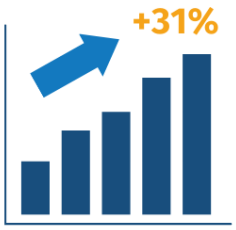
- The number of Australians with RA is projected to increase to 748,721 people by the year 2040. This equates to an additional 186,343 people living with rheumatoid arthritis in Australia by 2040.

- With little projected growth in the size of younger age groups (and an expected slight reduction in the size of the 15-18 age group from 2030-2035), the number of Australians with JIA is forecast to remain relatively steady from 2025 to 2040. It is estimated that 8,514 children and adolescents will be living with JIA in 2040, up from 8,201 in 2025.

- In all projection years, the number of females with arthritis, OA, RA, or JIA far exceeds the number of males with these conditions. This was most notable for OA, where the prevalence among women was almost 80% higher than for men.

Australians living with arthritis





4.11 million in 2025

5.39 million in 2040

The number of people with arthritis could reach 5.56 million by 2040 in a high population growth scenario



Arthritis affects more females than males

By 2040 there is likely to be

3,109,722 Australians with osteoarthritis

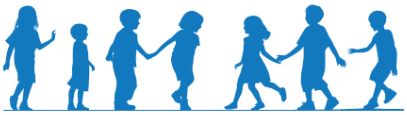
748,721 Australians with rheumatoid arthritis



$7.77 billion

health system expenditure for these conditions

8,514



Children and adolescents with juvenile idiopathic arthritis in 2040

Strengths and limitations

This research has several key strengths. We used the most recent national datasets to generate contemporary estimates of the future number of Australians living with arthritis conditions. We identified and sourced a comprehensive set of national government data sources from the ABS and AIHW, including National Health Survey data, national Census data and national population projections that are based on recent trends in fertility, life expectancy and migration. Importantly, we incorporated recently released arthritis prevalence data from the 2022 National Health Survey (published in December 2023) and new Australian population projections (published in November 2023). Our projections account for anticipated changes in population size plus population ageing, and we considered three alternative population growth scenarios. We also report, for the first time, sex-specific projections for arthritis, OA, RA, and JIA. These sex-based estimates highlight the far higher burden of arthritis conditions among females.

We also acknowledge the main limitations of the available data sources. The National Health Survey captures self-reported diagnosed arthritis, where survey participants report they have been told by a doctor or nurse that they have a particular condition. This approach may underestimate the true prevalence of arthritis, by excluding people in the early stages of disease with minimal symptoms, people who have not yet been diagnosed with arthritis or people who have not yet sought clinical care for their arthritis. This is particularly pertinent for the 2022 National Health Survey which reported lower prevalence rates for arthritis and OA (14.5% and 8.3%, respectively), compared with the 2014-15 (15.3% and 9.0%, respectively) and 2017-18 surveys (15.0% and 9.3%, respectively). This discrepancy might relate to under-diagnosis of arthritis conditions due to limited healthcare access with COVID-19 restrictions. We also note there was a small decrease in the overall prevalence of some other musculoskeletal conditions (for example, back problems and osteoporosis) in the most recent survey iteration, compared with the 2017-18 survey. As with any self-reported surveys, there may also be issues around individuals correctly identifying or recalling the specific type of arthritis. The National Health Survey only includes people living in private dwellings and does not include people living in nursing homes or aged care facilities. This could lead to an underestimation of conditions such as OA that disproportionately affect older people.

The National Health Survey does not sample very remote geographical areas or discrete Aboriginal and Torres Strait Islander communities and may underestimate the prevalence of arthritis among indigenous populations. In this report, we have not presented any stratified analysis by indigenous status but are cognisant that arthritis prevalence is considered higher among Indigenous Australians, based on data from the 2018-19 National Aboriginal and Torres Strait Islander Health Survey. It was estimated that 85,600 Indigenous Australians (across all age groups) were living with arthritis in 2018-2019.[37] The ABS have reported an age-standardised prevalence of arthritis of 16.5% in Aboriginal and Torres Strait Islander people, compared with 13.2% for non-indigenous people in the 2017-18 National Health Survey (13.4% for indigenous

males, compared with 10.9% for non-indigenous males, and 19.2% for indigenous females, compared with 15.4% for non-indigenous females).[37] However, no prevalence data were reported for specific arthritis conditions. Future research in partnership with Aboriginal Community Controlled Health Organisations may assist in better understanding the burden of arthritis among indigenous Australians.

We note that while the National Health Survey reports data on RA, it does not report disease-specific data for other inflammatory arthritis conditions such as psoriatic arthritis or axial spondyloarthritis. These conditions are most likely included within the arthritis subcategory of 'other and type unknown' and within the overarching category of 'total arthritis'. We also recognise that the margins of error in the National Health Survey vary by arthritis condition, by age group and by sex. This is particularly relevant where small numbers of people are reporting specific conditions. Another limitation is that the ABS and AIHW only report binary classifications of sex at birth in the National Health Survey, Census, and population projection datasets.[38] People who report a term other than male or female are included within the overall 'persons' category. While the ABS reports prevalence rates for males, females and persons, projection estimates derived from sex-specific rates do not sum to the projection estimates derived from prevalence rates for persons and this reflects the lack of reporting for non-binary groups or where an individual's sex is unknown. The ABS reports separate prevalence rates for OA, RA and 'other and type unknown', as well as prevalence rates for 'total arthritis'. Projection estimates derived from the condition-specific prevalence rates do not always sum to the projection estimates derived from the total arthritis prevalence rates and this may relate to rounding. The National Health Survey does not collect joint-specific data or data on laterality, so it is not possible to estimate the number of people who have hip, knee, hand or other site OA, or the number of people with OA affecting multiple joints.

We believe our projections are appropriately conservative. While we considered several population growth scenarios, we did not model any changes in the national prevalence of arthritis as population-level longitudinal data are not available and any model assumptions would be hypothetical. Finally, we emphasise that our previously published projections[1,39] cannot be directly compared with the updated projections in the current report. This is due to: 1) differences in the reported prevalence of arthritis conditions in the 2014-15 and 2022 National Health Surveys, reflecting the cross-sectional nature of the surveys (which provide a 'snapshot' of disease prevalence based on random sampling methods); and 2) differences in the Australian population size and structure between previous and current ABS population projection datasets. We have summarised these changes in Table 13 using the year 2030 as an example.

Future directions

An important limitation of the National Health Survey is the lack of joint-specific data on OA, the most common form of arthritis. Expanding future data collection procedures to include specific questions on hip, knee, foot, shoulder and hand OA (and ideally, multi-joint OA) would assist in overcoming this limitation. Having joint-specific OA data for Australia is also important for future iterations of the Australian Burden of Disease Study and the Global Burden of Disease Study. It would enable more granular projections of disease burden and facilitate better monitoring of OA trends, assessment of the impacts of prevention strategies and more targeted health service planning. There is also a need for more robust population-level data on doctor-diagnosed JIA conditions, rather than the current approach of limiting self-reported diagnosed arthritis to younger age groups. This would better inform national prevalence estimates to support health service planning for children and adolescents, including workforce requirements for paediatric rheumatology and specialist nurses.

This report sought to provide updated projections for the burden of arthritis, OA, RA and JIA, building upon our earlier *Counting the cost* report. However, we recognise that there are numerous other high burden musculoskeletal conditions that impact younger and older Australians. Applying similar projection methods to model, for example, the future prevalence of low back pain, neck pain, shoulder pain and gout will help to quantify the burden of musculoskeletal conditions more broadly and support advocacy efforts and health care planning. Finally, projections of healthcare costs were not included in the current report, but these costs are critical for understanding the full burden of arthritis now and into the future. Recent health system expenditure data show that over $5.26 billion is spent annually on OA and RA care in Australia.[3] This equates to $2,013 of annual health system spending per person with these conditions, based on 2022 prevalence data.[2] Even a very conservative forecast (without considering any growth in per-person expenditure as healthcare costs rise or as new treatments emerge) would translate to $7.77 billion of expenditure in 2040, based on our OA and RA projections. It will also be important for future projections of healthcare costs to consider productivity loss as well as out-of-pocket costs that are borne by people with arthritis and their families, including for people who live in rural and remote areas and face greater challenges in accessing care. At present, there are no national representative data on allied health expenditure (aside from consultations that are covered by Medicare Benefits Schedule items), community health services or non-reimbursed costs including private prescriptions, over-the-counter medicines and supplements. National-level data that help us understand the full extent of healthcare expenditure (including spending by governments, private health insurers and consumers) are needed to quantify the current cost of arthritis care and enable informed projections of future costs more accurately.

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Appendix

This Appendix reports the results of sensitivity analyses that used alternative ABS Australian population growth scenarios (low population growth and high population growth scenarios), as presented in the following tables:

- Table 9: Arthritis prevalence under alternative population growth scenarios
- Table 10: Osteoarthritis prevalence under alternative population growth scenarios
- Table 11: Rheumatoid arthritis prevalence under alternative population growth scenarios
- Table 12: Juvenile idiopathic arthritis prevalence under alternative population growth scenarios

Changes to arthritis projection model inputs since the 2016 *Counting the cost* report (using the year 2030 as an example) are summarised in the following table:

- Table 13: Changes to arthritis projection inputs for the year 2030

Table 9. Arthritis prevalence under alternative population growth scenarios

Year	Low growth*	Medium growth*	High growth*
2025			
0 - 14	4,801	4,850	4,907
15 - 24	20,553	20,800	21,124
25 - 34	124,806	125,728	126,897
35 - 44	247,234	248,268	249,589
45 - 54	539,654	540,701	542,047
55 - 64	955,609	958,290	961,791
65 - 74	1,094,455	1,097,652	1,101,777
75+	1,112,779	1,113,790	1,115,374
Total 2025	**4,099,891**	**4,110,079**	**4,123,506**
2030			
0 - 14	4,679	4,909	5,162
15 - 24	22,218	22,739	23,373
25 - 34	125,275	128,450	132,384
35 - 44	260,541	263,848	267,948
45 - 54	577,356	580,973	585,508
55 - 64	996,096	1,002,351	1,010,242
65 - 74	1,219,956	1,229,846	1,243,024
75+	1,345,198	1,349,360	1,360,152
Total 2030	**4,551,319**	**4,582,476**	**4,627,793**
2035			
0 - 14	4,536	4,975	5,450
15 - 24	22,159	22,888	23,684
25 - 34	132,108	137,926	144,700
35 - 44	260,419	266,792	274,216
45 - 54	640,803	648,683	658,234
55 - 64	1,017,606	1,027,491	1,039,642
65 - 74	1,274,654	1,291,429	1,314,251
75+	1,582,178	1,592,253	1,628,980
Total 2035	**4,934,463**	**4,992,437**	**5,089,157**
2040			
0 - 14	4,457	5,094	5,788
15 - 24	21,812	22,884	24,024
25 - 34	138,404	145,973	154,223
35 - 44	258,570	269,535	282,109
45 - 54	670,595	684,471	701,007
55 - 64	1,084,220	1,099,114	1,118,034
65 - 74	1,321,348	1,343,354	1,375,125
75+	1,798,673	1,817,465	1,901,017
Total 2040	**5,298,079**	**5,387,890**	**5,561,327**

Data are presented as the number of people with arthritis in each year

Blue shaded column represents the base case

*Based on Australian Bureau of Statistics population projections (low, medium, and high series)

Table 10. Osteoarthritis prevalence under alternative population growth scenarios

Year	Low growth*	Medium growth*	High growth*
2025			
25 - 34	26,474	26,670	26,918
35 - 44	100,439	100,859	101,396
45 - 54	339,782	340,442	341,289
55 - 64	523,235	524,703	526,620
65 - 74	669,271	671,226	673,748
75+	682,686	683,307	684,279
Total 2025	**2,341,887**	**2,347,207**	**2,354,250**
2030			
25 - 34	26,574	27,247	28,082
35 - 44	105,845	107,189	108,854
45 - 54	363,520	365,798	368,653
55 - 64	545,404	548,828	553,149
65 - 74	746,017	752,064	760,123
75+	825,275	827,828	834,449
Total 2030	**2,612,635**	**2,628,954**	**2,653,310**
2035			
25 - 34	28,023	29,257	30,694
35 - 44	105,795	108,385	111,400
45 - 54	403,469	408,430	414,444
55 - 64	557,181	562,594	569,247
65 - 74	779,465	789,723	803,679
75+	970,661	976,843	999,374
Total 2035	**2,844,594**	**2,875,232**	**2,928,838**
2040			
25 - 34	29,359	30,964	32,714
35 - 44	105,045	109,499	114,607
45 - 54	422,226	430,964	441,375
55 - 64	593,655	601,810	612,170
65 - 74	808,019	821,476	840,904
75+	1,103,481	1,115,009	1,166,268
Total 2040	**3,061,785**	**3,109,722**	**3,208,038**

Data are presented as the number of people with osteoarthritis in each year

0-14 and 15-24 age groups are not shown as the reported prevalence was 0.0%

Blue shaded column represents the base case analysis

*Based on Australian Bureau of Statistics population projections (low, medium, and high series)

Table 11. Rheumatoid arthritis prevalence under alternative population growth scenarios

Year	Low growth*	Medium growth*	High growth*
2025			
25 - 34	11,346	11,430	11,537
35 - 44	34,768	34,913	35,099
45 - 54	76,618	76,767	76,958
55 - 64	137,859	138,246	138,751
65 - 74	120,732	121,084	121,539
75+	179,774	179,938	180,194
Total 2025	**561,097**	**562,378**	**564,078**
2030			
25 - 34	11,389	11,678	12,035
35 - 44	36,639	37,104	37,681
45 - 54	81,971	82,484	83,128
55 - 64	143,700	144,602	145,740
65 - 74	134,576	135,667	137,121
75+	217,323	217,995	219,739
Total 2030	**625,598**	**629,530**	**635,444**
2035			
25 - 34	12,010	12,539	13,155
35 - 44	36,622	37,518	38,562
45 - 54	90,979	92,097	93,453
55 - 64	146,803	148,229	149,982
65 - 74	140,610	142,460	144,978
75+	255,608	257,236	263,169
Total 2035	**682,632**	**690,079**	**703,299**
2040			
25 - 34	12,583	13,271	14,021
35 - 44	36,362	37,904	39,672
45 - 54	95,208	97,178	99,526
55 - 64	156,412	158,561	161,291
65 - 74	145,761	148,188	151,693
75+	290,584	293,619	307,118
Total 2040	**736,910**	**748,721**	**773,321**

Data are presented as the number of people with rheumatoid arthritis in each year

0-14 and 15-24 age groups are not shown as the reported prevalence was 0.0%

Blue shaded column represents the base case analysis

*Based on Australian Bureau of Statistics population projections (low, medium, and high series)

Table 12. Juvenile idiopathic arthritis prevalence under alternative population growth scenarios

Year	Low growth*	Medium growth*	High growth*
2025			
0 - 4	577	589	602
5 - 9	1,204	1,211	1,220
10 - 14	2,402	2,413	2,426
15 - 18	3,964	3,988	4,020
Total 2025	**8,147**	**8,201**	**8,268**
2030			
0 - 4	539	600	665
5 - 9	1,194	1,231	1,271
10 - 14	2,388	2,420	2,460
15 - 18	4,089	4,144	4,210
Total 2030	**8,210**	**8,395**	**8,606**
2035			
0 - 4	539	614	698
5 - 9	1,108	1,240	1,382
10 - 14	2,350	2,440	2,537
15 - 18	3,994	4,088	4,195
Total 2035	**7,991**	**8,382**	**8,812**
2040			
0 - 4	553	641	738
5 - 9	1,107	1,269	1,446
10 - 14	2,184	2,457	2,747
15 - 18	3,945	4,147	4,362
Total 2040	**7,789**	**8,514**	**9,293**

Data are presented as the number of children and adolescents with juvenile idiopathic arthritis in each year

Blue shaded column represents the base case analysis

*Based on Australian Bureau of Statistics population projections (low, medium, and high series)

Table 13. Changes to arthritis projection inputs for the year 2030

Age group	ABS population projections for 2030		Prevalence rates for arthritis	
	Previous*	Current†	2014-15‡	2022#
0 - 14	5,502,575	4,908,844	0.0%	0.1%
15 - 24	3,740,217	3,789,740	1.6%	0.6%
25 - 34	3,983,783	3,892,424	3.5%	3.3%
35 - 44	4,252,174	4,122,620	7.1%	6.4%
45 - 54	3,737,585	3,586,252	17.4%	16.2%
55 - 64	3,301,584	3,286,395	34.9%	30.5%
65 - 74	2,853,627	2,949,269	48.6%	41.7%
75+	2,732,385	2,759,426	53.3%	48.9%
Total	**30,103,930**	**29,294,970**	**15.3%**	**14.5%**

*ABS population projections for 2012-2101,[40] as used for the 2016 *Counting the cost* report[1]

†New ABS population projections for 2022-2071,[36] as used for the current report

‡ABS 2014-15 National Health Survey data,[41] as used for the 2016 *Counting the cost* report[1]

#ABS 2022 National Health Survey data,[42] as used for the current report