MedicineInsight

General practice insights report

July 2018– June 2019

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NPS MEDICINEWISE

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FOREWORD

The NPS MedicineWise General Practice Insights Report 2018–19 provides an overview of the key features of general practice activity in Australia for the period July 2018 to June 2019. It includes information from 9% of all Australian GPs and 13% of all Australian patients who saw a GP at least once during the financial year. It builds on previous reports and further investigates how data from the MedicineInsight program can be used to describe general practice activity.

Once again, the report highlights the important role primary care plays in the management of chronic illness and mental health. This report provides new information on a number of primary care patient groups, including children, patients with long-term mental illnesses and patients with dementia.

Since the publication of the 2017–18 General Practice Insights Report, the number of peer-reviewed publications from NPS MedicineWise staff and external researchers has continued to increase. We have also completed a validation study which explored whether MedicineInsight accurately identifies clinical encounters and conditions and these results will be published soon. Linkage of MedicineInsight to other Australian databases is currently being explored and, if possible, will contribute to the evaluation of health outcomes of patients and will enhance post-market surveillance of health technologies.

This report has been a collaborative effort with the Department of Health (DoH), the Australian Bureau of Statistics (ABS), the Australian Institute of Health and Welfare (AIHW) and academic general practitioners. We appreciate their support and the efforts of NPS MedicineWise staff in producing this report.

We would like to thank all of the patients, general practices and general practice staff whose data makes this report possible. We hope that this document provides patients, GPs, policy makers and researchers with an the Royal Australian College of General Practitioners (RACGP) accurate picture of the enormous amount of work undertaken in primary care and enhances current understanding of the Australian health system.

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GPIR AT A GLANCE

- The GPIR uses data from:
    - 481 general practice sites, comprising 569 general practices
    - 3255 unique GP providers
    - 2,893,776 patients with 14,723,569 clinical encounters in the 12-month period from 1 July 2018 to 30 June 2019
    - almost 12 million issued prescriptions and 37 million issued plus repeat prescriptions in 2018–19, and
    - almost 72 million pathology test results recorded in 2018–19.
- Compared to national data and rates, the GPIR includes 7% of practices, 9% of GPs and 13% of Australian patients who saw a GP at least once in 2018–19.
- MedicineInsight patients are similar in terms of age, gender and socio-economic status to all Australian patients with at least one MBS-subsidised GP visit.
- For every 100 GP clinical encounters[a] during 2018–19, on average:
    - 29.7 were with a patient with a history of hypertension, 25.7 were with a patient with a history of low back pain and 24.0 were with a patient with a history of dyslipidaemia
    - 23.5 were with a patient with a history of depression and 19.8 were with a patient with a history of anxiety disorder
    - 5.2 were with a patient with current long-term depression and 4.6 were with a patient with a current long-term anxiety disorder
    - 1.7 were with a patient with bipolar disorder and 1.1 were with a patient with schizophrenia
    - 1.6 were with a patient with dementia, and
    - there were 79 prescriptions issued – sufficient for 241 prescriptions to be dispensed if both issued scripts and repeats are included.
- On average, for every 100 GP clinical encounters[a] with children aged 0–14 years during 2018–19, 37.1 were with a child with a recent history of an acute upper respiratory tract infection (URTI) and 13.7 were with a child with a recent history of otitis media.
- For patients with long-term mental illness, the prevalence of existing cardiovascular disease (CVD) and every single cardiovascular risk factor was significantly higher when compared to the general patient population without long-term mental illness.
- New prevalence estimates for dementia reveal 3.4% of patients aged 65 years or older had a record of dementia.
- Medicines for the nervous system (ATC-N), which include the analgesics and psychotropic medicines, accounted for the largest proportion of issued prescriptions (28.0%). However, cardiovascular medicines (ATC-C) accounted for the largest proportion of medicines ordered for MedicineInsight patients, in terms of the total volume of prescriptions (issued plus repeats; 31.2%).
- The majority of medicines prescribed in practices are PBS-subsidised (84.7%).
- Approximately 2 in 5 patients had at least one pathology test recorded in 2018–19.
- Patients with chronic kidney disease (CKD), type 2 diabetes and rheumatoid arthritis were most likely to be in the top 10% of tested patients.

[a] Note: conditions and prescriptions are not linked directly to GP clinical encounters but to patients.

EXECUTIVE SUMMARY

MedicineInsight was established by NPS MedicineWise in 2011, with core funding from Australian Government Department of Health (DoH). MedicineInsight collects general practice data to support quality improvement in Australian primary care and post-market surveillance of medicines and tests, and it continues to grow as a valuable resource for Australian longitudinal general practice research.

This report has been undertaken with funding from the DoH and with advice from representatives of general practice, DoH, academia, Australian Bureau of Statistics (ABS), Royal Australian College of General Practitioners (RACGP), and the Australian Institute of Health and Welfare (AIHW).

This General Practice Insights Report (GPIR) 2018–19 provides an overview of the care provided to patients by GPs working in general practice, including patient prevalence of selected common non-communicable conditions and an exploration of the care provided to patients with long-term mental illness or dementia. We also present data on pathology testing and prescribing of medicines.

This report is based on the MedicineInsight November 2019 data download and includes encounters from 1 July 2018 to 30 June 2019. It includes data from 2.9 million patients and 15 million clinical encounters.

Practices, providers and patients

This report includes nationwide data from 569 general practices and 3255 GPs. This corresponds to 7.1% of all Australian general practices and 8.6% of all Australian GPs. The distribution of GPs between state and territories is similar to the national coverage.

Approximately 2.89 million patients were seen at least once by GPs in the participating practices during 2018–19. This represents 13.2% of all patients seen by GPs nationally. The demographic profile of MedicineInsight patients and Medicare Benefits Schedule (MBS) data on all Australian patients who visited a GP during 2018–19 were similar in terms of age, gender and socio-economic status.

Encounters

During 2018–19 there were 14.7 million GP clinical encounters recorded in eligible MedicineInsight practices. The average number of GP clinical encounters per patient during 2018–19 was 5.1.

Across all ages, with the exception of 0–9 years, female patients had a higher average annual number of GP clinical encounters than male patients. The average number of GP clinical encounters during 2018–19 rose with increasing age, to a peak of 13.7 among people aged 90 years or older.

Non-communicable diseases

During 2018–19, hypertension was the most common of the selected non-communicable conditions recorded for patients seen by GPs in MedicineInsight practices (5.7% of patients), followed by depression (4.7% of patients) and anxiety disorder (4.6% of patients).

Patient condition prevalence in 2018–19 was explored by identifying patients who were recorded as having a particular condition at any time before or during 2018–19. Hypertension was the most prevalent of the selected non-communicable conditions (16.3% of patients), followed by low back pain (14.5%) and depression (13.9%). The patient prevalence estimates for most of the conditions aligned with the population prevalence estimates from the 2017–18 ABS National Health Survey. Consistent with national data, the proportion of patients with hypertension, low back pain and dyslipidaemia increased with age in both males and females.

We calculated the rates of conditions per 100 encounters to get an overview of GP workload.[b] This indicated that for every 100 GP clinical encounters during 2018–19, on average:

- 10 were with a patient with a recent record of hypertension and 30 were with a patient with hypertension ever recorded
- 9 were with a patient with a recent record of depression and 24 were with a patient with depression ever recorded
- 8 were with a patient with a recent record of anxiety disorder and 20 were with a patient with anxiety disorder ever recorded, and
- 8 were with a patient with a recent record of low back pain and 26 were with a patient with low back pain ever recorded.

Long-term mental illness

Of all patients who visited a MedicineInsight practice in 2018–19, 4.7% had a recent history of long-term mental illness: 2.4% had current long-term depression that lasted at least 6 months,[c] 2.2% had current long-term anxiety disorder that lasted at least 6 months, 0.9% had bipolar disorder and 0.5% had schizophrenia recorded. Regardless of the type of long-term mental illness, the average number of encounters in 2018–19 for these patients was similar, at around 10 GP clinical encounters per year, double that for the general population (5.1 per year). Almost half of patients with current long-term anxiety disorder or current long-term depression had a mental health care plan created, or reviewed, by a GP during 2018–19.

The prevalence of existing CVD and every single cardiovascular risk factor was significantly higher for patients with long-term mental illness when compared to the general patient population without long-term mental illness. Compared to the general population without long-term mental illness, having long-term mental illness increased the odds of :

- CVD by 50%
- being a current smoker by 250%
- dyslipidaemia by 90%
- overweight/obesity by 80%
- hypertension by 40%
- type 2 diabetes by 30%.

While most patients with long-term mental illness and existing CVD had at least one preventive medicine recorded, they were less likely than the general population with existing CVD to have both a lipid-lowering and a BP-lowering medicine recorded, as recommended in guidelines for the secondary prevention of cardiovascular events. While people with long-term mental illness have a high morbidity burden, these findings represent opportunities for primary care providers to make substantial differences to the health of this group as many of the risk factors and conditions identified are modifiable or manageable.

Dementia

In 2018–19 the patient prevalence of dementia was 3.4% among patients aged 65 years or older and 0.6% among patients of all ages. Our findings align with the population prevalence estimates for dementia from the ABS Survey of Disability, Aging and Carers Report 2018 that estimated 3.1% of the population aged 65 years or over had dementia. Dementia was most common among patients aged 90 years or older (12.6%) and those aged 80–89 (6.8%). The prevalence of dementia was similar among males and females in younger ages, but in those aged 80 years or more, dementia was more common among females than males. Although patients with dementia have a comparatively high average yearly encounter rate (15.4 encounters per year), they attend 1.6 out of every 100 GP clinical encounters.

[b] Note: conditions are not linked directly to GP clinical encounters but to patients.

[c] To be regarded as having long-term anxiety disorder or long-term depression the conditions needed to have been recorded on at least two separate occasions at least 6 months apart.

Childhood conditions

Almost 520,000 MedicineInsight patients (18.0%) seen during 2018–19 were children aged 0–14 years. Unlike the entire MedicineInsight patient cohort, there were slightly more males than females (51.8% vs 48.2%) in the child cohort.

Of the selected conditions, acute upper respiratory tract infections (URTIs) were the most commonly recorded for children aged 0–14 years (22.7%). Acute otitis media was recorded for 7.5% of children and 3.9% had acute tonsillitis. Asthma was recorded in 4.2% of children and dermatitis/eczema in 3.9%.

The most commonly encountered of the selected conditions among children aged 0–14 years were URTIs (37.1 per 100 GP encounters). Children with otitis media were managed on average for 13.7 encounters per 100 GP encounters, and children with acute tonsillitis, asthma and dermatitis/eczema were managed in 6.6, 6.7 and 6.9 encounters per 100 GP encounters, respectively. The average number of GP clinical encounters for children during 2018–19 was 3.3, lower than the 5.1 average for all patients.

Prescriptions

Information on prescriptions is reported by issued prescriptions (which may or may not include repeat prescriptions) and total prescriptions (the total number of prescriptions that are generated as a result of an issued prescription including repeats). Almost 12 million issued prescriptions and 36.7 million total prescriptions with unique Anatomical Therapeutic Chemical (ATC) codes were written by GPs in MedicineInsight practices during 2018–19. Almost 71% of MedicineInsight patients were prescribed a medicine at least once during 2018–19. While a third of patients only had one or two prescriptions issued, 6.4% of patients had 15 or more issued prescriptions during 2018–19.

There was an overall average of 3.9 issued prescriptions per patient in 2018–19. The average number of prescriptions per patient increased with age and with socio-economic disadvantage, consistent with higher disease burdens in these populations. On average, every 100 GP encounters[d] result in 78.8 issued prescriptions and 240.6 total prescriptions (issued plus repeats).

Medicines to treat the nervous system (ATC N; antidepressants, analgesics, antiepileptics) were the most commonly issued prescriptions in 2018–19 but cardiovascular medicines (ATC C; lipid-modifying medicines, antihypertensives) were the most commonly prescribed issued plus repeat medicines. Opioids (N02A) accounted for 10.6% of all issued prescriptions while lipid-lowering medicines (C10A) accounted for 9.8% of total prescriptions.

MedicineInsight captures prescriptions that have been written, whether they are private, subsidised on the Pharmaceutical Benefits Scheme (PBS) or under co-payment. In contrast, PBS data capture prescriptions when the medicine is dispensed on the PBS or is under co-payment. This report shows that an overwhelming majority of medicines (84.7%) were subsidised by the Australian Government under the PBS or the Repatriation Schedule of Pharmaceutical Benefits (RPBS). Private prescriptions are more common if the medicine is for topical dermatological use, for hormonal contraception, or is an anti-infective for the eye or ear.

Pathology testing

Just over 40% of patients had at least one atomised test result recorded in 2018–19 and there were almost 72 million atomised pathology test results recorded.

Each component of a pathology test result is recorded separately (atomised) in MedicineInsight and so a request from the GP for something like a full blood test (FBC) can generate up to a dozen individual test results. Bearing this in mind, rates of testing increased with age and women had a

[d] Note: prescriptions are not linked directly to GP clinical encounters but to patients

higher average number of atomised test results recorded than men. Patients in the top 10% of tested patients were more likely to have chronic conditions such as type 2 diabetes and CKD.

Using haemoglobin, creatinine and alanine aminotransferase as proxy measures, the percentage of patients aged 20 years or older who had an FBC was 42.0%, a kidney function test was 42.2% and a liver function test (LFT) was 41.0%, respectively.

We also looked at the proportion of patients who had at least one test result that fell outside the relevant reference range[e] at least once during the year. We did not attempt to collect information on follow-up tests or the conditions diagnosed for these patients (with the exception of diabetes) and so cannot comment upon the appropriateness of subsequent management decisions. However, bearing this in mind:

- more than two-thirds of patients with diagnosed diabetes had their glycated haemoglobin (HbA_{1c}) levels checked during 2018–19. For half of these, at least one result was higher than 53 mmol/mol (7.0%) suggesting that they may have benefited from clinical review
- only 10.3% of MedicineInsight patients without a diagnosis of diabetes had an HbA_{1c} test, suggesting that patients who are not considered to be at high risk of diabetes are unlikely to have HbA_{1c} tests
- fewer than 10% of patients who had at least one thyroid stimulating hormone (TSH) test during the year had a result that was outside the reference range
- 28.2% of MedicineInsight patients who had a vitamin D test had a result that fell outside the reference range.

Risk factors

We explored the completeness of the MedicineInsight dataset over time on three important health risk factors: smoking, alcohol use, and body mass index (BMI). We have also investigated the recording of weight as an individual measurement. Some GPs may record information on BMI, smoking or alcohol use in different sections in the medical record not available to MedicineInsight, such as progress notes, and this can have a significant effect on completeness rates.

Information on smoking status was the most complete and was recorded at least once in the medical record for 84.0% of patients over 18 years of age in 2018–19, an increase of 1.1% from 2017–18.

Alcohol use was ever recorded for only 21.5% of patients over 18 years of age, a decrease of 0.6% from 2017–18. Alcohol use was more frequently recorded for females (23.4%) than males (19.0%). Patients aged 80 years and over had substantially higher rates of recording of alcohol use compared to younger patients.

In the 24-month period from 1 July 2017 to 30 June 2019, BMI (or height and weight) was recorded for 33.9% of patients of all ages. In the same period, weight was recorded for 41.9% of patients of all ages.

[e] As defined by the Royal College of Pathologists of Australasia Manual

1. INTRODUCTION

1.1. Aims and objectives

The General Practice Insights Report (GPIR) 2018–19 provides an overview of the key features of general practice patients and activity in Australia for the period 1 July 2018 to 30 June 2019. This report prioritises information that cannot be obtained from other sources and aspects of general practice for which MedicineInsight data are capable of providing reasonable estimates.

This work builds on previous NPS MedicineWise General Practice Insights Reports,[1,2] and further describes and investigates how data from the MedicineInsight program can be used to describe general practice activity. This report also includes vignettes showing how MedicineInsight can be used to improve the quality use of medicines and medical tests and in the evaluation of primary care interventions, for the purpose of demonstrating the versatility and utility of the dataset.

1.2. Report overview

Each chapter explores a different aspect of the clinical and sociodemographic information collected in MedicineInsight. The report begins with a high-level overview of the number and the geographical distribution of practices and general practitioner providers in MedicineInsight and compares this with national data. MedicineInsight patients are characterised by gender, age, Aboriginal and Torres Strait Islander status and location of residence (state or territory, rurality and ABS Socio-Economic Indexes for Areas [SEIFA]). We have also quantified differences in the numbers of GP encounters based on patient characteristics, including age, gender, medical conditions and geographical location.

We also present data on the patient prevalence of selected common non-communicable conditions, long-term mental health and cognitive conditions, childhood illnesses and on the provision of services such as pathology testing and prescribing.

Information on conditions is presented in two ways, as:

- patient prevalence, which is the proportion of patients with the condition recorded at any time in their medical record (‘ever recorded’)
- conditions recorded during 2018–19.

Depending on individual GP recording practices, ongoing management may be provided for a condition that has been recorded historically, but is not routinely recorded at subsequent GP clinical encounters. For example, a GP may have recorded that a patient has type 2 diabetes many years ago but because they know the patient’s history, they may not continue to record this as being the reason for visit despite continuing to actively manage the condition. Therefore, relying solely on diagnoses recorded during 2018–19 may underestimate the prevalence of conditions that are currently being actively managed.

Patient prevalence can be considered the most accurate way of estimating prevalence of chronic conditions, such as diabetes and chronic obstructive pulmonary disease (COPD). However, it might overestimate the current prevalence for conditions that can resolve over time, such as depression and anxiety disorder, or with age, such as asthma and eczema.

Reporting on both the patient prevalence (ever recorded) and conditions recorded in 2018–19 is a way to describe both the maximum and minimum estimates of GP management of patients with these conditions, respectively.

Further details about the methodology for this report are provided in Appendix 1. Readers should also refer to Chapter 10 for other limitations or caveats to consider when interpreting the data in this report.

1.3. Advisory group

The scope, rationale and methodology for this report were developed by NPS MedicineWise, with expert input from a specially convened Advisory Group. This Advisory Group included representatives from NPS MedicineWise and:

- Australian Government Department of Health (DoH)
- Australian Institute of Health and Welfare (AIHW)
- Australian Bureau of Statistics (ABS)
- Royal Australian College of General Practitioners (RACGP)
- University of New South Wales
- University of Melbourne, and
- Curtin University.

1.4. The MedicineInsight program

NPS MedicineWise is an independent, not-for-profit and evidence-based organisation that works to improve the way health technologies, medicines and medical tests are used. MedicineInsight was initially established by NPS MedicineWise in 2011, with core funding from the DoH, to collect general practice data to support quality improvement in Australian primary care and post-market surveillance of medicines.

MedicineInsight uses third-party data extraction tools to de-identify, extract and securely transmit data from within each participating general practice's clinical information system (CIS). This includes patient demographic and clinical data entered by GPs and practice staff directly into the system or collected in the CIS from external sources (eg, pathology test results). However, data are not extracted from fields that may contain identifying information such as the progress notes.

Regular national-level MedicineInsight study reports are provided to the DoH to support quality use of health technologies for Australia, including medicines, immunisations and medical tests. MedicineInsight data are used for quality improvement activities in general practice by comparing practice activity with best practice clinical guidelines in areas such as asthma, diabetes, anxiety disorder and opioid use. This allows practice staff to reflect on current practice and identify potential areas for improvement. MedicineInsight data are also available to support research that aligns with the NPS MedicineWise mission and the ethos of the MedicineInsight program and are approved by the independent Data Governance Committee.

Further details about MedicineInsight are available in Appendix 2 and at www.nps.org.au/medicine-insight. Further information on population health and health service research projects that have used MedicineInsight data can be found at www.nps.org.au/approved-projects-using-medicineinsight-data.

1.5. Data governance and ethics

The MedicineInsight program has rigorous governance processes in place to mitigate any risk to participants and to ensure that the program is run lawfully, ethically and for the public good. MedicineInsight data use is subject to a robust data governance framework, including approval by an independent Data Governance Committee. The committee comprises consumer advocates, data privacy and security experts, general practitioners and researchers. It approved the use of data for this report.

The pilot MedicineInsight program was approved by the RACGP National Research and Evaluation Ethics Committee in January 2013. In December 2017, the same committee granted NPS MedicineWise ethics approval for the MedicineInsight program. This approval covers the standard operations and uses of the MedicineInsight database.

Additional ethics approval was granted by the RACGP National Research and Evaluation Ethics Committee in October 2019 (NREEC 19-011) for this report.

2. PRACTICES, PROVIDERS AND PATIENTS

In summary

- This report includes data collected from 569 general practices and 3255 GPs during 2018–19.
- This report includes information on 7.1% of general practices and 8.6% of GPs nationally.
- Approximately 2.89 million patients were seen at least once by GPs in the participating practices during 2018–19. This represents 13.2% of all patients seen by GPs nationally.
- The demographic profile of MedicineInsight patients and MBS data on all Australian patients visiting GPs are similar in terms of age, gender and socio-economic status.
- 3.0% of MedicineInsight patients were recorded as being of Aboriginal or Torres Strait Islander background.
- Information on Aboriginal and Torres Strait Islander status was missing for 19.8% of the MedicineInsight population. The NT had the lowest rate of missing data on Indigenous status and Victoria the highest.

This chapter describes:

- the characteristics of the general practices in the cohort, compared to all practices nationally, including:
  - the number of practices within each practice site
  - the distribution of practices in the cohort and all practices nationally
  - percentage of practices covered by state, rurality, and PHN
- the distribution of GP providers in the cohort and all providers nationally by state and rurality
- the characteristics of the patient cohort, compared to all patients nationally, including:
  - the distribution of patients in the cohort and all patients nationally, and
  - percentage of patients by sociodemographic characteristics and location.

2.1. General practice sites

MedicineInsight extracts data from two general practice CISs – Best Practice (BP) and MedicalDirector (MD). Where multiple general practices share a CIS, this is a general practice site. A site may consist of several geographically and administratively distinct practices with discrete patient lists, or it may consist of a collection of practices with shared staff and patients. Patient electronic files from each general practice are amalgamated within the site's CIS, and it is not possible for MedicineInsight to distinguish within a site which general practice a specific patient's record comes from.

Data are included for 569 general practices from 481 general practice sites, representing 7.1% of all practices nationally. Table 2.1 provides a summary of the number of general practices for each site.

TABLE 2.1 GENERAL PRACTICES AND GENERAL PRACTICE SITES, MEDICINEINSIGHT 2018–19

Number of general practices within each site	General practice sites		Total number of general practices
	No.	%	
1	438	91.1	438
2	34	7.1	68
3	4	0.8	12
4 or more	5	1.0	51
Total	**481**	**100**	**569**

Table 2.2 presents data on MedicineInsight general practices compared with national data, by state/territory, rurality and primary health network (PHN). This table presents both the proportional

geographical representation and the differences in relative coverage of MedicineInsight practices compared with national data.

As can be seen in Table 2.2, there is high coverage of practices from Tasmania (22.9% coverage) and the Hunter New England and Central Coast PHN (25.2% coverage) in NSW. This reflects previous active campaigns to recruit practices from these areas. In contrast, practices from South Australia (2.9% coverage) are underrepresented, and there are no MedicineInsight practices in the Western Queensland PHN.

Statistical weighting of the data by age, sex and PHN has largely addressed differences in area-level representativeness of MedicineInsight practices (see Appendix 1).

TABLE 2.2 GEOGRAPHICAL REPRESENTATION OF MEDICINEINSIGHT GENERAL PRACTICES 2018–19, COMPARED TO NATIONAL DATA, 2019

General practice location	MedicineInsight 2018–19		National practices 2019[a]		% coverage of MedicineInsight practices
Australian total	569		8056[b]		7.1
	No.	% practices	No.	% practices	%
State/Territory					
ACT	10	1.8	108	1.3	9.3
NSW	197	34.6	2763	34.3	7.1
NT	9	1.6	126	1.6	7.1
QLD	116	20.4	1633	20.3	7.1
SA	16	2.8	551	6.8	2.9
TAS	38	6.7	166	2.1	22.9
VIC	125	22.0	1986	24.7	6.3
WA	58	10.2	719	8.9	8.1
Rurality					
Major city	304	53.4	5503[c]	68.2	5.5
Inner regional	135	23.7	1396[c]	17.3	9.7
Outer regional	113	19.9	779[c]	9.7	14.5
Remote/very remote	17	3.0	379[c]	4.7	4.5
Primary Health Network (PHN)					
Adelaide	12	2.1	361	4.5	3.3
Australian Capital Territory	10	1.8	108	1.3	9.3
Brisbane North	19	3.3	325	4.0	5.8
Brisbane South	20	3.5	337	4.2	5.9
Central Queensland, Wide Bay, Sunshine Coast	29	5.1	276	3.4	10.5
Central and Eastern Sydney	20	3.5	579	7.2	3.5
Country SA	<5	<1	190	2.4	<5
Country WA	21	3.7	198	2.5	10.6
Darling Downs and West Moreton	11	1.9	167	2.1	6.6
Eastern Melbourne	21	3.7	434	5.4	4.8
Gippsland	5	0.9	96	1.2	5.2
Gold Coast	19	3.3	211	2.6	9.0

General practice location	MedicineInsight 2018–19		National practices 2019[a]		% coverage of MedicineInsight practices
Australian total	569		8056[b]		7.1
	No.	% practices	No.	% practices	%
Hunter New England and Central Coast	103	18.1	409	5.1	25.2
Murray	44	7.7	210	2.6	21.0
Murrumbidgee	<5	<1	87	1.1	<5
Nepean Blue Mountains	<5	<1	135	1.7	<5
North Coast	15	2.6	180	2.2	8.3
North Western Melbourne	34	6.0	568	7.1	6.0
Northern Queensland	18	3.2	253	3.1	7.1
Northern Sydney	7	1.2	292	3.6	2.4
Northern Territory	9	1.6	126	1.6	7.1
Perth North	17	3.0	266	3.3	6.4
Perth South	20	3.5	257	3.2	7.8
South Eastern Melbourne	14	2.5	482	6.0	2.9
South Eastern NSW	14	2.5	203	2.5	6.9
South Western Sydney	12	2.1	423	5.3	2.8
Tasmania	38	6.7	166	2.1	22.9
Western NSW	7	1.2	113	1.4	6.2
Western Queensland	-	-	64	0.8	=
Western Sydney	11	1.9	329	4.1	3.3
Western Victoria	7	1.2	210	2.6	3.3

a Healthdirect Australia. National Health Services Directory. Sydney: Healthdirect Australia, October 2019, https://studio.healthmap.com.au/ (accessed 21 November 2019).
b Including GP practices that are in the Cocos Keeling Islands and on Norfolk Island.
c Relies upon historical numbers from National Health Services Directory, 2017.

2.2. GP providers

There were 3,255 unique GP providers in MedicineInsight for 2018–19, representing 8.6% of practising GPs in Australia. Using data from GP Workforce Statistics and MedicineInsight for 2018–19, Table 2.3 shows the geographical location of MedicineInsight GPs compared to the national coverage. The proportional distribution of GPs was similar to that of general practices, with the highest rate of coverage in Tasmania (24.5%), and the lowest in the NT (2.3%). Most MedicineInsight GPs were based in major cities (59.8%), which is lower than the proportion observed in the national data (68.6%).

TABLE 2.3 GEOGRAPHICAL DISTRIBUTION OF MEDICINEINSIGHT GPs COMPARED TO NATIONAL DATA, 2018–19

GP location	MedicineInsight GPs 2018–19		National GPs 2018–19[a]		% coverage of MedicineInsight GPs
Australian total	**3255**		**37,642**		**8.6**
	No.	**%**	**No.**	**%**	
State/Territory					
ACT	96	3.0	593	1.6	16.2
NSW	1235	37.9	11,516	30.6	10.7
NT	13	0.4	493	1.3	2.6
QLD	611	18.8	8167	21.7	7.5
SA	111	3.4	2794	7.4	4.0
TAS	224	6.9	944	2.5	23.7
VIC	619	19.0	9240	24.5	6.7
WA	346	10.6	3895	10.3	8.9
Remoteness					
Major city	1946	59.8	27,448[b]	64.3	7.1
Inner regional	846	26.0	8617[b]	20.3	9.8
Outer regional	396	12.2	4201[b]	9.9	9.4
Remote	67	2.1	2264[b]	5.3	3.0

a Australian Government Department of Health. General Practice Primary Care Statistics – 2014-15 to 2018–19: Canberra: DoH; 2020.
b As GPs can work across multiple sites, the total number of GPs by remoteness is higher than the number of GPs Australia-wide.

2.3. Patients

There were 2.89 million patients who were eligible for inclusion in this report, representing 13.2% of all patients who visited a GP in 2018–19. MedicineInsight patients are broadly similar when compared to national MBS information for patients who visited a GP during 2018–19, in terms of age, gender and socio-economic status (Table 2.4). A detailed assessment of the representativeness of patients included in GPIR 2018–19 is provided in Appendix 1, based on which the results were weighted by age, sex and PHN.

Aboriginal and Torres Strait Islander status was missing for 19.8% of the MedicineInsight population. However, a similar proportion of MedicineInsight patients were recorded as being Aboriginal or Torres Strait Islander as in the MBS patient population.

Consistent with MBS patient data, MedicineInsight patients were more likely to be female (54.7%). Women between the ages of 20 and 39 years account for the largest proportion of MedicineInsight patients (Figure 2.1). Less than 0.01% of patients were recorded as having intersex or indeterminate gender (< 0.1%). These patients have not been included in further analyses because of their small numbers.

Consistent with the higher coverage of general practices from Tasmania in MedicineInsight, the proportion of MedicineInsight patients from Tasmania was higher (6.5%) when compared with national figures (2.2%). Consistent with the lower coverage of general practices from South Australia, the proportion of MedicineInsight patients from South Australia was lower (2.6%) than national figures (7.0%). Patients residing in inner regional areas are overrepresented in MedicineInsight (25.7%) compared with national data (12.3%) (Table 2.4).

Statistical weighting of the data by age, sex and PHN has largely addressed differences in area-level representativeness of MedicineInsight practices (see Appendix 1).

Information on patient distribution by PHN is provided in Appendix 6.

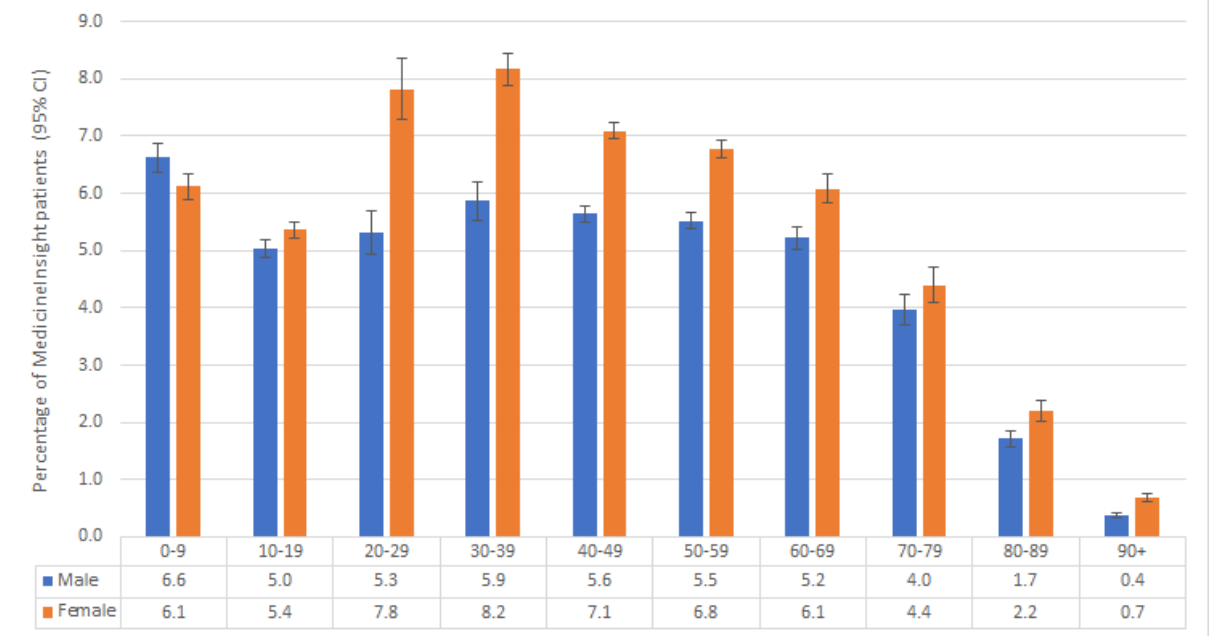
TABLE 2.4 SOCIODEMOGRAPHIC DISTRIBUTION OF MEDICINEINSIGHT PATIENTS 2018–19 (UNWEIGHTED) COMPARED TO MBS NATIONAL DATA, 2018–19

Patient sociodemographic characteristic	MedicineInsight patients 2018–19		Australian national data (MBS)[a] 2018–19		% coverage of MedicineInsight patients
TOTAL	**2,893,776**		**21,942,493**		**13.2**
	No.	**%**	**No.**	**%**	**%**
Gender					
Male	1,310,200	45.3	10,460,231	47.7	12.5
Female	1,583,332	54.7	11,482,262	52.3	13.8
Other	244	<0.01	-	-	-
Age group (years)					
0–9	368,811	12.7	2,842,286	12.9	13.0
10–19	300,679	10.4	2,397,652	10.9	12.5
20–29	380,455	13.1	2,674,895	12.2	14.2
30–39	406,194	14.0	3,068,601	14.0	13.2
40–49	368,554	12.7	2,894,573	13.2	12.7
50–59	355,951	12.3	2,805,704	12.8	12.7
60–69	327,118	11.3	2,487,117	11.3	13.2
70–79	242,239	8.4	1,748,278	8.0	13.9
80–89	113,037	3.9	830,741	3.8	13.6
90+	30,738	1.1	192,634	0.9	16.0
Aboriginal and Torres Strait Islander status[3]					
Aboriginal and/or Torres Strait Islander	86,330	3.0	-	2.9	-
Neither Aboriginal nor Torres Strait Islander	2,233,799	77.2	-	97.1	-
Not recorded	573,647	19.8	-	-	-
State/Territory					
ACT	72,793	2.5	363,196	1.7	20.0
NSW	985,784	34.1	7,039,884	32.1	14.0
NT	33,681	1.2	188,949	0.9	17.8
QLD	555,857	19.2	4,428,674	20.2	12.6
SA	76,365	2.6	1,544,329	7.0	4.9
TAS	187,247	6.5	475,488	2.2	39.4
VIC	637,464	22.0	5,621,488	25.6	11.3
WA	344,585	11.9	2,280,485	10.4	15.1
Rurality					
Major city	1,775,641	61.4	15,683,593	71.5	11.3
Inner regional	743,073	25.7	2,700,612	12.3	27.5
Outer regional	337,198	11.7	2,708,695	12.3	12.4
Remote/very remote	37,864	1.3	846,820	3.9	4.5
Socio-economic status (SEIFA IRSAD quintile)	(1935 missing)		(6626 missing)		
1 (most disadvantaged)	419,410	14.5	3,465,978	15.8	12.1
2	491,579	17.0	3,538,927	16.1	13.9
3	737,284	25.5	4,314,363	19.7	17.1
4	611,119	21.1	4,555,735	20.8	13.4
5 (most advantaged)	632,449	21.9	6,060,864	27.6	10.4

Patient sociodemographic characteristic	MedicineInsight patients 2018–19		Australian national data (MBS)[a] 2018–19		% coverage of MedicineInsight patients
TOTAL	**2,893,776**		**21,942,493**		**13.2**
	No.	**%**	**No.**	**%**	**%**
Concession cards	(2,075,202 missing)				
Health Care Card	810,115	28.0	1,418,216[4]	6.5	57.1
DVA Health Card	8459	0.3	199,123[5]	0.9	4.2

a MBS data from Australian Government Department of Health

FIGURE 2.1 AGE AND SEX DISTRIBUTION OF MEDICINEINSIGHT PATIENTS, 2018–19* (UNWEIGHTED)



*Excludes 244 patients with indeterminate sex

2.3.1. Aboriginal and Torres Strait Islander status by state

Of the 86,330 MedicineInsight patients who identified as Aboriginal or Torres Strait Islander, the majority lived in NSW or Queensland (Table 2.5). However, information about Aboriginal and Torres Strait Islander status was not recorded for 19.8% of patients in MedicineInsight. Recording of Aboriginal and Torres Strait Islander status was most complete in the Northern Territory (10.5% not recorded) and the least complete in Victoria (28.3% not recorded).

TABLE 2.5: ABORIGINAL AND TORRES STRAIT ISLANDER STATUS BY STATE AND TERRITORY (UNWEIGHTED), MEDICINEINSIGHT 2018–19

	Aboriginal and/or Torres Strait Islander		Not Aboriginal and/or Torres Strait Islander		Not recorded	
State/Territory	**No.**	**%**	**No.**	**%**	**No.**	**%**
ACT	709	1.0	58,653	80.6	13,431	18.5
NSW	35,880	3.6	780,890	79.2	169,014	17.1
NT	2,293	6.8	27,852	82.7	3536	10.5
QLD	26,591	4.8	440,275	79.2	88,991	16.0
SA	631	0.8	60,489	79.2	15,245	20.0
TAS	5,714	3.1	139,592	74.5	41,941	22.4
VIC	6,578	1.0	450,191	70.6	180,695	28.3
WA	7,934	2.3	275,857	80.1	60,794	17.6
Australia	**86,330**	**3.0**	**2,233,799**	**77.2**	**573,647**	19.8

3. ENCOUNTERS

In summary

- During 2018–19 there were 14.7 million clinical encounters with GPs recorded in the 569 eligible MedicineInsight practices.
- The average number of clinical encounters with a GP per patient during 2018–19 was 5.1.
- More than half the patients had 1–3 GP clinical encounters during the year.
- With the exception of the 0–9 years age group, female patients have a higher average number of GP clinical encounters than male patients.

This chapter describes the characteristics of GP clinical encounters in the MedicineInsight cohort, compared to all MBS-billed GP clinical encounters nationally, including:

- number of encounters per patient for encounters in the cohort and all encounters nationally
- average number of encounters per patient for encounters in the cohort and all encounters nationally, grouped by sex, age, state, rurality, and socio-economic status
- average number of encounters by age and sex, and by socio-economic status and sex
- proportion of encounters by age group, compared to encounters nationally
- proportion of encounters according to reason for encounter.

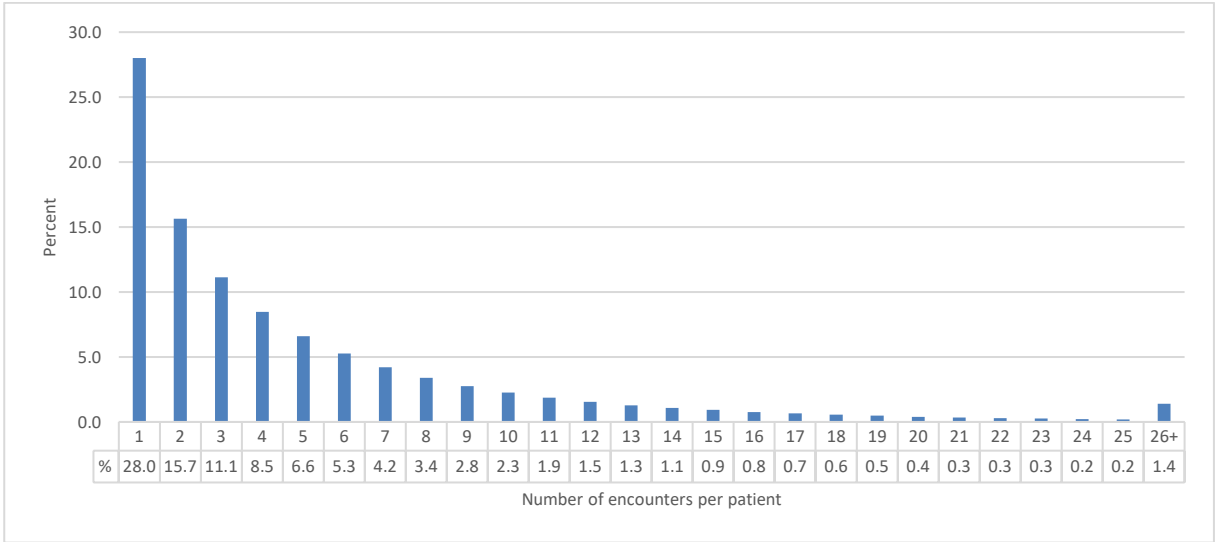
Identifying GP clinical encounters in MedicineInsight data is a challenge because an encounter is created in the CIS whenever a patient record is opened, whether it is opened for clinical or administrative reasons. NPS MedicineWise has developed an algorithm to define a clinical encounter with a GP (see Appendix 1, Box 1). Although we identified certain encounters as 'clinical' for the purposes of counting and describing characteristics of clinical encounters in this report, all clinical data about a patient (eg, diagnoses and prescriptions) recorded on any date during the financial year 2018–19 was used, even if associated with an administrative encounter.

3.1. GP clinical encounter rate per patient

A total of 14,723,569 GP clinical encounters were recorded in MedicineInsight in 2018–19 for 2,893,776 patients, representing an average of 5.1 GP clinical encounters per patient for the year (Table 3.1) and with more than half of the patients (54.8%) having 1–3 GP clinical encounters during the year. Just over 10% of patients had 12 or more clinical encounters over the year (Figure 3.1).

The relative distribution of the number of GP clinical encounters per patient is shown below.

FIGURE 3.1 FREQUENCY DISTRIBUTION OF THE NUMBER OF GP CLINICAL ENCOUNTERS PER PATIENT (UNWEIGHTED), MEDICINEINSIGHT 2018–19



	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26+
%	28.0	15.7	11.1	8.5	6.6	5.3	4.2	3.4	2.8	2.3	1.9	1.5	1.3	1.1	0.9	0.8	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.2	0.2	1.4

Patient loyalty data provided by the DoH indicates that 63% of all patients attend only one practice. Another 26% attend two practices and 11% attend three or more practices (data on file, Australian Government Department of Health).

Using this patient loyalty data, in combination with the estimates of the proportion of practices in MedicineInsight (6.0%), we can also model the likely number of duplicate patient-ID numbers in MedicineInsight. Assuming no change in patient behaviour, we estimate that 2.2% of patients in the cohort have two or more unique patient ID numbers, due to visiting more than one MedicineInsight practice site.

TABLE 3.1 AVERAGE NUMBER OF GP CLINICAL ENCOUNTERS PER PATIENT BY SOCIODEMOGRAPHIC CHARACTERISTIC IN MEDICINEINSIGHT 2018–19 (UNWEIGHTED) COMPARED TO MBS NATIONAL DATA, 2018–19

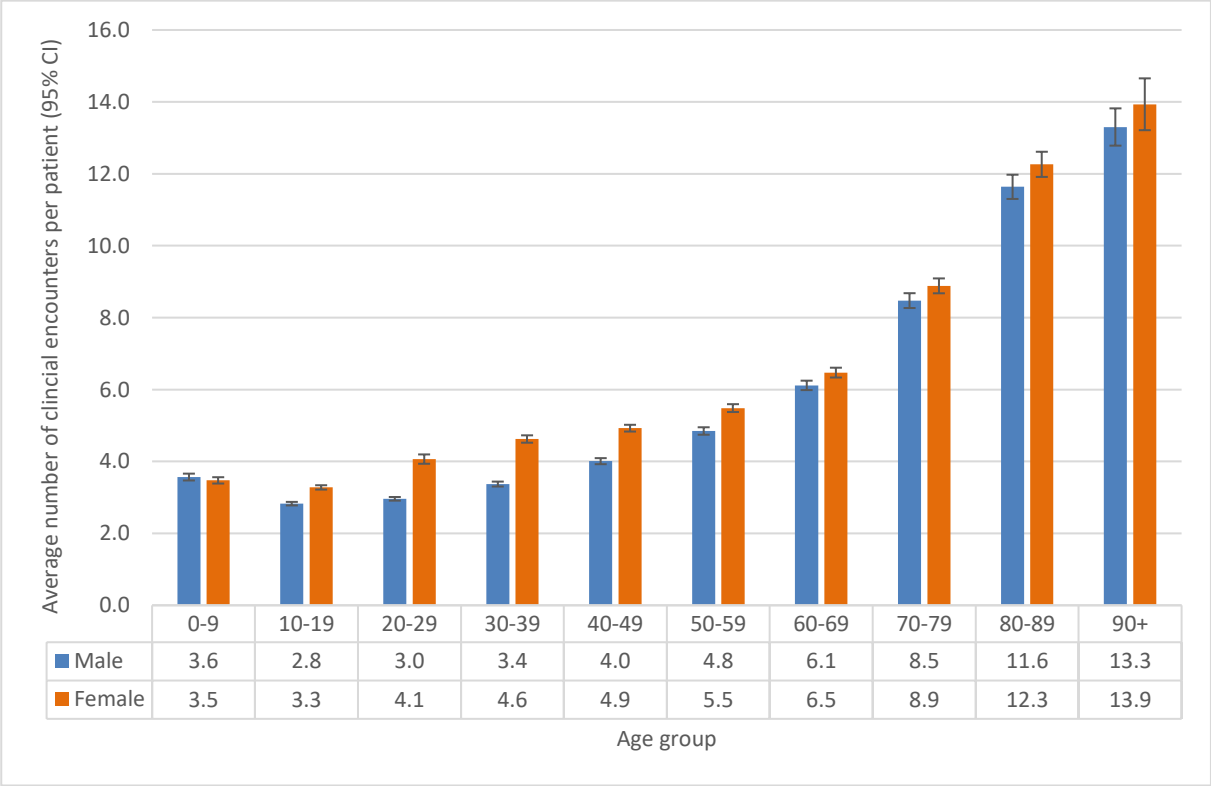
Patient characteristic	MedicineInsight average number of encounters per patient	95% CI	MBS average number of encounters per patient[a]
All patients[b]	**5.1**	**(5.0, 5.2)**	**6.9**
Sex			
Male	4.7	(4.6, 4.8)	6.6
Female	5.4	(5.3, 5.5)	7.6
Age group (years)			
0–9	3.5	(3.4, 3.6)	5.5
10–19	3.1	(3.0, 3.1)	4.2
20–29	3.6	(3.5, 3.7)	5.8
30–39	4.1	(4.0, 4.2)	6.1
40–49	4.5	(4.4, 4.6)	6.3
50–59	5.2	(5.1, 5.3)	6.9
60–69	6.3	(6.2, 6.4)	8.2
70–79	8.7	(8.5, 8.9)	10.9
80–89	12.0	(11.7, 12.3)	14.5
90+	13.7	(13.1, 14.3)	16.8
State/Territory			
ACT	4.8	(4.4, 5.2)	5.6
NSW	5.1	(4.9, 5.3)	7.2
NT	5.1	(3.6, 6.6)	5.7
QLD	5.1	(4.9, 5.4)	7.0
SA	5.4	(5.0, 5.8)	6.9
TAS	5.6	(5.1, 6.2)	6.3
VIC	5.0	(4.7, 5.2)	7.0
WA	4.9	(4.6, 5.2)	6.4
Rurality			
Major city	5.0	(4.8, 5.1)	7.1
Inner regional	5.4	(5.1, 5.8)	6.5
Outer regional	5.2	(4.9, 5.5)	6.9
Remote/very remote	3.8	(3.4, 4.2)	5.8
Socio-economic status (SEIFA IRSAD quintile)			
1 (most disadvantaged)	5.6	(5.3, 5.8)	7.5
2	5.2	(5.0, 5.4)	7.2
3	5.3	(5.1, 5.5)	7.1

Patient characteristic	MedicineInsight average number of encounters per patient	95% CI	MBS average number of encounters per patient[a]
4	4.9	(4.8, 5.1)	7.0
5 (most advantaged)	4.6	(4.5, 4.8)	6.3

a MBS data from Australian Government Department of Health Total GP Non-Referred Attendances excluding Practice Nurse Items 2018–19.
b There were 244 patients of indeterminate gender who are not included in this table or for the rest of the report.

Across all ages with the exception of 0–9 years, female patients have a higher average number of GP encounters than male patients (Figure 3.2). This difference was most significant for men aged 20–39 years. The average number of encounters per year increased significantly with age from 3.5 encounters per patient aged 0–9 years to 13.7 encounters per patient aged 90+ years (Table 3.1 and Figure 3.2). Comparable trends were seen in the national MBS data (Table 3.1).

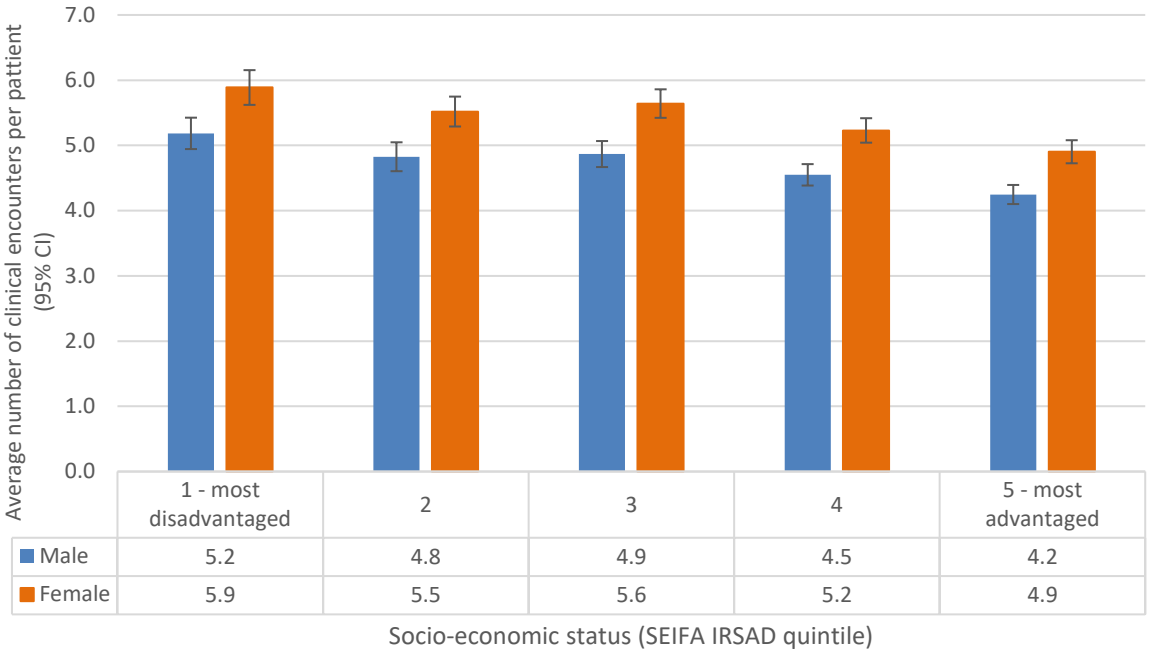
FIGURE 3.2 AVERAGE NUMBER OF GP CLINICAL ENCOUNTERS PER PATIENT BY SEX AND AGE GROUP (UNWEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	3.6	2.8	3.0	3.4	4.0	4.8	6.1	8.5	11.6	13.3
Female	3.5	3.3	4.1	4.6	4.9	5.5	6.5	8.9	12.3	13.9

Encounter rates were similar between different states. As expected, given the increased difficulty in accessing health care in remote and very remote regions, patients living in these areas had significantly fewer GP clinical encounters per year than any of the other regions (Table 3.1). The number of encounters each year increased with increasing socio-economic disadvantage (Table 3.1 and Figure 3.3).

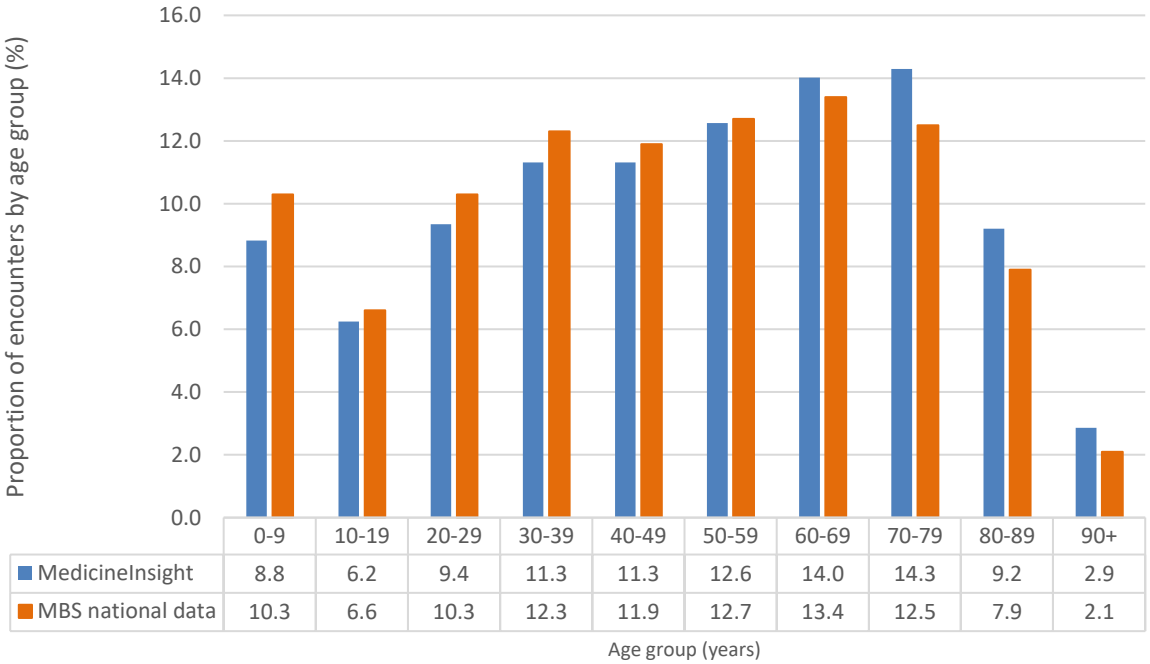
FIGURE 3.3 AVERAGE NUMBER OF GP CLINICAL ENCOUNTERS PER PATIENT BY SEIFA QUINTILE AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19



	1 - most disadvantaged	2	3	4	5 - most advantaged
Male	5.2	4.8	4.9	4.5	4.2
Female	5.9	5.5	5.6	5.2	4.9

Similar patterns were seen when comparing the distribution of all encounters in MedicineInsight practices and Medicare Benefits Schedule (MBS) national data by age groups (Figure 3.4). In both datasets there was a peak in the number of encounters during childhood (0–9 years) which then fell substantially during adolescence and early adulthood. From age 20 until 69, the number of encounters rose again before levelling off and falling again in the oldest age groups.

FIGURE 3.4 DISTRIBUTION OF GP CLINICAL ENCOUNTERS BY PATIENT AGE GROUP IN MEDICINEINSIGHT (UNWEIGHTED) COMPARED TO MBS NATIONAL DATA, 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
MedicineInsight	8.8	6.2	9.4	11.3	11.3	12.6	14.0	14.3	9.2	2.9
MBS national data	10.3	6.6	10.3	12.3	11.9	12.7	13.4	12.5	7.9	2.1

4. NON-COMMUNICABLE DISEASES

In summary

- Hypertension was the most common selected condition recorded during 2018–19 for patients seen by GPs in MedicineInsight practices (5.7% of patients). This was followed by depression (4.7%) and anxiety disorder (4.6%), lower back pain (4.0%) and asthma (3.2%).
- Patient prevalence in 2018–19 was further explored by identifying patients who were recorded as having a particular condition at any time in their medical record. Once again hypertension was the most commonly reported of the selected non-communicable conditions (16.3% of patients), followed by low back pain (14.5%) and depression (13.9%).
- The patient prevalence estimates for most of the selected conditions align with the population prevalence estimates from the 2017–18 ABS National Health Survey.
- Consistent with national data, the proportion of patients with hypertension, low back pain and dyslipidaemia increased with age in both males and females.
- Compared to males, female patients were more likely to have a record of depression and anxiety disorder, across all age groups.
- The proportion of patients with asthma was highest among boys aged 19 years or younger. From age 20 onwards, women were more likely to have asthma than men.
- For every 100 GP clinical encounters during 2018–19, on average:
  - 10.3 were with a patient with a recent record of hypertension and 29.7 were with a patient with hypertension ever recorded
  - 8.8 were with a patient with a recent record of depression and 23.5 were with a patient with depression ever recorded.

This chapter describes:

- the proportion of patients with selected conditions reported at encounters in 2018–19
- the age and sex-specific proportions of patients with a subset of the most common non-communicable conditions
- the proportions of patients with selected non-communicable conditions ever recorded
- the number of encounters with selected non-communicable conditions recorded per 100 encounters.
- average number of encounters during 2018–19 for patients with selected conditions.

Detailed definitions of the conditions included in this report are provided in Appendix 5.

4.1. Patient prevalence

Hypertension was the most common condition with 16.3% of patients having a diagnosis of hypertension ever recorded (at any time in their medical record; Table 4.1). The next four most prevalent conditions were low back pain (14.5%), depression (13.9%), dyslipidaemia (13.7%) and anxiety disorder (12.3%).

The patient prevalence estimates of most of the conditions were similar in this cohort, the 2017–18 MedicineInsight GPIR cohort 18[2] and the population estimates from the 2017–18 ABS National Health Survey (ABS NHS), including anxiety disorder, asthma, CVD, type 1 diabetes, osteoarthritis, COPD, osteoporosis, atrial fibrillation, CKD and stroke.[6] Anxiety disorder was recorded for 12.3% of MedicineInsight patients and 13.1% of ABS NHS participants. Similarly, COPD was recorded for 2.5% of both MedicineInsight patients and ABS NHS participants (Table 4.1).[6]

Patient prevalence estimates were higher for a number of conditions in the current MedicineInsight cohort during 2018–19 than the population prevalence estimates from the 2017–18 ABS NHS, including hypertension, dyslipidaemia, heart failure, dermatitis/eczema and depression. In the MedicineInsight cohort during 2018–19, the proportion of people with hypertension ever recorded was 16.3%, compared with 10.6% with current hypertension among ABS NHS participants. The proportion

of MedicineInsight patients with dyslipidaemia ever recorded was 13.7%, compared with 6.1% of ABS NHS participants reporting current high cholesterol. The differences in prevalence are partly a reflection of the different populations from which the data are drawn (general practice patients compared with the general population), the different collection methods (self-reported data compared with secondary use of electronic health records) and the method of defining a 'current condition'. There is also the possibility that patients taking medicines that adequately control their hypertension and lipid levels may no longer self-report having these conditions when asked as part of the NHS survey.

MedicineInsight data include people visiting their GPs, while the ABS NHS data were collected via self-report from people randomly selected from the general population. The ABS NHS asked respondents mostly about 'current conditions' (which was defined as medical conditions which have lasted, or are expected to last, for 6 months or more), while MedicineInsight data were based on whether a GP had 'ever' recorded a condition in a patient's medical history. Prevalence estimates using MedicineInsight data do not account for conditions resolving over time, as depression can, so they have the potential to overestimate prevalence. This is less of an issue for chronic conditions which are unlikely to resolve, such as CVD.

The weighted proportions for conditions tend to be lower than for raw data, particularly for conditions that are primarily seen in older people. Weighting has adjusted for the overrepresentation of MedicineInsight patients in Tasmania which has an older population. While overall the age distribution of MedicineInsight patients is similar to the national MBS data (Table 2.4), as Tasmania has an older population and the MedicineInsight data from Tasmania has been given less weight, this might explain the lower prevalence of some conditions in the weighted data.

TABLE 4.1 PROPORTION OF MEDICINEINSIGHT PATIENTS (UNWEIGHTED AND WEIGHTED) WITH SELECTED CHRONIC CONDITIONS EVER RECORDED IN 2018–19 COMPARED WITH GPIR 2017–18

Condition[a]	MedicineInsight unweighted (condition ever recorded; N = 2,893,532)		MedicineInsight weighted (condition ever recorded)		GPIR 2017–18 (unweighted)	
	% patients	95% CI	% patients	95% CI	% patients	95% CI
Hypertension	16.8	(16.0, 17.7)	16.3	(15.5, 17.1)	16.9	(16.1, 17.6)
Low back pain	14.8	(14.2, 15.4)	14.5	(13.8, 15.2)	nr	nr
Depression	14.9	(14.3, 15.5)	13.9	(13.2, 14.6)	14.9	(14.3, 15.5)
Dyslipidaemia	13.5	(12.9, 14.2)	13.7	(13.0, 14.4)	13.6	(13.0, 14.2)
Anxiety disorder	12.9	(12.4, 13.4)	12.3	(11.7, 12.9)	12.4	(11.8, 12.9)
GORD	12.5	(11.9, 13.0)	12.1	(11.5, 12.7)	12.1	(11.6, 12.7)
Asthma	12.3	(11.9, 12.7)	12.1	(11.6, 12.7)	12.2	(11.8,12.6)
Osteoarthritis	10.0	(9.3, 10.6)	9.4	(8.7, 10.0)	nr	nr
Dermatitis/eczema	7.0	(6.7, 7.4)	7.4	(6.9, 7.8)	nr	nr
Diabetes (type 2/NOS)	5.5	(5.2, 5.8)	5.4	(5.1, 5.7)	5.3	(5.1, 5.6)
CVD[b]	5.0	(4.6, 5.4)	4.8	(4.4, 5.1)	5.0	(4.7, 5.3)
Migraine	4.7	(4.5, 4.9)	4.5	(4.3, 4.7)	nr	nr
Osteoporosis	4.6	(4.2, 5.0)	4.5	(4.1, 4.9)	4.6	(4.3, 4.9)
COPD	2.7	(2.6, 2.9)	2.5	(2.3, 2.7)	2.7	(2.5, 2.9)
Atrial fibrillation	2.3	(2.1, 2.5)	2.2	(2.0, 2.3)	2.3	(2.1, 2.4)
Chronic kidney disease	1.2	(1.1, 1.3)	1.1	(0.9, 1.2)	1.2	(1.0, 1.3)
Breast cancer	1.2	(1.1, 1.3)	1.1	(1.0, 1.2)	nr	nr
Heart failure	1.1	(1.0, 1.2)	1.0	(1.0, 1.1)	1.2	(1.1, 1.2)

Condition[a]	MedicineInsight unweighted (condition ever recorded; N = 2,893,532)		MedicineInsight weighted (condition ever recorded)		GPIR 2017–18 (unweighted)	
	% patients	95% CI	% patients	95% CI	% patients	95% CI
Stroke	1.0	(1.0, 1.1)	1.0	(0.9, 1.1)	nr	nr
Prostate cancer	0.9	(0.8, 0.9)	0.9	(0.8, 0.9)	nr	nr
Rheumatoid arthritis	0.8	(0.8, 0.9)	0.7	(0.7, 0.8)	nr	nr
Diabetes (gestational)	0.7	(0.6, 0.7)	0.7	(0.6, 0.7)	nr	nr
Diabetes (type 1)	0.6	(0.5, 0.6)	0.5	(0.5, 0.6)	nr	nr

CI: confidence interval; COPD: chronic obstructive pulmonary disease; CVD: cardiovascular disease; GORD: gastro-oesophageal reflux disease; GPIR: General Practice Insights Report; NOS: not otherwise specified; nr: not recorded; n/a: not available.
[a] As information about the status of the condition is not regularly updated within the CIS, conditions are included irrespective of whether they are marked as 'active' or 'inactive'.
b Includes coronary artery disease, peripheral vascular disease, atrial fibrillation, heart failure, stroke and transient ischaemic attack

4.2. Conditions recorded for patients in 2018–19

The most commonly recorded conditions in 2018–19 were similar to conditions recorded ever (at any time in the medical record) (Table 4.1) and conditions recorded in 2017–18 (Table 4.2).[2] Once again, hypertension was the most commonly recorded condition during the 2018–19 study period, affecting 5.7% of patients (Table 4.2). Depression (4.7%) and anxiety disorder (4.6%) were also commonly recorded, followed by low back pain (4.0%), asthma (3.2%) and dyslipidaemia (3.2%).

These findings are consistent with data presented by the RACGP in the 2019 Health of the Nation report. In this online survey, GPs identified psychological (eg, depression, anxiety disorder), musculoskeletal (eg back pain, arthritis) and respiratory (eg, asthma, common cold) conditions as those they most commonly managed, while circulatory issues were sixth.[7]

TABLE 4.2 PROPORTION OF MEDICINEINSIGHT PATIENTS WITH SELECTED NON-COMMUNICABLE CONDITIONS RECORDED DURING 2018–19 (UNWEIGHTED AND WEIGHTED) COMPARED WITH GPIR 2017–18 (UNWEIGHTED)

Condition[a]	Unweighted (N = 2,893,532)		Weighted		GPIR 2017–18 (unweighted)	
	% patients	(95% CI)	% patients	(95% CI)	% patients	(95% CI)
Hypertension	5.8	(5.5, 6.2)	5.7	(5.3, 6.0)	5.7	(5.4, 6.0)
Depression	5.1	(4.9, 5.3)	4.7	(4.4, 5.0)	4.8	(4.6, 5.1)
Anxiety disorder	4.9	(4.7, 5.2)	4.6	(4.4, 4.9)	4.4	(4.2, 4.7)
Low back pain	4.1	(3.9, 4.3)	4.0	(3.8, 4.2)	nr	nr
Asthma	3.3	(3.2, 3.4)	3.2	(3.1, 3.4)	3.2	(3.1, 3.4)
Dyslipidaemia	3.1	(3.0, 3.3)	3.2	(3.0, 3.4)	3.2	(3.0, 3.3)
GORD	3.0	(2.8, 3.1)	2.9	(2.7, 3.0)	2.7	(2.6, 2.9)
Diabetes (type 2/NOS)	2.5	(2.4, 2.7)	2.5	(2.3, 2.6)	2.4	(2.2, 2.5)
Osteoarthritis	2.3	(2.2, 2.5)	2.2	(2.0, 2.3)	nr	nr
Dermatitis/eczema	1.6	(1.5, 1.6)	1.6	(1.5, 1.7)	nr	nr
Osteoporosis	1.4	(1.2, 1.5)	1.4	(1.2, 1.5)	1.3	(1.2, 1.4)
Migraine	1.2	(1.2, 1.3)	1.2	(1.1, 1.2)	nr	nr
CVD[b]	1.2	(1.1, 1.3)	1.1	(1.1, 1.2)	1.2	(1.1, 1.2)
COPD	1.0	(0.9, 1.1)	0.9	(0.8, 1.0)	1.0	(0.9. 1.0)
Atrial fibrillation	0.8	(0.7, 0.8)	0.7	(0.7, 0.8)	0.7	(0.7, 0.8)
Heart failure	0.4	(0.4, 0.4)	0.4	(0.3, 0.4)	0.4	(0.3, 0.4)

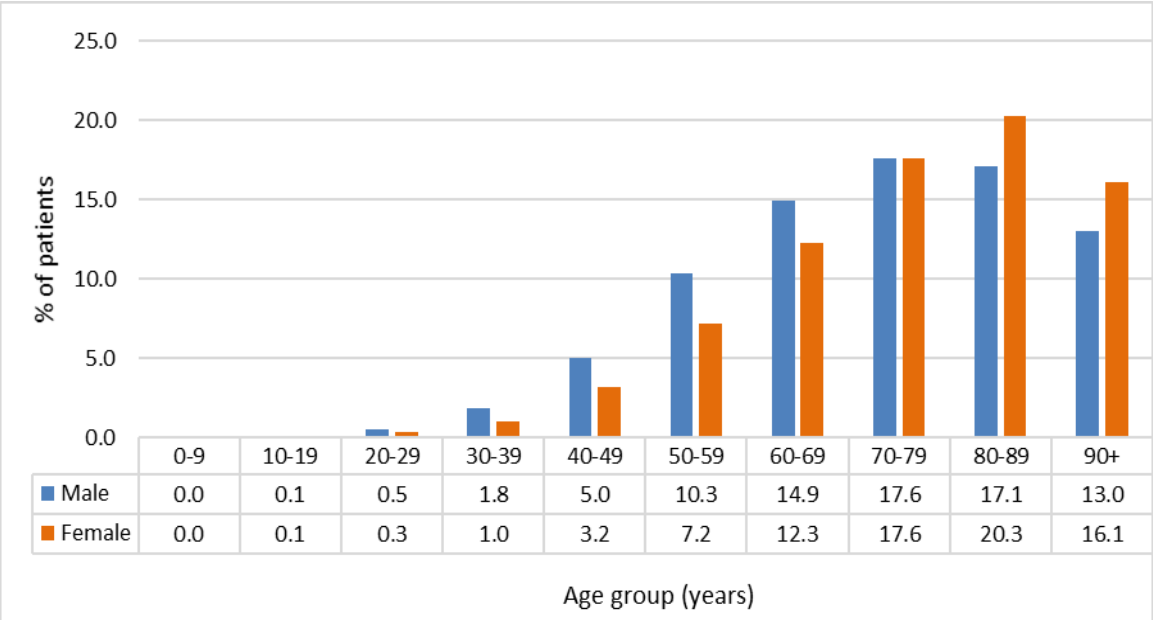
Condition[a]	Unweighted (N = 2,893,532)		Weighted		GPIR 2017–18 (unweighted)	
	% patients	(95% CI)	% patients	(95% CI)	% patients	(95% CI)
Chronic kidney disease	0.4	(0.3, 0.4)	0.3	(0.3, 0.3)	0.3	(0.3, 0.4)
Rheumatoid arthritis	0.3	(0.2, 0.3)	0.2	(0.2, 0.2)	nr	nr
Stroke	0.2	(0.2, 0.2)	0.2	(0.2, 0.2)	nr	nr
Breast cancer	0.2	(0.2, 0.3)	0.2	(0.2, 0.2)	nr	nr
Prostate cancer	0.2	(0.2, 0.2)	0.2	(0.2, 0.2)	nr	nr
Diabetes (type 1)	0.2	(0.2, 0.2)	0.2	(0.2, 0.2)	nr	nr
Diabetes (gestational)	0.1	(0.1, 0.1)	0.1	(0.1, 0.1)	nr	nr

CI: Confidence interval; COPD: chronic obstructive pulmonary disease; CVD: cardiovascular disease; GORD: gastro-oesophageal reflux disease; GPIR: General Practice Insights Report; NOS: not otherwise specified; nr: not recorded.
[a] As information about the status of the condition is not regularly updated within the CIS, conditions are included irrespective of whether they are marked as 'active' or 'inactive'.
b Includes coronary artery disease, peripheral vascular disease, atrial fibrillation, heart failure, stroke and transient ischaemic attack

Figures 4.1 to 4.6 show the age- and sex-specific rates for the six most common chronic conditions recorded during 2018–19.

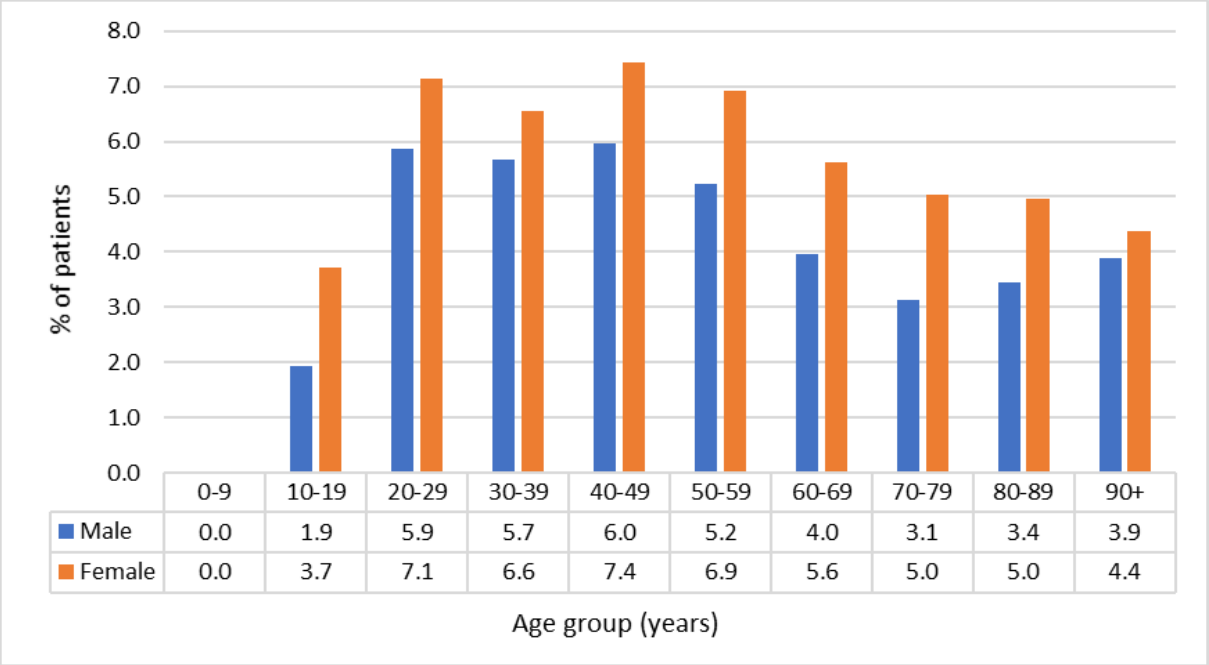
As expected, recorded diagnoses of hypertension in 2018–19 increased with age in both men and women until age 70–79 in men and 80–89 in women (Figure 4.1). Hypertension was more commonly recorded in men until age 60–69 and was more commonly reported in women at 80 years and above. These results compare reasonably well to the 2017–18 ABS NHS data.[6]

FIGURE 4.1 AGE- AND SEX-SPECIFIC RATES FOR PATIENTS WITH HYPERTENSION RECORDED (WEIGHTED), MEDICINEINSIGHT 2018–19



Consistent with other data sources, including the 2017–18 ABS NHS, female patients were more likely to have a record of depression than males across every age group (Figure 4.2). Among patients with a recorded diagnosis of depression in 2018–19, the highest rate was recorded in women aged 40–49 (7.4%). The highest rate of depression recorded for men was also in the 40–49 age group. The rate of depression in adolescent girls was almost twice that of adolescent boys (3.7% vs 1.9%, respectively).

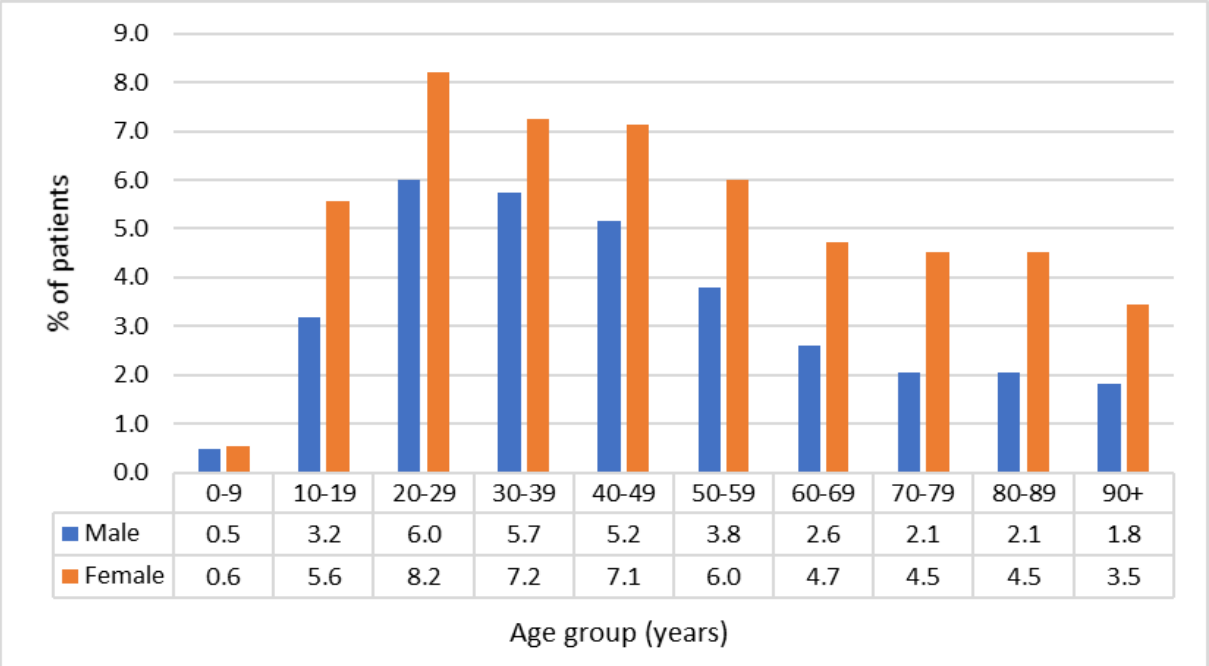
FIGURE 4.2 AGE- AND SEX-SPECIFIC RATES FOR PATIENTS WITH DEPRESSION RECORDED (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	0.0	1.9	5.9	5.7	6.0	5.2	4.0	3.1	3.4	3.9
Female	0.0	3.7	7.1	6.6	7.4	6.9	5.6	5.0	5.0	4.4

As with depression, females of all ages were more likely to have a record of anxiety disorder than males (Figure 4.3). Unlike depression, the highest rates of anxiety disorder were recorded in people aged 20–29: 8.2% of women and 6.0% of men in this age group had a record of anxiety disorder in 2018–19.

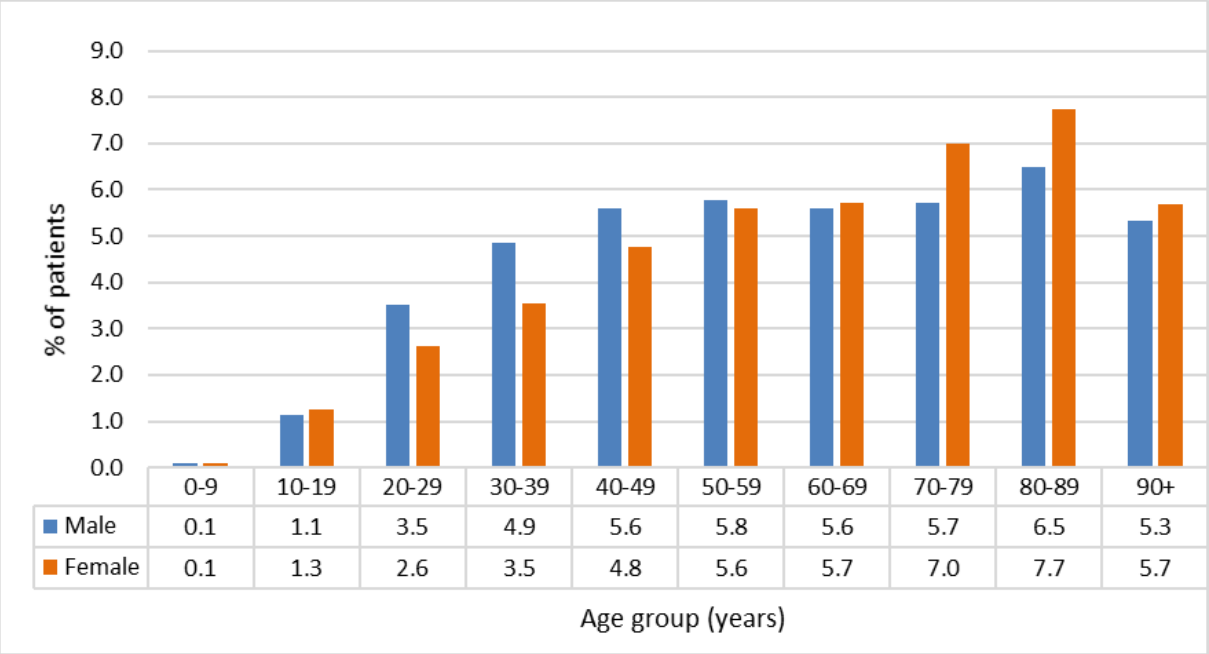
FIGURE 4.3 AGE- AND SEX-SPECIFIC RATES FOR PATIENTS WITH ANXIETY DISORDER RECORDED (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	0.5	3.2	6.0	5.7	5.2	3.8	2.6	2.1	2.1	1.8
Female	0.6	5.6	8.2	7.2	7.1	6.0	4.7	4.5	4.5	3.5

The rate of low back pain in 2018–19 increased with age in both men and women and was greatest at age 80–89 years for both sexes (Figure 4.4). Low back pain was more commonly recorded in men until age 49 years and then between the ages of 50–69 years rates were relatively similar for both sexes. From age 70 years onwards low back pain was more commonly reported in women.

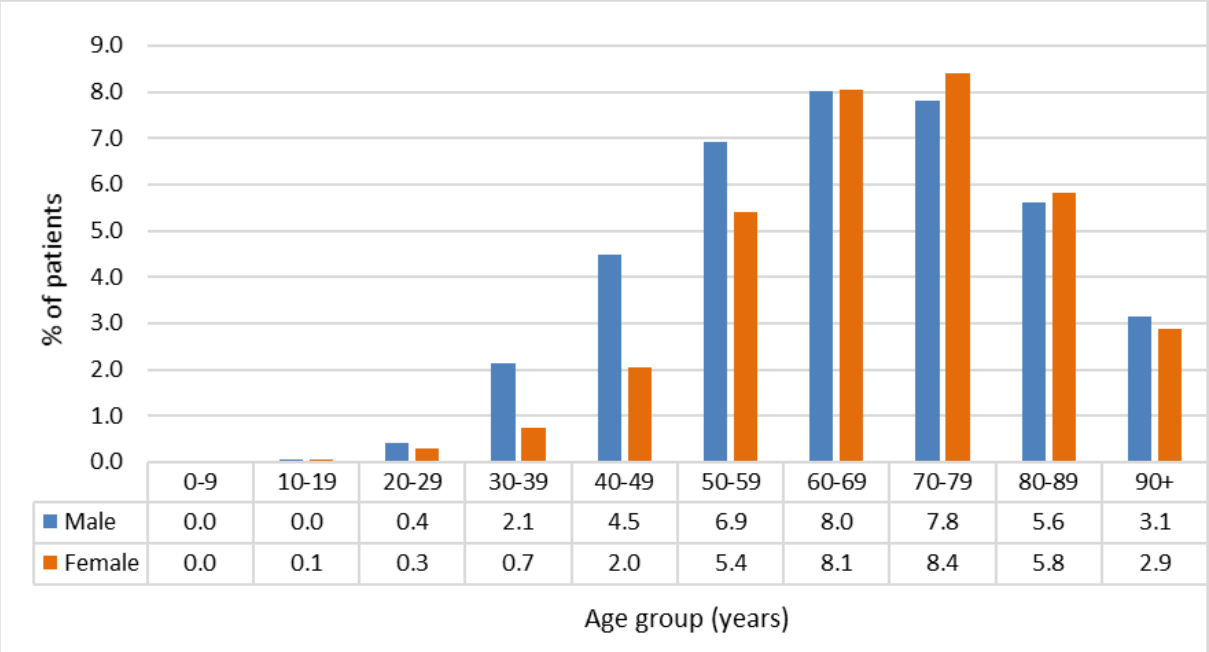
FIGURE 4.4 AGE- AND SEX-SPECIFIC RATES FOR PATIENTS WITH LOW BACK PAIN RECORDED (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	0.1	1.1	3.5	4.9	5.6	5.8	5.6	5.7	6.5	5.3
Female	0.1	1.3	2.6	3.5	4.8	5.6	5.7	7.0	7.7	5.7

Consistent with data reported from the 2017–18 ABS NHS,[6] dyslipidaemia increased with age for both males and females (Figure 4.5). Males were more likely to have dyslipidaemia recorded compared with females in age groups up to 59 years, after which the rates are more similar. Females aged 70–79 years had the highest rate of dyslipidaemia (8.4%).

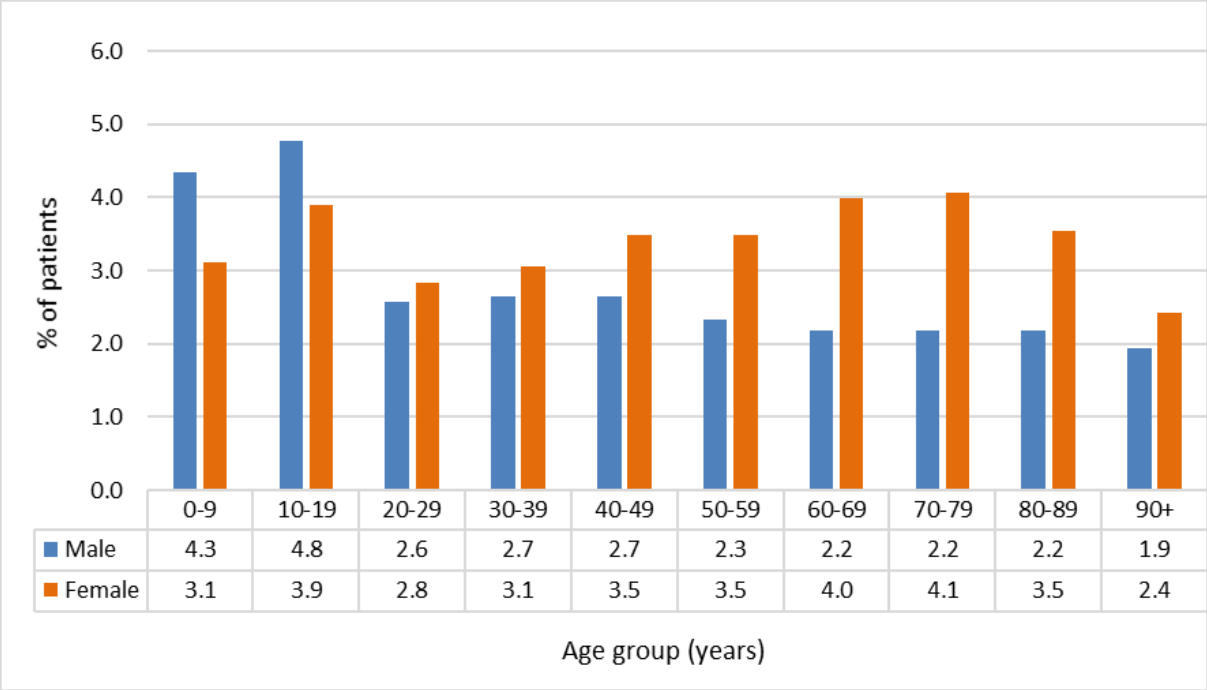
FIGURE 4.5 AGE- AND SEX-SPECIFIC RATES FOR PATIENTS WITH DYSLIPIDAEMIA RECORDED (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	0.0	0.0	0.4	2.1	4.5	6.9	8.0	7.8	5.6	3.1
Female	0.0	0.1	0.3	0.7	2.0	5.4	8.1	8.4	5.8	2.9

During childhood and adolescence, boys were more likely to have a record of asthma than girls (Figure 4.6) although asthma was more common in women than in men, consistent with data reported in the 2017–18 ABS NHS.[6]

FIGURE 4.6 AGE- AND SEX-SPECIFIC RATES FOR PATIENTS WITH ASTHMA RECORDED (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	4.3	4.8	2.6	2.7	2.7	2.3	2.2	2.2	2.2	1.9
Female	3.1	3.9	2.8	3.1	3.5	3.5	4.0	4.1	3.5	2.4

4.3. Conditions per 100 GP clinical encounters

Consistent with the data shown above, patients with a record of hypertension, depression, anxiety disorder and low back pain were among the most frequently seen at GP consultations in 2018–19 (Table 4.3).[f] These results provide important information about GP workload during 2018–19 by describing both the number of encounters with patients with a condition recorded recently (during 2018–19) and the number of encounters with patients with a condition ever recorded (recently or historically).

For every 100 GP clinical encounters during 2018–19, on average (Table 4.3):

- 10 were with a patient with a recent record of hypertension and 30 were with a patient with hypertension ever recorded,
- 9 were with a patient with a recent record of depression and 24 were with a patient with depression ever recorded,
- 8 were with a patient with a recent record of anxiety disorder and 20 were with a patient with anxiety disorder ever recorded,
- 8 were with a patient with a recent record of low back pain and 26 were with a patient with low back pain ever recorded.

[f] The second column from left of Table 4.3 describes the rate at which patients with selected conditions recorded in 2018–19 were managed per 100 encounters, calculated by dividing the number of encounters with patients with the condition recorded in 2018–19 by the total number of encounters for all patients multiplied by 100. The right-hand column of Table 4.3 describes the rate at which patients with selected conditions recorded ever (at any time in their medical records) were managed per 100 encounters, calculated by dividing the number of encounters with patients with the condition recorded ever by the total number of encounters for all patients multiplied by 100.

TABLE 4.3 PATIENTS WITH SELECTED CONDITIONS PER 100 GP CLINICAL ENCOUNTERS (WEIGHTED) IN MEDICINEINSIGHT 2018–19

Condition[a]	Condition recorded in 2018–19		Condition ever recorded	
	Encounters with patients with condition (recorded in 2018–19) per 100 encounters[b]	95% CI	Encounters with patients with condition (ever recorded) per 100 encounters[b]	95% CI
Hypertension	10.3	(9.3, 11.3)	29.7	(27.1, 32.4)
Depression	8.8	(8.3, 9.3)	23.5	(22.5, 24.4)
Anxiety disorder	8.3	(7.8, 8.7)	19.8	(18.9, 20.6)
Low back pain	8.2	(7.4, 9.1)	25.7	(23.1, 28.2)
GORD	5.9	(5.3, 6.6)	22.7	(20.5, 24.9)
Diabetes (type 2/NOS)	5.4	(4.9, 5.9)	11.4	(10.4, 12.4)
Dyslipidaemia	5.3	(4.7, 5.9)	24.0	(21.8, 26.2)
Osteoarthritis	5.2	(4.7, 5.7)	20.2	(18.3, 22.0)
Asthma	5.0	(4.4, 5.5)	16.6	(15.0, 18.2)
Osteoporosis	3.4	(3.0, 3.7)	10.7	(9.7, 11.7)
CVD[c]	2.9	(2.7, 3.2)	11.5	(10.5, 12.5)
COPD	2.5	(2.2, 2.8)	6.3	(5.7, 7.0)
Dermatitis/eczema	2.3	(2.0, 2.6)	9.7	(8.6, 10.8)
Atrial fibrillation	2.0	(1.8, 2.2)	5.7	(5.2, 6.2)
Migraine	2.0	(1.7, 2.2)	7.0	(6.3, 7.8)
Heart failure	1.4	(1.2, 1.5)	3.4	(3.1, 3.7)
Chronic kidney disease	1.0	(0.9, 1.1)	2.9	(2.6, 3.2)
Breast cancer	0.5	(0.4, 0.5)	2.1	(1.9, 2.3)
Prostate cancer	0.5	(0.4, 0.5)	1.8	(1.6, 1.9)
Rheumatoid arthritis	0.5	(0.5, 0.6)	1.6	(1.4, 1.7)
Stroke	0.5	(0.5, 0.6)	2.5	(2.3, 2.7)
Diabetes (type 1)	0.4	(0.3, 0.4)	1.0	(0.9, 1.1)
Diabetes (gestational)	0.2	(0.2, 0.2)	-	-

CI: confidence interval; CIS: clinical information system; COPD: chronic obstructive pulmonary disease; CVD: cardiovascular disease; GORD: gastro-oesophageal reflux disease; NOS: not otherwise specified.

[a] As information about the status of the condition is not regularly updated within the CIS, conditions are included irrespective of whether they are marked as 'active' or 'inactive'.

[b] While patients may have a history of a condition, it may not necessarily be managed at every encounter. In addition, patients may present with more than one condition at each encounter. The number of patients with each specified condition either during 2018–19 or "ever-recorded" are averaged over 100 GP clinical encounters in 2018–19.

[c] Includes coronary artery disease, peripheral vascular disease, atrial fibrillation, heart failure, stroke and transient ischaemic attack

4.4. Annual GP clinical encounter rate for patients with selected conditions (ever recorded)

Unsurprisingly, the average number of GP clinical encounters in 2018–19 for patients with each selected condition was significantly greater than the average annual GP clinical encounter rate for the entire study cohort (5.1). Table 4.4 presents the mean number of GP clinical encounters in 2018–19 for patients with a selected condition ever recorded in the CIS, adjusted for age and sex.

While patients with a record of heart failure were only managed at an average of 3.4 out of every 100 GP clinical encounters (Table 4.3; right-hand columns) they had the highest average adjusted GP clinical encounter rate in 2018–19 at 11.5. Although patients with CKD and stroke were less commonly

seen by GPs per 100 clinical encounters than those with heart failure, they had some of the highest average encounter rates per person in 2018–19 (Table 4.4). Patients with CKD were seen at 2.9 out of every 100 encounters (Table 4.3; right-hand columns) but had an average adjusted GP clinical encounter rate in 2018–19 of 9.8 (Table 4.4). Other conditions with high annual GP clinical encounter rates were osteoporosis (9.7), followed by COPD (9.5), stroke (9.2) and CVD (9.1).

The severity of a condition, coupled with recommended management guidelines, may require regular monitoring of patients, leading to frequent visits to the GP. For example, the Australian guidelines for management of CKD recommend regular monitoring of patients 1–3 monthly, 3–6 monthly or yearly, depending on the severity of the disease.[8] Additionally, these findings may partly reflect the impact of multimorbidity where patients with these conditions tend to have two or more diagnosed chronic conditions,[9,10] thus are likely to have more medical appointments.[7] Using data from the Bettering the Evaluation And Care of Health (BEACH) program, Taylor *et al* demonstrated that 99.1% of patients with heart failure had at least one and 53.4% had six or more other chronic conditions.[9] The AIHW's 2016 report about the health of Australians shows that 90% of people with COPD had two or more chronic diseases.[10]

Although these results have been corrected for age and sex, they may include instances of multimorbidity, which may lead to an overestimation of the average encounters for some groups of patients with selected conditions.

TABLE 4.4 AVERAGE NUMBER OF GP CLINICAL ENCOUNTERS IN 2018–19 PER PATIENT WITH A SELECTED CONDITION, AGE- AND SEX-ADJUSTED, MEDICINEINSIGHT 2018–19

	MedicineInsight 2018–19, unweighted (N = 2,893,532)			
	Average number of GP clinical encounters in 2018–19 adjusted for age and sex[a]	**(95% CI)**	**Average number of GP clinical encounters in 2018–19 (unadjusted)**	**(95% CI)**
All patients	-	-	5.1	(5.0, 5.2)
Patient condition (ever recorded)[b]				
Heart failure	11.5	(10.9, 12.1)	16.5	(16.1, 16.9)
Chronic kidney disease	9.8	(9.4, 10.2)	14.0	(13.7, 14.3)
Osteoporosis	9.7	(9.4, 10.1)	12.0	(11.7, 12.2)
COPD	9.5	(9.2, 9.9)	12.6	(12.3, 12.9)
Stroke	9.2	(8.8, 9.5)	12.9	(12.5, 13.3)
CVD	9.1	(8.8, 9.4)	12.3	(12.0, 12.5)
Osteoarthritis	8.8	(8.5, 9.0)	10.8	(10.6, 11.0)
Diabetes (type 2/NOS)	8.8	(8.6, 9.1)	10.8	(10.6, 11.1)
Atrial fibrillation	8.6	(8.3, 9.0)	13.4	(13.1, 13.7)
Rheumatoid arthritis	8.3	(8.0, 8.5)	10.8	(10.5, 11.0)
Diabetes (type 1)	8.1	(7.8, 8.4)	9.0	(8.7, 9.4)
GORD	7.9	(7.7, 8.1)	9.6	(9.3, 9.8)
Anxiety disorder	7.8	(7.6, 7.9)	8.0	(7.9, 8.2)
Low back pain	7.7	(7.6, 7.9)	8.9	(8.7, 9.1)
Migraine	7.6	(7.4, 7.7)	7.9	(7.7, 8.0)
Depression	7.5	(7.3, 7.7)	8.4	(8.2, 8.6)
Dyslipidaemia	7.5	(7.3, 7.6)	8.9	(8.8, 9.1)
Breast cancer	7.4	(6.7, 8.1)	9.6	(9.4, 9.8)
Hypertension	7.4	(7.3, 7.5)	9.3	(9.1, 9.5)

	MedicineInsight 2018–19, unweighted (N = 2,893,532)			
	Average number of GP clinical encounters in 2018–19 adjusted for age and sex[a]	**(95% CI)**	**Average number of GP clinical encounters in 2018–19 (unadjusted)**	**(95% CI)**
Prostate cancer	7.1	(5.7, 8.6)	10.6	(10.3, 10.8)
Asthma	6.8	(6.7, 7.0)	7.0	(6.8, 7.1)
Dermatitis/eczema	6.8	(6.6, 6.9)	6.7	(6.5, 6.8)

CI: confidence interval; COPD: chronic obstructive pulmonary disease; CVD: cardiovascular disease; GORD: gastro-oesophageal reflux disease; NOS: not otherwise specified.

[a] To adjust for confounding by age and sex the GPIR 2018–19 all patient cohort was used as the reference population for age- and sex-standardisation of encounter rates for patients with selected conditions (using direct standardisation).

[b] While patients may have a history of a condition, it may not necessarily be managed at every encounter. In addition, patients may present with more than one condition at each encounter. The average (mean) number of GP clinical encounters in 2018–19 is calculated for each group of patients with each selected condition ever recorded.

5. IN-DEPTH ANALYSIS: LONG-TERM MENTAL AND COGNITIVE CONDITIONS

In summary

Long-term mental illness

- 4.7% of all patients who visited a MedicineInsight practice once or more in 2018–19 had a recent history of long-term mental illness recorded.
  - 2.4% had current long-term depression and 2.2% had current long-term anxiety disorder. (NB: Our definition of long-term anxiety disorder or depression required the recording of these conditions multiple times at least 6 months apart. Depending on GP recording practices, or if longitudinal records are unavailable, this might not occur.)
  - 0.9% had bipolar disorder.
  - 0.5% had schizophrenia recorded.
- Regardless of the type of long-term mental illness, the average number of encounters in 2018–19 for these patients was similar, at around 10 encounters per year, which is double that for the general population (5.1 per year).
- The prevalence of existing CVD, and every single CVD risk factor, was significantly higher for patients with long-term mental illness when compared to the general patient population without long-term mental illness.
- Compared to the general patient population without long-term mental illness, having long-term mental illness increased the odds of CVD by 50%, being a current smoker by 250%, dyslipidaemia by 90%, overweight/obesity by 80%, hypertension by 40% and type 2 diabetes by 30%.
- Compared to patients in the general patient population with existing CVD , patients with long-term mental illness and established CVD were less likely to be prescribed the combination of medicines recommended in guidelines for the (secondary) prevention of cardiovascular events.

Dementia

- In 2018–19, 3.4% of patients aged 65 and over had a record of dementia and 0.6% of all patients had a record of dementia; dementia was most common among patients aged 90 years or more (12.6%) and those aged 80–89 (6.8%).
- Among patients attending general practice with a record of dementia, 58.6% were female, more than 90% were aged 70 years or older, with 22.9% aged 70–79 and 68.0% aged 80 years or older.
- Although patients with dementia have a comparatively high average yearly encounter rate (15.4 encounters per year) they attend 1.6 out of every 100 GP clinical encounters.

This chapter describes:

- the sociodemographic characteristics of patients with long-term mental illness or dementia
- the proportion of patients with long-term mental illness or dementia
- the age and sex-specific proportion of patients with long-term mental illness or dementia
- encounters during 2018–19 with people with long-term mental illness or dementia per 100 encounters
- the average number of encounters during 2018–19 for patients with long-term mental illness or dementia
- the uptake of mental health care plans in 2018–19 among patients with long-term mental illness
- the prevalence, risk and management of CVD in people with long-term mental illness.

5.1. Background

Mental illnesses, such as anxiety disorder, depression, bipolar disorder and schizophrenia, cause a high burden of disease in Australia. A substantial proportion of the Australian population will experience mental illness during their lifetime.[11] In response to national and international evidence that

people with mental illness have poorer physical health and lower life expectancies than those without, the Fifth National Mental Health Plan identified improving the physical health of people with mental illness as one of its key priorities.[12]

Among MedicineInsight patients, depression and anxiety disorder were the second and third most commonly recorded conditions, respectively, in 2018–19 (see Chapter 4) and in the 2017–18 GPIR report.[2] This is consistent with the RACGP 2019 Health of the Nation report, in which GPs identified psychological conditions as the most commonly managed class of conditions.[7]

This chapter describes the characteristics of patients with current long-term mental illness, including how often they visit a GP and their uptake of mental health care plans. In addition, it explores the burden of CVD – the leading cause of death and disease burden in Australia – for patients with long-term mental illness. More than a quarter of 1825 Australian patients in the 2010 Survey of High Impact Psychosis (SHIP) reported having a cardiovascular condition,[13] however recent information and estimates for Australian patients with other mental illnesses are lacking.

Dementia is a syndrome caused by a number of underlying diseases – most commonly Alzheimer disease, vascular disease, or Lewy body disease. Dementia gradually impairs brain function and affects memory, thinking, behaviour, communication and a person's ability to perform activities of daily living.

The most recent national data on the prevalence of dementia in Australia is from the ABS Survey of Disability, Aging and Carers Report 2018. They found 3.1% of the population aged 65 years or over had dementia.[14] This is lower than prior estimates from the AIHW, based on international data and modelling, that predicted 8.7% of people aged 65 and over in Australia had dementia in 2018.[11]

This chapter also quantifies the proportion of general practice patients recorded as having dementia, describes their sociodemographic characteristics and how often they visit, or are visited by, a GP.

5.2. Identifying patients with long-term mental illness or dementia

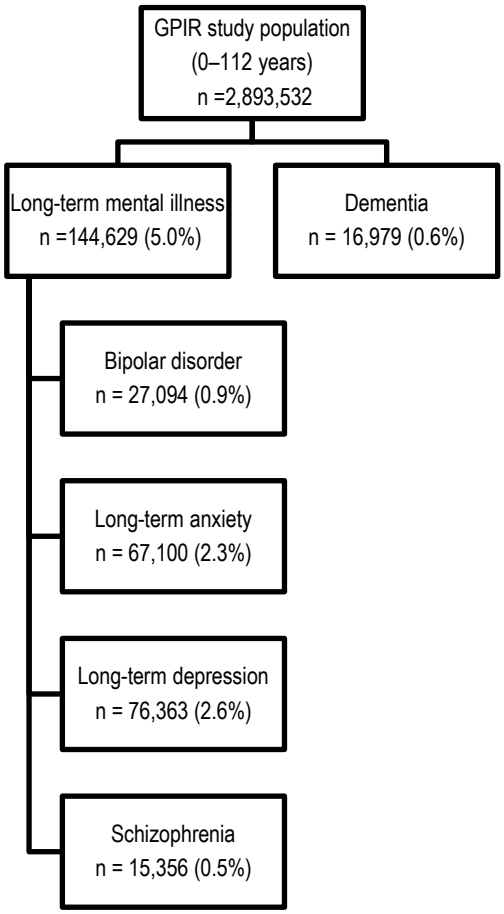
This analysis included patients with dementia (ever recorded) or any of the following four categories of severe or current long-term mental illness.

- Long-term anxiety disorder (two records or more, at least six months apart over two consecutive years between 1 July 2016 and 30 June 2019).
- Long-term depression (two records or more, at least six months apart over two consecutive years between 1 July 2016 and 30 June 2019);
- Bipolar disorder (ever recorded).
- Schizophrenia (ever recorded).

Due to the nature of routinely collected data, information on whether a patient had mild, moderate or severe depression or anxiety disorder was often missing. For this reason, we used duration of illness to define the cohort of patients with recent long-term mental illness. Detailed definitions of the conditions are provided in Appendix 5.

Figure 5.1 displays the study selection flow chart for patients with long-term mental illness or dementia. Among the unweighted GPIR population there were 144,629 patients (5.0%) with long-term mental illness and 16,979 (0.6%) with dementia.

FIGURE 5.1 STUDY SELECTION FLOWCHART FOR PATIENTS WITH CURRENT LONG-TERM MENTAL ILLNESS OR DEMENTIA



5.3. Patient prevalence of current long-term mental illness and dementia

5.3.1. Long-term mental illness

Among patients of all ages who visited a MedicineInsight practice at least once in 2018–19, 4.7% had at least one current long-term mental illness: 2.4% had current long-term depression that lasted at least 6 months, 2.2% current long-term anxiety disorder that lasted at least 6 months, 0.9% bipolar disorder and 0.5% schizophrenia (Table 5.1). Some patients had more than one mental illness, with 1.0% of patients having both long-term anxiety disorder and long-term depression recorded.

This report might underestimate the proportion of patients with current long-term depression or anxiety disorder if their illness was not recorded in the clinical information system multiple times and at least 6 months apart between 1 July 2016 and 30 June 2019. Underestimating long-term mental illness is particularly likely when analysing data for patients for whom longitudinal medical records were not available; such as transient patients and those new to the MedicineInsight practice, who may have visited as little as once during 2018–19 (the inclusion criteria for entry into the GPIR study population).

TABLE 5.1 PROPORTION OF MEDICINEINSIGHT PATIENTS WITH CURRENT LONG-TERM MENTAL ILLNESS OR DEMENTIA EVER RECORDED, MEDICINEINSIGHT 2018–19

	MedicineInsight unweighted (N = 2,893,532)		MedicineInsight weighted	
	% patients	95% CI	% patients	95% CI
Long-term mental illness (any)	5.0	(4.7, 5.3)	4.7	(4.4, 5.0)
Bipolar disorder	0.9	(0.9, 1.0)	0.9	(0.8, 0.9)
Long-term anxiety disorder	2.3	(2.2, 2.5)	2.2	(2.0, 2.3)
Long-term depression	2.6	(2.5, 2.8)	2.4	(2.2, 2.6)
Schizophrenia	0.5	(0.5, 0.6)	0.5	(0.5, 0.6)
Long-term anxiety disorder and long-term depression	1.1	(1.0, 1.1)	1.0	(0.9, 1.1)
Dementia	0.6	(0.5, 0.7)	0.5	(0.5, 0.6)

Figures 5.2 to 5.6 describe the age- and sex- specific rates of each long-term mental illness in the GPIR population. Females of all ages were more likely than males to have current long-term anxiety disorder (2.9% versus 1.6%; Table 5.2) or long-term depression (3.1% vs 2.1%; Table 5.2). The highest rates of long-term anxiety disorder were recorded in people aged 40–49: 3.9% of women and 2.5% of men in this age group had a recent record of long-term anxiety disorder (Figure 5.2). Similarly, the highest rates of long-term depression were found in people aged 40–49: 4.3% of women and 3.1% of men in this age group had a recent record of long-term depression (Figure 5.3). For males and females, long-term anxiety disorder was more common than long-term depression in adolescents aged 10–19.

FIGURE 5.2 AGE- AND SEX-SPECIFIC RATE OF PATIENTS WITH CURRENT LONG-TERM ANXIETY DISORDER (WEIGHTED), MEDICINEINSIGHT 2018–19

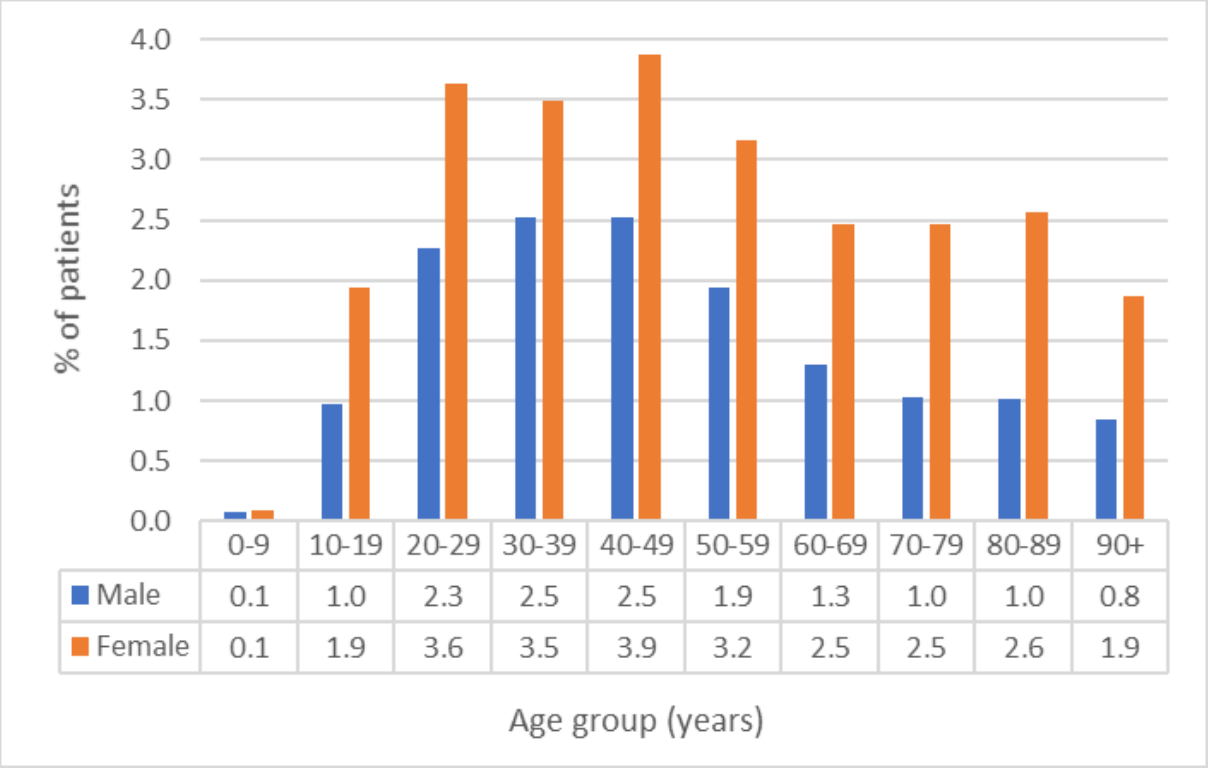
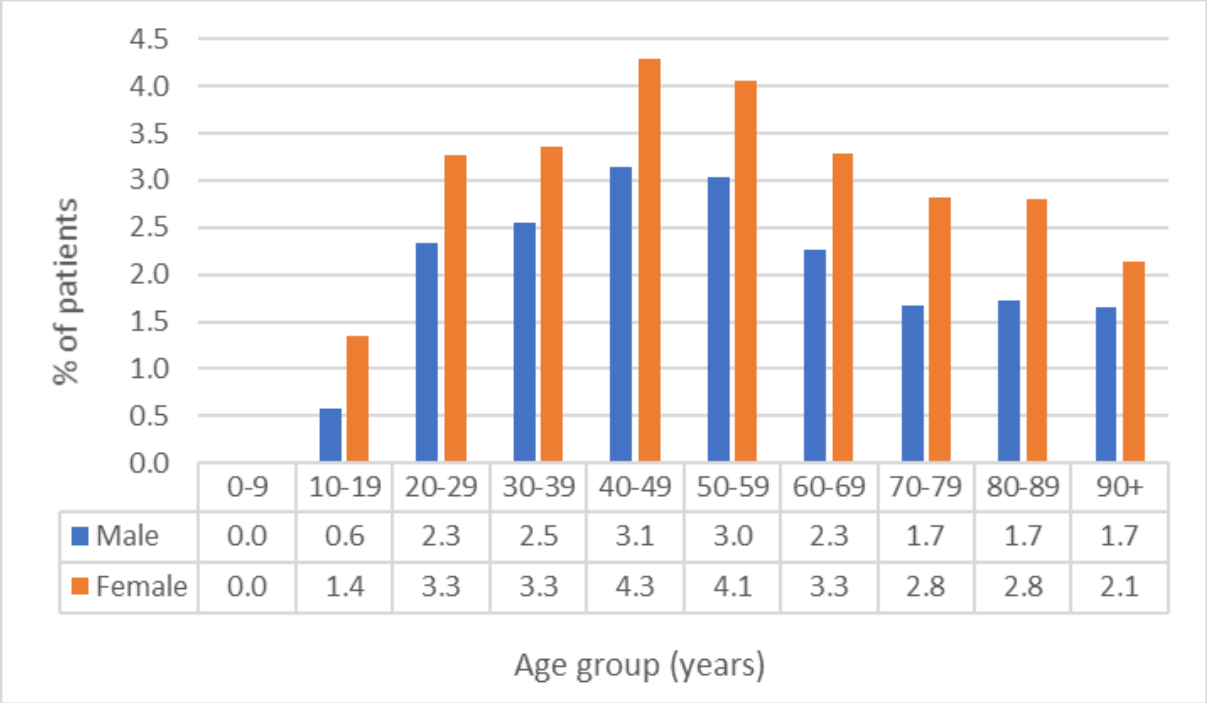


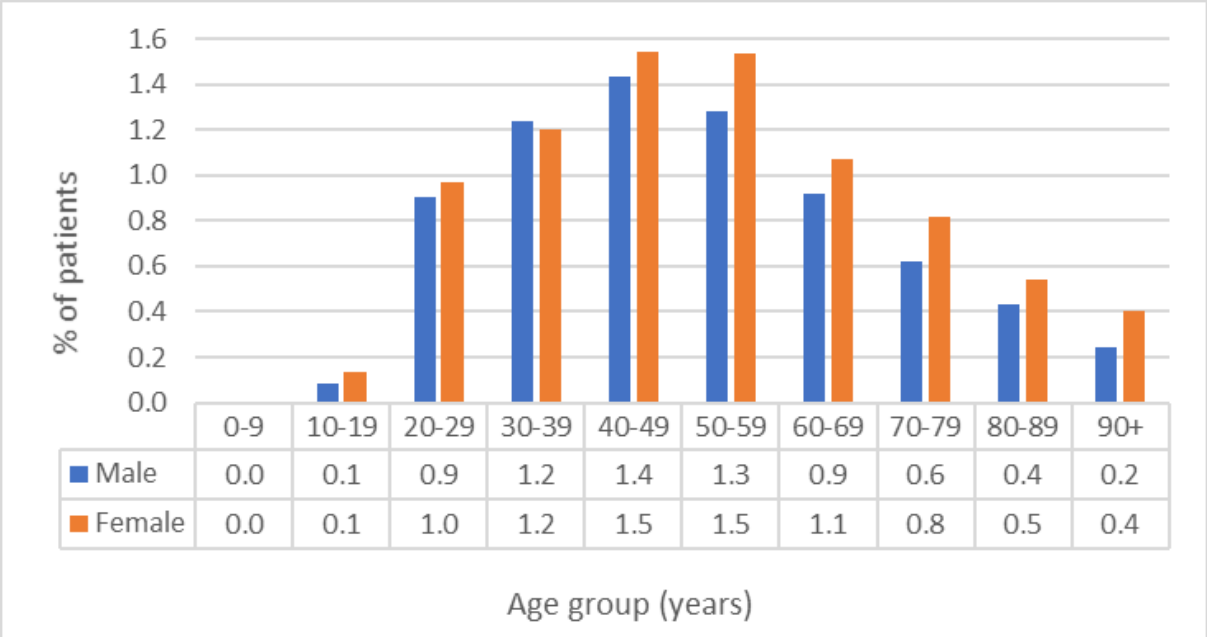
FIGURE 5.3 AGE- AND SEX-SPECIFIC RATE OF PATIENTS WITH CURRENT LONG-TERM DEPRESSION (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	0.0	0.6	2.3	2.5	3.1	3.0	2.3	1.7	1.7	1.7
Female	0.0	1.4	3.3	3.3	4.3	4.1	3.3	2.8	2.8	2.1

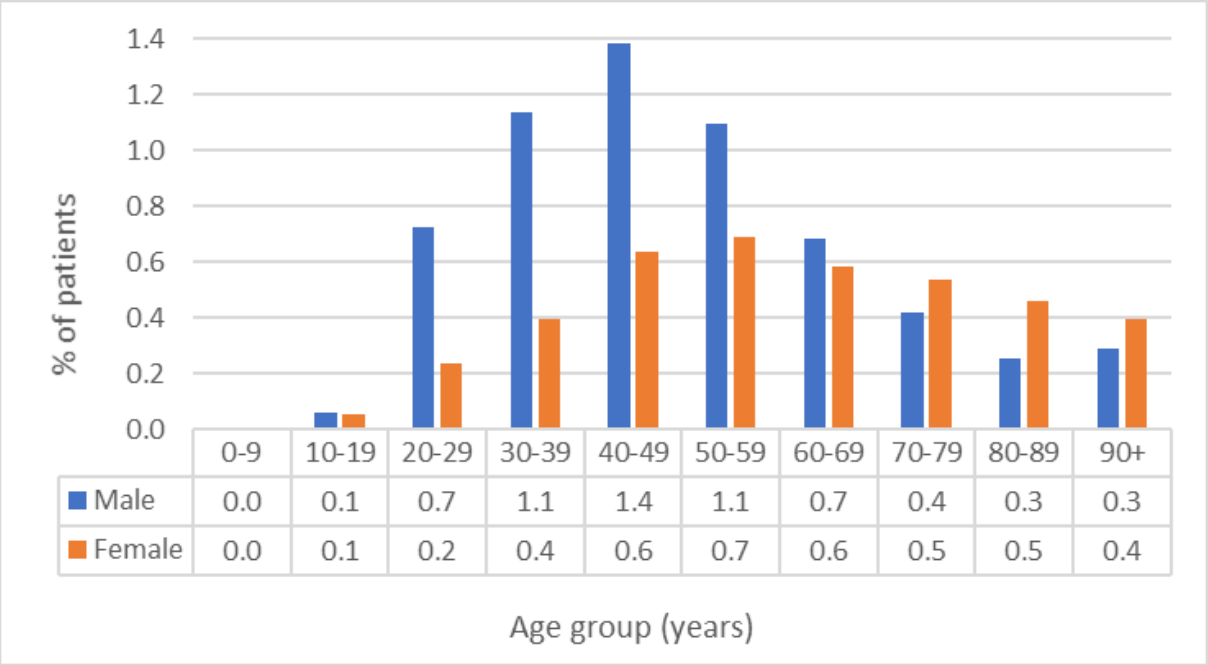
Bipolar disorder was only slightly more common in females than males, increasing from 0.1% of adolescents aged 10–19, to 1.5% of females and 1.4% of males aged 40–49, then decreasing with age (Figure 5.4, Table 5.2). Overall, schizophrenia was more common among males than females, but after 70 years of age was more common among females than males. The proportion of patients with schizophrenia increased from 0.1% of adolescents aged 10–19 to 1.4% of males and 0.6% of females aged 40–49, before decreasing with age to 0.4% among patients aged 70–89 (Figure 5.5, Table 5.2).

FIGURE 5.4 AGE- AND SEX-SPECIFIC RATE OF PATIENTS WITH BIPOLAR DISORDER (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	0.0	0.1	0.9	1.2	1.4	1.3	0.9	0.6	0.4	0.2
Female	0.0	0.1	1.0	1.2	1.5	1.5	1.1	0.8	0.5	0.4

FIGURE 5.5 AGE- AND SEX-SPECIFIC RATE OF PATIENTS WITH SCHIZOPHRENIA (WEIGHTED), MEDICINEINSIGHT 2018–19



The proportion of patients with current long-term mental illness varied according to the patients' rurality of residence (Table 5.2). The proportion of patients with long-term anxiety disorder was significantly higher in major cities (2.4%) and inner regional areas (2.5%) than in other areas. The proportion of patients with long-term depression was significantly higher in inner regional areas (3.1%) than in other areas. The proportion of patients with bipolar disorder was significantly higher in inner regional (1.2%) and outer regional areas (1.1%) compared with major cities (0.8%) and remote areas (0.8%). Schizophrenia was more common in regional areas than major cities although this finding was not statistically significant.

Long-term depression was more common among those living in the most socio-economically disadvantaged areas compared with the most advantaged areas (3.0% versus 2.1% respectively). Both bipolar disorder and schizophrenia become less common with increasing socio-economic advantage whereas the proportion of patients with chronic anxiety disorder did not change significantly with socio-economic advantage (Table 5.2)

TABLE 5.2 PROPORTION OF PATIENTS WITH CURRENT LONG-TERM MENTAL ILLNESS STRATIFIED BY SOCIODEMOGRAPHICS (UNWEIGHTED), MEDICINEINSIGHT 2018–19

Patient characteristic	Long-term anxiety disorder		Long-term depression		Bipolar disorder		Schizophrenia	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI
All patients	2.3	(2.2, 2.5)	2.6	(2.5, 2.8)	0.9	(0.9, 1.0)	0.5	(0.5, 0.6)
Sex								
Male	1.6	(1.5, 1.7)	2.1	(1.9, 2.2)	0.9	(0.8, 0.9)	0.7	(0.6, 0.7)
Female	2.9	(2.7, 3.1)	3.1	(2.9, 3.3)	1.0	(0.9, 1.1)	0.4	(0.4, 0.4)
Age group (years)								
0–9	0.1	(0.1, 0.1)	0	(0.0, 0.0)	0.0	(0.0, 0.0)	0.0	(0.0, 0.0)
10–19	1.6	(1.5, 1.7)	1.1	(1.0, 1.2)	0.1	(0.1, 0.1)	0.1	(0.0, 0.1)
20–29	3.3	(3.0, 3.6)	3.2	(2.9, 3.4)	1.0	(0.9, 1.2)	0.4	(0.4, 0.5)
30–39	3.3	(3.1, 3.6)	3.4	(3.1, 3.7)	1.4	(1.2, 1.5)	0.7	(0.7, 0.8)
40–49	3.5	(3.2, 3.7)	4.1	(3.8, 4.4)	1.7	(1.5, 1.8)	1.0	(0.9, 1.1)
50–59	2.7	(2.6, 2.9)	3.8	(3.6, 4.1)	1.5	(1.4, 1.6)	0.9	(0.8, 1.0)

Patient characteristic	Long-term anxiety disorder		Long-term depression		Bipolar disorder		Schizophrenia	
	%	95%CI	%	95%CI	%	95%CI	%	95%CI
60–69	2.0	(1.8, 2.1)	2.9	(2.7, 3.1)	1.0	(1.0, 1.1)	0.6	(0.6, 0.7)
70–79	1.8	(1.6, 1.9)	2.3	(2.1, 2.5)	0.7	(0.7, 0.8)	0.4	(0.4, 0.5)
80–89	1.8	(1.7, 2.0)	2.3	(2.1, 2.5)	0.5	(0.4, 0.5)	0.4	(0.3, 0.4)
90+	1.5	(1.3, 1.7)	1.9	(1.6, 2.2)	0.3	(0.3, 0.4)	0.3	(0.3, 0.4)
Rurality								
Major city	2.4	(2.2, 2.6)	2.5	(2.3, 2.7)	0.8	(0.7, 0.9)	0.5	(0.4, 0.5)
Inner regional	2.5	(2.2, 2.8)	3.1	(2.8, 3.4)	1.2	(1.0, 1.3)	0.6	(0.5, 0.7)
Outer regional	1.7	(1.4, 2.0)	2.5	(2.1, 2.8)	1.1	(1.0, 1.2)	0.7	(0.5, 0.8)
Remote/very remote	1.3	(0.8, 1.8)	2.2	(1.4, 3.0)	0.8	(0.6, 1.0)	0.4	(0.2, 0.5)
Socio-economic status (SEIFA IRSAD quintile)								
1 (most disadvantaged)	2.2	(1.8, 2.6)	3	(2.5, 3.5)	1.3	(1.1, 1.4)	0.8	(0.7, 0.9)
2	2.6	(2.3, 2.8)	3.1	(2.8, 3.4)	1.2	(1.0, 1.4)	0.6	(0.6, 0.7)
3	2.4	(2.1, 2.6)	2.8	(2.5, 3.0)	0.9	(0.9, 1.0)	0.5	(0.5, 0.6)
4	2.3	(2.0, 2.5)	2.4	(2.2, 2.7)	0.8	(0.7, 0.8)	0.4	(0.3, 0.5)
5 (most advantaged)	2.2	(2.0, 2.5)	2.1	(1.8, 2.4)	0.7	(0.6, 0.8)	0.4	(0.3, 0.4)

5.3.2. Dementia

In 2018–19, the patient prevalence of dementia was 3.4% among patients aged 65 years or older and 0.6% among patients of all ages (Table 5.3). Dementia was most common among patients aged 90+ (12.6%) and those aged 80–89 (6.8%). The prevalence of dementia was similar among males and females in younger ages, but from 80 years onwards was more common among females than males. Dementia did not appear to be more or less common according to rurality. There was some evidence that dementia was more common among patients residing in the most socio-economically disadvantaged areas than advantaged (Table 5.3).

Our findings align with the population prevalence estimates for dementia from the ABS Survey of Disability, Aging and Carers Report 2018.[14] It estimated that 3.1% (95% CI 2.8% to 3.4%) of the population aged 65 years or over had dementia. This is lower than estimates from the AIHW, based on international data and modelling, that predicted 8.7% of people aged 65 and over in Australia had dementia in 2018.[11]

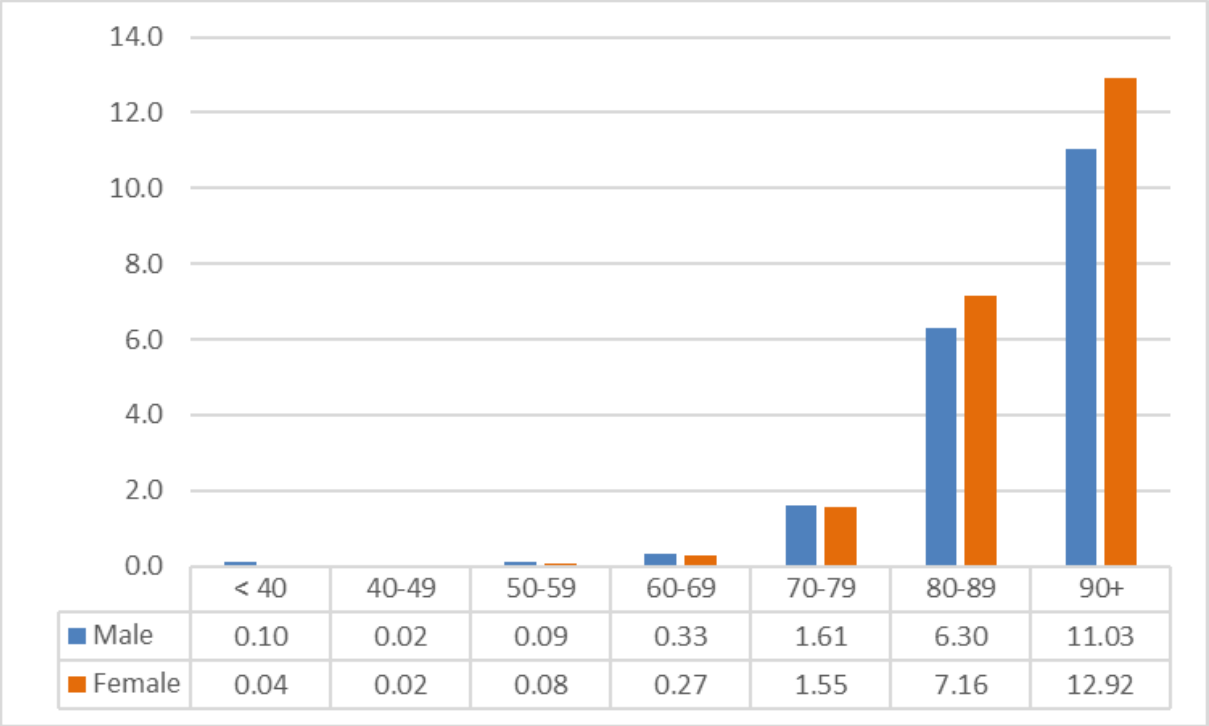
There are a number of potential explanations for the lower prevalence in the GPIR 2018–19 cohort (3.4%) compared with the AIHW estimate (8.7%):

- the GPIR estimate could be a true finding;
- patients with dementia who remain undiagnosed will not be identified in MedicineInsight;
- patients with dementia who are managed and diagnosed by specialists or by a GP outside the MedicineInsight program will not be identified;
- patients in aged care facilities where there is a much higher prevalence of dementia (around 50%[15]) may be underrepresented in MedicineInsight; and,
- transient patients not receiving all of their care at the MedicineInsight practice may inflate the denominator population leading to an underestimate.

TABLE 5.3 PROPORTION OF PATIENTS WITH DEMENTIA (EVER RECORDED) STRATIFIED BY SOCIODEMOGRAPHIC CHARACTERISTICS (UNWEIGHTED), MEDICINEINSIGHT 2018–19

Patient characteristic	Dementia	
	%	95%CI
All patients	**0.6**	**(0.5, 0.7)**
Sex		
Male	0.5	(0.5, 0.6)
Female	0.6	(0.6, 0.7)
Age group (years)		
< 40	0.0	(0.0, 0.0)
40–49	0.0	(0.0, 0.0)
50–59	0.1	(0.1, 0.1)
60–69	0.3	(0.3, 0.3)
70–79	1.6	(1.5, 1.7)
80–89	6.8	(6.4, 7.2)
90+	12.6	(11.7, 13.5)
65+	3.4	(3.2, 3.6)
State/Territory		
ACT	0.6	(0.3, 0.8)
NSW	0.7	(0.6, 0.8)
NT	0.4	(0.0, 0.7)
QLD	0.5	(0.4, 0.6)
SA	0.7	(0.5, 1.0)
TAS	0.7	(0.5, 0.8)
VIC	0.6	(0.4, 0.8)
WA	0.4	(0.3, 0.6)
Rurality		
Major city	0.5	(0.5, 0.6)
Inner regional	0.7	(0.5, 0.8)
Outer regional	0.6	(0.5, 0.7)
Remote/very remote	0.5	(0.3, 0.7)
Socio-economic status (SEIFA IRSAD quintile)		
1 (most disadvantaged)	0.7	(0.6, 0.8)
2	0.6	(0.5, 0.7)
3	0.7	(0.6, 0.8)
4	0.5	(0.4, 0.6)
5 (most advantaged)	0.5	(0.4, 0.6)

FIGURE 5.6 AGE- AND SEX-SPECIFIC RATE OF PATIENTS WITH DEMENTIA (WEIGHTED), MEDICINEINSIGHT 2018–19



	< 40	40-49	50-59	60-69	70-79	80-89	90+
Male	0.10	0.02	0.09	0.33	1.61	6.30	11.03
Female	0.04	0.02	0.08	0.27	1.55	7.16	12.92

5.4. Sociodemographic characteristics of patients by type of long-term mental illness

In 2018–19, 58.7% of patients attending general practice with a record of bipolar disorder were female whereas 58.4% of patients with a record of schizophrenia were male. The majority of patients with a record of long-term anxiety disorder (68.4%) and long-term depression (64.6%) were female. Over three-fifths of patients with bipolar disorder (62.8%) or schizophrenia (64.3%) were aged 30–59, and 56% of patients with long-term depression were aged 30–59. Of the patients with long-term anxiety disorder, 57.9% were aged 20–49 (Table 5.4).

The spread of patients across states and territories was similar for individual long-term mental illnesses (Table 5.4) and reflects the general coverage of MedicineInsight patients in those areas (Table 3.4).

TABLE 5.4 SOCIODEMOGRAPHIC CHARACTERISTICS OF MEDICINEINSIGHT PATIENTS SEEN IN 2018–19 WITH CURRENT LONG-TERM MENTAL ILLNESS (UNWEIGHTED) (% BY COLUMN), MEDICINEINSIGHT 2018–19

Patient characteristic	Bipolar disorder		Long-term anxiety disorder		Long-term depression		Schizophrenia	
	No.	% (95%CI)	No.	% (95% CI)	No.	% (95% CI)	No.	% (95% CI)
All patients	**27,094**	**0.9 (0.9, 1.0)**	**67,100**	**2.3 (2.2, 2.5)**	**76,363**	**2.6 (2.5, 2.8)**	**15,356**	**0.5 (0.5, 0.6)**
Sex								
Male	11,196	41.3 (40.2, 42.4)	21,211	31.6 (30.6, 32.6)	27,025	35.4 (34.5, 36.3)	8975	58.4 (57.2, 59.7)
Female	15,898	58.7 (57.6, 59.8)	45,889	68.4 (67.4, 69.4)	49,338	64.6 (63.7, 65.5)	6381	41.6 (40.3, 42.8)
Age group (years)								
0–9	5	0.0 (0.0, 0.0)	299	0.4 (0.4, 0.5)	23	0.0 (0.0, 0.1)	9	0.1 (0.0, 0.1)
10–19	353	1.3 (1.1, 1.5)	4819	7.2 (6.7, 7.6)	3241	4.2 (4.0, 4.5)	167	1.1 (0.9, 1.3)
20–29	3992	14.7 (13.7, 15.8)	12,480	18.6 (17.8, 19.4)	12,033	15.8 (15.0, 16.5)	1701	11.1 (10.3, 11.9)
30–39	5563	20.5 (19.7, 21.4)	13,593	20.3 (19.5, 21.0)	13,794	18.1 (17.3, 18.8)	3016	19.6 (18.6, 20.6)
40–49	6114	22.6 (22.0, 23.2)	12,746	19.0 (18.6, 19.4)	15,239	20.0 (19.5, 20.4)	3713	24.2 (23.3, 25.0)
50–59	5336	19.7 (19.1, 20.3)	9776	14.6 (14.2, 15.0)	13,690	17.9 (17.5, 18.4)	3149	20.5 (19.9, 21.2)
60–69	3372	12.4 (11.8, 13.1)	6525	9.7 (9.3, 10.2)	9582	12.5 (12.0, 13.1)	2027	13.2 (12.4, 14.0)
70–79	1707	6.3 (5.6, 7.0)	4305	6.4 (5.9, 6.9)	5607	7.3 (6.8, 7.9)	1076	7.0 (6.3, 7.7)
80–89	546	2.0 (1.7, 2.3)	2083	3.1 (2.8, 3.5)	2565	3.4 (3.0, 3.7)	397	2.6 (2.2, 2.9)
90+	106	0.4 (0.3, 0.5)	474	0.7 (0.6, 0.8)	589	0.8 (0.6, 0.9)	101	0.7 (0.5, 0.8)
State/Territory								
ACT	639	2.4 (0.6, 4.1)	2181	3.3 (0.8, 5.7)	2264	3.0 (0.7, 5.3)	256	1.7 (0.5, 2.8)
NSW	10,685	39.4 (33.0, 45.9)	24,540	36.6 (30.2, 42.9)	28,113	36.8 (30.8, 42.8)	6022	39.2 (32.9, 45.5)
NT	131	0.5 (0.1, 0.9)	125	0.2 (0.0, 0.4)	186	0.2 (0.0, 0.5)	99	0.6 (0.0, 1.3)
QLD	4617	17.0 (12.4, 21.7)	11,187	16.7 (12.5, 20.9)	12,926	16.9 (12.7, 21.2)	2914	19.0 (13.3, 24.7)
SA	585	2.2 (1.0, 3.3)	1574	2.3 (1.0, 3.7)	1844	2.4 (0.9, 3.9)	361	2.4 (1.0, 3.7)
TAS	2004	7.4 (4.3, 10.5)	4321	6.4 (3.7, 9.1)	5717	7.5 (4.3, 10.6)	1030	6.7 (3.8, 9.6)

Patient characteristic	Bipolar disorder		Long-term anxiety disorder		Long-term depression		Schizophrenia	
	No.	% (95%CI)	No.	% (95% CI)	No.	% (95% CI)	No.	% (95% CI)
VIC	5902	21.8 (12.6, 31.0)	14,138	21.1 (14.8, 27.3)	15,594	20.4 (13.6, 27.2)	3451	22.5 (15.5, 29.4)
WA	2531	9.3 (5.9, 12.7)	9034	13.5 (8.7, 18.2)	9719	12.7 (8.2, 17.3)	1223	8.0 (5.0, 11.0)
Rurality								
Major city	14,460	53.4 (45.7, 61.1)	42,233	62.9 (56.6, 69.3)	44,321	58.0 (51.2, 64.9)	8487	55.3 (48.1, 62.4)
Inner regional	8628	31.8 (24.9, 38.8)	18,658	27.8 (22.1, 33.5)	22,912	30.0 (23.9, 36.1)	4461	29.1 (22.9, 35.2)
Outer regional	3699	13.7 (10.1, 17.2)	5728	8.5 (6.1, 11.0)	8289	10.9 (7.9, 13.8)	2259	14.7 (10.3, 19.1)
Remote/very remote	307	1.1 (0.6, 1.7)	481	0.7 (0.3, 1.1)	841	1.1 (0.5, 1.7)	149	1.0 (0.4, 1.5)
Socio-economic status (SEIFA IRSAD quintile)								
1 (most disadvantaged)	5304	19.6 (15.9, 23.3)	9312	13.9 (10.7, 17.1)	12,548	16.4 (12.9, 19.9)	3396	22.1 (18.0, 26.3)
2	5762	21.3 (16.5, 26.1)	12543	18.7 (15.0, 22.4)	15,155	19.9 (15.9, 23.8)	3134	20.4 (16.2, 24.6)
3	6961	25.7 (21.9, 29.6)	17365	25.9 (22.2, 29.6)	20,405	26.7 (22.9, 30.6)	3922	25.6 (21.6, 29.5)
4	4704	17.4 (15.0, 19.7)	13865	20.7 (17.9, 23.5)	14,923	19.6 (16.9, 22.2)	2593	16.9 (13.8, 20.0)
5 (most advantaged)	4340	16.0 (12.5, 19.6)	13983	20.8 (16.8, 24.9)	13,293	17.4 (13.7, 21.2)	2296	15.0 (11.6, 18.4)
Not assessable	23		32		39		15	

5.5. Comparisons of sociodemographic characteristics of patients with dementia to the general patient population

In 2018–19, 58.6% of patients attending general practice with a record of dementia were female, which aligns with 2018 national data reported by the AIHW. Over 90% of MedicineInsight patients with dementia were aged 70 years and over (Table 5.5). The AIHW estimates that 43% of people with dementia were aged 85 and over in 2018 whereas 68% of the GPIR 2018–19 patients with dementia were aged 80 and over.

The proportion of patients with dementia according to geographical areas (state/territory, rurality and socio-economic status) reflects the general coverage of MedicineInsight patients in those areas. (Tables 3.4 and 5.5)

TABLE 5.5 SOCIODEMOGRAPHIC DISTRIBUTION OF MEDICINEINSIGHT PATIENTS WITH DEMENTIA EVER RECORDED (UNWEIGHTED), MEDICINEINSIGHT 2018–19

Patient characteristic	Dementia		MedicineInsight patients 2018–19	
	No.	(%, 95%CI)	No.	(%)
All patients	**16,979**	**0.6 (0.5, 0.7)**	**2,893,776**	
Sex				
Male	7031	41.4 (40.4, 42.4)	1,310,200	45.3
Female	9948	58.6 (57.6, 59.6)	1,583,332	54.7
Age group (years)				
< 40	222	1.3 (1.0, 1.6)	1,456,139	50.2
40–49	66	0.4 (0.3, 0.5)	368,554	12.7
50–59	275	1.6 (1.4, 1.8)	355,951	12.3
60–69	982	5.8 (5.3, 6.2)	327,118	11.3
70–79	3887	22.9 (22.1, 23.7)	242,239	8.4
80–89	7680	45.2 (44.4, 46.1)	113,037	3.9
90+	3867	22.8 (21.6, 23.9)	30,738	1.1
State/Territory				
ACT	429	2.5 (0.6, 4.4)	72,793	2.5
NSW	6435	37.9 (31.9, 43.9)	985,784	34.1
NT	119	0.7 (0.0, 1.7)	33,681	1.2
QLD	2800	16.5 (12.5, 20.5)	555,857	19.2
SA	560	3.3 (1.2, 5.4)	76,365	2.6
TAS	1244	7.3 (4.2, 10.4)	187,247	6.5
VIC	3865	22.8 (17.2, 28.4)	637,464	22.0
WA	1527	9.0 (5.2, 12.8)	344,585	11.9
Rurality				
Major city	9603	56.6 (50.5, 62.6)	1,775,641	61.4
Inner regional	5117	30.1 (24.4, 35.8)	743,073	25.7
Outer regional	2066	12.2 (8.8, 15.5)	337,198	11.7
Remote/very remote	193	1.1 (0.4, 1.9)	37,864	1.3
Socio-economic status (SEIFA IRSAD quintile)				
1 (most disadvantaged)	3033	17.9 (14.0, 21.8)	419,410	14.5
2	2944	17.3 (13.9, 20.8)	491,579	17
3	4884	28.8 (23.8, 33.8)	737,284	25.5
4	2934	17.3 (14.1, 20.5)	611,119	21.1
5 (most advantaged)	3175	18.7 (14.9, 22.5)	632,449	21.9
Not assessable	9		1935	

5.6. Average number of GP clinical encounters in 2018–19 for patients with long-term mental illness or dementia

5.6.1. Long-term mental illness

The average number of GP clinical encounters in 2018–19 for patients with each of the long-term mental illnesses was similar, ranging from 10.0 to 10.7 over the year. This was double the 5.1 GP clinical encounters per year seen among the general patient population (Table 5.6). These findings align with the SHIP survey, which found that patients with psychosis consulted a GP on average 8.9 times over a year,[13] and provide new data for patients with long-term depression or anxiety disorder.

5.6.2. Dementia

The average number of GP clinical encounters in 2018–19 for patients with dementia was 15.4 per year (Table 5.6), considerably higher than the average number of encounters for older patients aged 60–69 (6.3 per year), 70–79 (8.7 per year) and 80–89 (12.0 per year; Table 3.1).

TABLE 5.6 AVERAGE NUMBER OF GP CLINICAL ENCOUNTERS PER YEAR FOR PATIENTS WITH SELECTED CONDITIONS (UNWEIGHTED), MEDICINEINSIGHT 2018–19

	MedicineInsight 2018–19 (N = 2,893,532)	
	Average[a]	(95% CI)
All patients	5.1	(5.0, 5.2)
Bipolar disorder	10.0	(9.7, 10.3)
Long-term anxiety disorder	10.5	(10.2, 10.7)
Long-term depression	10.6	(10.4, 10.9)
Dementia	15.4	(14.0, 16.8)
Schizophrenia	10.7	(10.3, 11.1)

a While patients may have a history of a condition, it may not necessarily be managed at every encounter. In addition, patients may present with more than one condition

5.7. Conditions per 100 GP clinical encounters

For every 100 clinical encounters with a GP, 5.2 were with a patient with long-term depression and 4.6 were with a patient with a long-term anxiety disorder. Although patients with dementia have a comparatively high average yearly encounter rate (15.4 encounters per year; Table 5.6), they attend 1.6 out of every 100 GP clinical encounters, similar to patients with bipolar disorder (1.7 bipolar patients per 100 encounters; Table 5.7).

TABLE 5.7 ENCOUNTERS WITH PATIENTS WITH A RECORD OF SELECTED CONDITIONS PER 100 GP CLINICAL ENCOUNTERS (WEIGHTED), MEDICINEINSIGHT 2018–19

	Encounters with patients with condition recorded per 100 encounters[a]	95% CI
Bipolar disorder	1.7	(1.6, 1.9)
Long-term anxiety disorder	4.6	(4.3, 4.9)
Long-term depression	5.2	(4.8, 5.6)
Dementia	1.6	(1.4, 1.8)
Schizophrenia	1.1	(1.0, 1.3)

a While patients may have a history of a condition, it may not necessarily be managed at every encounter. In addition, patients may present with more than one condition.

5.8. Mental health care plans for people with long-term mental illness

The Mental Health Care Plan (MHCP) is part of the Better Access to Psychiatrists, Psychologists and General Practitioners initiative through the MBS. This initiative aims to improve outcomes for people with clinically diagnosed mental disorders, particularly for those not already under the care of specialist mental health services. It identifies what type of health care the person needs, and provides referrals to local mental health services if agreed. A MHCP entitles the patient to Medicare rebates for up to 10 individual and 10 group appointments in a year with some allied mental health services, including psychologists, occupational therapists and social workers.

The use of GP mental health care plans among patients with long-term mental illness was identified either via the MBS billing items for MHCP and mental health consultations (only available for practice sites where the billing system is integrated with the CIS) or via free text entry in one of the three diagnosis fields recorded at any time during the 2018–19 financial year (Section 2.5). The MHCP cannot be linked directly with a patient's mental illness diagnosis using MedicineInsight data. The uptake of GP Management Plans, which can also be used to support patients with mental illness, was not assessed in this report

Patients with long-term anxiety disorder (47%) and long-term depression (45%) were most likely to have an MHCP created, or reviewed, by a GP during 2018–19 (Table 5.8). Patients already under the care of specialist mental health services are unlikely to require an MHCP from the GP to manage their mental illness, which might explain why fewer patients with schizophrenia or bipolar disorder had an MHCP recorded.

TABLE 5.8 PROPORTION OF PATIENTS WITH LONG-TERM MENTAL ILLNESS AND MENTAL HEALTH CARE PLAN RECORD IN 2018–19 (UNWEIGHTED), MEDICINEINSIGHT 2018–19

	Mental health care plan in 2018–19		
	No.	%	(95% CI)
Bipolar disorder	9463	34.9	(33.0, 36.9)
Long-term anxiety disorder	31,789	47.4	(45.5, 49.3)
Long-term depression	34,356	45.0	(43.2, 46.8)
Schizophrenia	4091	26.6	(24.5, 28.8)

5.9. Cardiovascular disease and cardiovascular risk factors in people with long-term mental illness

We assessed the prevalence of CVD[g] and selected CVD risk factors (diabetes, hypertension, dyslipidaemia, obesity and smoking status) among patients with long-term mental illness compared to the general patient population without long-term mental illness.

Among 114,629 patients who attended a GP in 2018–19 and who had long-term mental illness recorded (Table 5.9):

- 6.8% had a record of CVD
- 8.2% had a record of type 2 (or unspecified) diabetes
- 21.5% had a record of hypertension
- 20.8% had a record of dyslipidaemia
- 25.2 were overweight or obese; and
- 25.4 were current smokers.

[g] Defined as atherosclerosis, coronary heart disease (including myocardial infarction and angina), peripheral vascular disease, stroke and transient ischaemic attack)

The prevalence of established CVD and every single cardiovascular risk factor was significantly higher for patients with long-term mental illness when compared to the general patient population without long-term mental illness (Table 5.9). Compared to the general population without long-term mental illness, having long-term mental illness increased the odds of:

- CVD by 50%
- being a current smoker by 250%
- dyslipidaemia by 90%
- overweight/obesity by 80%
- hypertension by 40%
- type 2 diabetes by 30%.

This is a cross-sectional study so it cannot provide information on causality. In other words, it cannot distinguish whether the patient's diagnosis with mental illness led to a worsening of their cardiovascular health or vice versa. The reasons for poorer cardiovascular health among people with a mental illness are complex. Mental health treatment may be prioritised over treatment of conditions, patients may experience barriers to accessing health care, and patients may be more likely to adopt lifestyle risk factors and be exposed to socio-economic disadvantage. Being diagnosed with CVD can also have an adverse impact upon mental health.[12,16]

TABLE 5.9 PROPORTION OF PATIENTS WITH LONG-TERM MENTAL ILLNESS WITH CVD OR CVD RISK FACTORS COMPARED TO GENERAL PATIENTS WITHOUT LONG-TERM MENTAL ILLNESS, MEDICINEINSIGHT 2018–19

Condition	Unweighted GPIR long-term mental illness (N = 144,629)		Unweighted GPIR general population excluding long- term mental illness (N = 2,748,903)		Adjusted odds ratio[c] (relative risk)	Confounders
	% patients	95% CI	% patients	95% CI	aOR (95% CI)	
CVD (ever)	6.8	(6.4, 7.3)	4.7	(4.3, 5.1)	1.5 (1.5, 1.6)	Sex, age, dyslipidaemia, hypertension, current smoking, obesity
Hypertension (ever)	21.5	(20.7, 22.3)	15.7	(14.9, 16.5)	1.4 (1.3, 1.4)	Sex, age, obesity, T2DM
Dyslipidaemia (ever)	20.8	(19.9, 21.6)	12.2	(11.6, 12.8)	1.9 (1.8, 2.0)	Sex, age
Type 2 diabetes (ever)	8.2	(7.9, 8.6)	5.1	(4.9, 5.4)	1.3 (1.2, 1.3)	Sex, age, dyslipidaemia, hypertension, current smoking, obesity
Overweight/obese (2018–19)	25.2	(24.1, 26.4)	14.0	(13.3, 14.8)	1.8 (1.7, 1.8)	Sex, age
Current smoker (last recorded)[a]	25.4	(23.5, 27.2)	9.5	(8.8, 10.3)	2.5 (2.4, 2.6)	Sex, age
HbA_{1c} outside reference range (2018–19) [b]	3.5	(3.3, 3.7)	2.3	(2.2, 2.4)	1.2 (1.2, 1.3)	Sex, age, obesity

a As recorded in the latest recorded observation in the CIS.
b $HbA_{1c} \geq 48$mmol/mol (6.5%) in people without a diagnosis of diabetes and ≥ 53 mmol/mol (7.0%) in people with a diagnosis of diabetes.
c. Association between the CVD or CVD risk factors and chronic mental illness was estimated using the multi-level logistic regression models. The GPIR general patients (with no records of chronic mental illness) were used as a reference group in all models. To account for the clustering effect of the practice sites, the Stata survey analysis with logistic estimation and robust standard errors was utilised. All models were adjusted for purposefully selected confounders, that were found to be having statistically significant (modifying) effect on the estimations, based on our earlier studies.

5.10. Management of cardiovascular disease in people with long-term mental illness

To prevent future heart attacks and strokes (secondary prevention) among patients with existing CVD, patients should be treated simultaneously with blood pressure-lowering and lipid-lowering medicines, unless contraindicated or clinically inappropriate.[17]

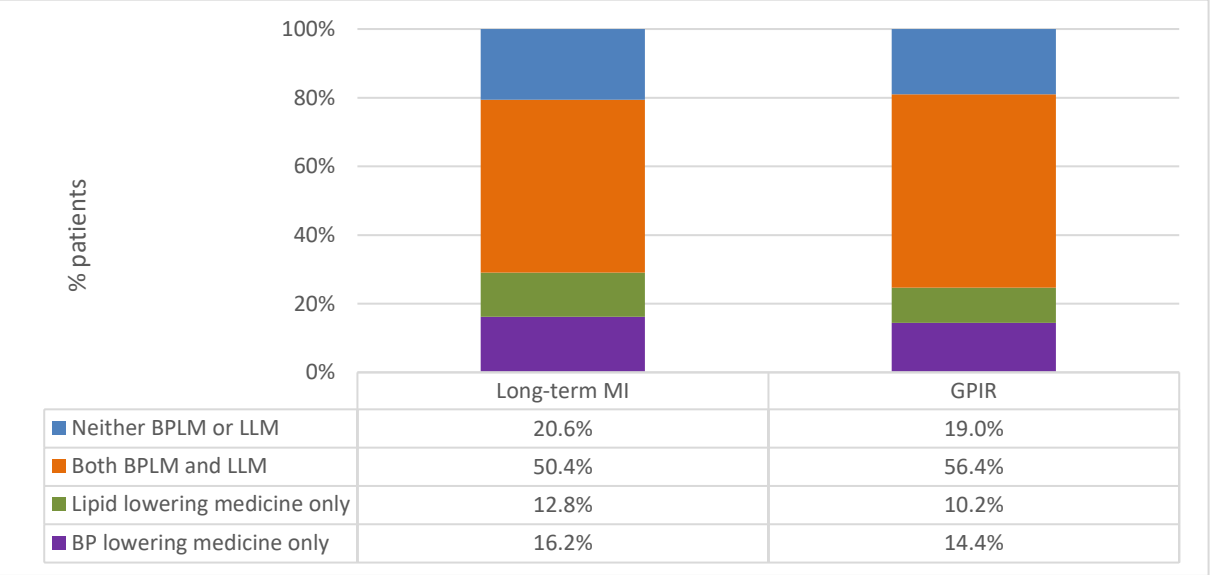
Among 9,905 patients with long-term mental illness and existing CVD, 50.4% were prescribed both a blood pressure-lowering and lipid-lowering medicine, which was significantly less than in the general population with existing CVD (56.4%). Conversely, patients with long-term mental illness were more likely to have a BP-lowering medicine only, or a lipid-lowering therapy only, recorded than the general GPIR population. Further to this, slightly more patients with long-term mental illness had neither blood pressure-lowering medicine, nor lipid-lowering medicine, recorded than the general GPIR population (20.6% versus 19.0%; Table 5.10; Figure 5.7).

TABLE 5.10 PROPORTION OF PATIENTS WITH LONG-TERM MENTAL ILLNESS AND CVD PRESCRIBED RECOMMENDED MEDICINES COMPARED TO ALL GPIR PATIENTS, MEDICINEINSIGHT 2018–19

	Unweighted long-term mental illness with CVD (ever) (N = 9905)		Unweighted GPIR population with CVD (ever) (N = 139,207)	
	% patients	95% CI	% patients	95% CI
BP-lowering medicine only	16.2	(15.3, 17.0)	14.4	(14.1, 14.8)
Lipid-lowering medicine only	12.8	(12.1, 13.6)	10.2	(10.0, 10.4)
Both BPLM and LLM	50.4	(49.2, 51.6)	56.4	(55.7, 57.0)
Neither of above	20.6	(19.7, 21.6)	19.0	(18.5, 19.5)

BP: blood pressure; BPLM: blood pressure lowering medicine; LLM: lipid lowering medicine

FIGURE 5.7 PROPORTION OF PATIENTS WITH LONG-TERM MENTAL ILLNESS AND CVD PRESCRIBED RECOMMENDED MEDICINES COMPARED TO ALL GPIR PATIENTS, MEDICINEINSIGHT 2018–19



BP: blood pressure; BPLM: blood pressure lowering medicine; LLM: lipid lowering medicine

5.11. Conclusions

This chapter provides evidence that the prevalence of CVD, diabetes, hypertension, dyslipidaemia, obesity and smoking is higher among patients with long-term mental illness than the general population without long-term mental illness. These findings are consistent with other Australian studies on people living with psychotic illness[13,18,19] and provides new information on patients with long-term anxiety disorder or depression. While most patients with long-term mental illness and existing CVD had at least one preventive medicine recorded, they were less likely than the general population with existing CVD to be prescribed both a lipid-lowering and a BP-lowering medicine as recommended in guidelines for the secondary prevention of cardiovascular events.

These findings highlight an opportunity to improve cardiovascular health among people with long-term mental illness, both through lifestyle advice to improve the risk factor profile of these patients, and through recommended medicines. Three-quarters of Australians with mental illness seek medical help from a GP rather than specialist mental health services[20] and, in our study, patients with long-term mental illness visited a GP around 10 times per year, on average. By continuing to provide ongoing support and management, GPs and other primary care health providers can work together with these patients to greatly improve their health and life expectancy.

6. CHILDHOOD CONDITIONS (0–14 YEARS)

In summary

- Of the 2.89 million patients in MedicineInsight, 18.0% were children aged 0–14 years.
- Acute upper respiratory tract infection (URTI) was the most commonly recorded condition for children aged 0–14 years in MedicineInsight in 2018–19 (22.7%).
- Acute otitis media was recorded for 7.5% of children and acute tonsillitis for 3.9%. Asthma was recorded in 4.2% of children and dermatitis/eczema in 3.9%.
- Children with acute URTI recorded in 2018–19 were the most commonly managed by GPs, at 37.1 per 100 encounters for children aged 0–14 years.
- For every 100 GP clinical encounters with children during 2018–19, children with otitis media recorded in 2018–19 attended 13.7 encounters per 100 encounters, on average, and patients with acute tonsillitis, asthma and dermatitis/eczema were managed in 6.6, 6.7 and 6.9 encounters per 100 encounters, respectively.

This chapter describes 2018–19 MedicineInsight data for children aged 0–14 years, including:

- sociodemographic characteristics
- the proportion of children with selected conditions reported at encounters in 2018–19
- the age and sex specific proportions of some of the most common non-communicable conditions in children
- the average number of encounters with children with selected conditions recorded in 2018–19.

6.1. Sociodemographic characteristics of children in MedicineInsight, 2018–19

Of the 2,893,532 patients in MedicineInsight eligible for this report in 2018–19, there were 519,399 children aged 0–14 years (18.0%). There were slightly more males than females (51.8% vs 48.2%), which is different from the overall MedicineInsight cohort, in which there are more female than male patients (Table 6.1). The geographical and socio-economic distribution of children aged 0–14 years was similar to that seen in the general MedicineInsight population. NSW had the largest proportion of children (32.1%), and most were located in major cities (71.9%).

TABLE 6.1 SOCIODEMOGRAPHIC CHARACTERISTICS OF CHILDREN AGED 0–14 YEARS (UNWEIGHTED), MEDICINEINSIGHT 2018–19

	Children ages 0–14 years, MedicineInsight 2018–19, unweighted (N = 519,399)			All patients, MedicineInsight 2018–19, unweighted (N = 2,893,776)	
	No.	% patients	(95% CI)	No.	%
Gender					
Male	269,267	51.8	(51.6, 52.1)	1,310,200	45.3
Female	250,132	48.2	(47.9, 48.4)	1,583,332	54.7
Age group					
0–4	191,150	36.8	(36.0, 37.6)	191,150	36.8
5–9	177,644	34.2	(33.9, 34.5)	177,644	34.2
10–14	150,605	29.0	(28.3, 29.6)	150,605	29.0
State/Territory					
ACT	14,197	2.7	(0.9, 4.6)	72,793	2.5
NSW	173,302	33.4	(27.7, 39.0)	985,784	34.1
NT	6,020	1.2	(0.2, 2.1)	33,681	1.2
QLD	102,350	19.7	(15.2, 24.2)	555,857	19.2

	Children ages 0–14 years, MedicineInsight 2018–19, unweighted (N = 519,399)			All patients, MedicineInsight 2018–19, unweighted (N = 2,893,776)	
	No.	% patients	(95% CI)	No.	%
SA	12,134	2.3	(1.0, 3.7)	76,365	2.6
TAS	32,949	6.3	(3.4, 9.3)	187,247	6.5
VIC	111,300	21.4	(14.9, 28.0)	637,464	22.0
WA	67,147	12.9	(8.7, 17.2)	344,585	11.9
Rurality					
Major city	329,873	63.5	(57.7, 69.4)	1,775,641	61.4
Inner regional	125,611	24.2	(19.2, 29.2)	743,073	25.7
Outer regional	57,765	11.1	(8.3, 14.0)	337,198	11.7
Remote/very remote	6,150	1.2	(0.6, 1.8)	37,864	1.3
Socio-economic status (SEIFA IRSAD quintile)					
1 (most disadvantaged)	69,018	13.3	(10.9, 15.7)	419,410	14.5
2	83,484	16.1	(13.3, 18.9)	491,579	17.0
3	135,084	26.0	(22.6, 29.4)	737,284	25.5
4	114,334	22.0	(19.2, 24.8)	611,119	21.1
5 (most advantaged)	117,268	22.6	(18.7, 26.4)	632,449	21.9
Missing	211	0.0	(0.0, 0.0)	1935	0.0

6.2. Conditions recorded for children in 2018–19

Of the selected conditions investigated, acute upper respiratory tract infection (URTI) was the most commonly recorded condition for children aged 0–14 years in MedicineInsight in 2018–19 (22.7%). Condition coding for URTI in this report includes search terms such as acute or bacterial pharyngitis, sore throat, rhinitis and throat pain, as well as URTI (a full list of search terms is provided in Appendix 5).

Acute otitis media was recorded for 7.5% of children. Recorded rates of acute tonsillitis, asthma and dermatitis/eczema were similar (3.9%, 4.2% and 3.9%, respectively) (Table 6.2). Previous Australian studies have suggested that approximately one-third of children aged 5–12 years have an episode of acute sore throat per year (including acute tonsillitis and acute URTI).[21] These rates do not reflect the overall incidence or prevalence of these conditions, and should be interpreted as the number of children who visit a GP for these selected reasons. Condition definitions, including search terms, are provided in Appendix 5.

Acute otitis media, acute URTI and dermatitis/eczema were seen more frequently in children under 5 years, compared to older children, whereas asthma and acute tonsillitis were more common in older age groups. Previous research has shown that the highest incidence of otitis media is seen in children aged between 6 and 11 months, with a second peak in incidence in children aged 4–5 years.[22] Figures 6.1–6.5 illustrate the age and sex-specific rates of the selected conditions listed in Table 6.2.

In keeping with data from the ABS NHS,[6] asthma was more frequently recorded for males, particularly in the 5–14 year age groups (Figure 6.4). The Australian Asthma Handbook recommends that asthma should not be diagnosed in infants less than 12 months old, and states that is it difficult to make a diagnosis of asthma with a high degree of certainty in children aged 1–5 years of age, as lung function testing by spirometry is not usually possible in this age group.[23]

In the MedicineInsight cohort, 6.2% of children under 5 years of age in MedicineInsight were recorded as having eczema rates (Figure 6.5). This is lower than the figure reported by the Australasian Society of Clinical Immunology and Allergy which estimated 20% of Australian children aged under 2 years have eczema.[24] Infantile eczema typically improves between the ages of 2 and 5 years, and a

consistent reduction in eczema/dermatitis rates was seen in older age groups of children in MedicineInsight. The condition coding terms used for eczema in this report were quite broad (see Appendix 5), and should capture both severe and mild/moderate cases. However, parents may seek medical advice and care from pharmacists when children have mild cases of eczema, rather than presenting to GPs, and this may lead to an underestimate of cases of dermatitis/eczema in children in MedicineInsight.

TABLE 6.2 PROPORTION OF MEDICINEINSIGHT CHILDREN (0–14 YEARS) WITH SELECTED CONDITIONS RECORDED (UNWEIGHTED AND WEIGHTED), MEDICINEINSIGHT 2018–19

	MedicineInsight 2018–19, unweighted (N = 519,399)		MedicineInsight 2018–19, weighted	
	% children	(95% CI)	% children	(95% CI)
Acute otitis media	7.6	(7.2, 8.0)	7.5	(7.0, 8.0)
Acute tonsillitis	4.0	(3.7, 4.3)	3.9	(3.6, 4.2)
Acute URTI	22.2	(21.1, 23.3)	22.7	(21.3, 24.2)
Asthma	4.3	(4.1, 4.5)	4.2	(4.0, 4.4)
Dermatitis/eczema	3.8	(3.6, 4.0)	3.9	(3.6, 4.1)

FIGURE 6.1 RECORDED RATES OF OTITIS MEDIA BY AGE AND SEX IN CHILDREN AGED 0–14 YEARS (WEIGHTED), MEDICINEINSIGHT 2018–19

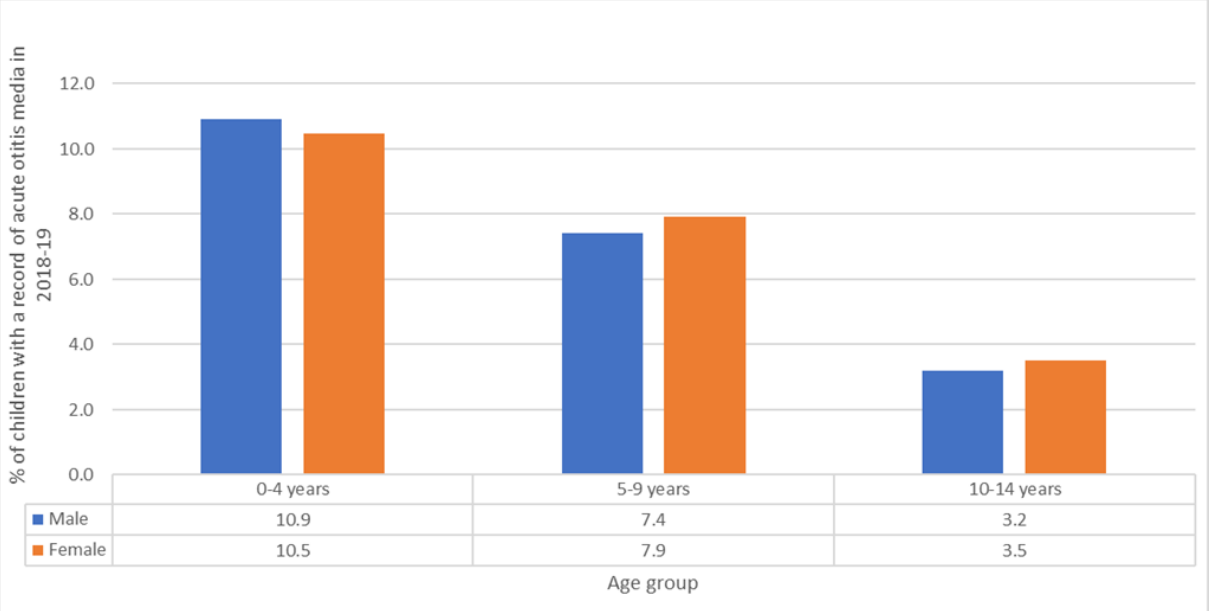


FIGURE 6.2 RECORDED RATES OF ACUTE TONSILLITIS BY AGE AND SEX IN CHILDREN AGED 0-14 YEARS (WEIGHTED), MEDICINEINSIGHT 2018–19

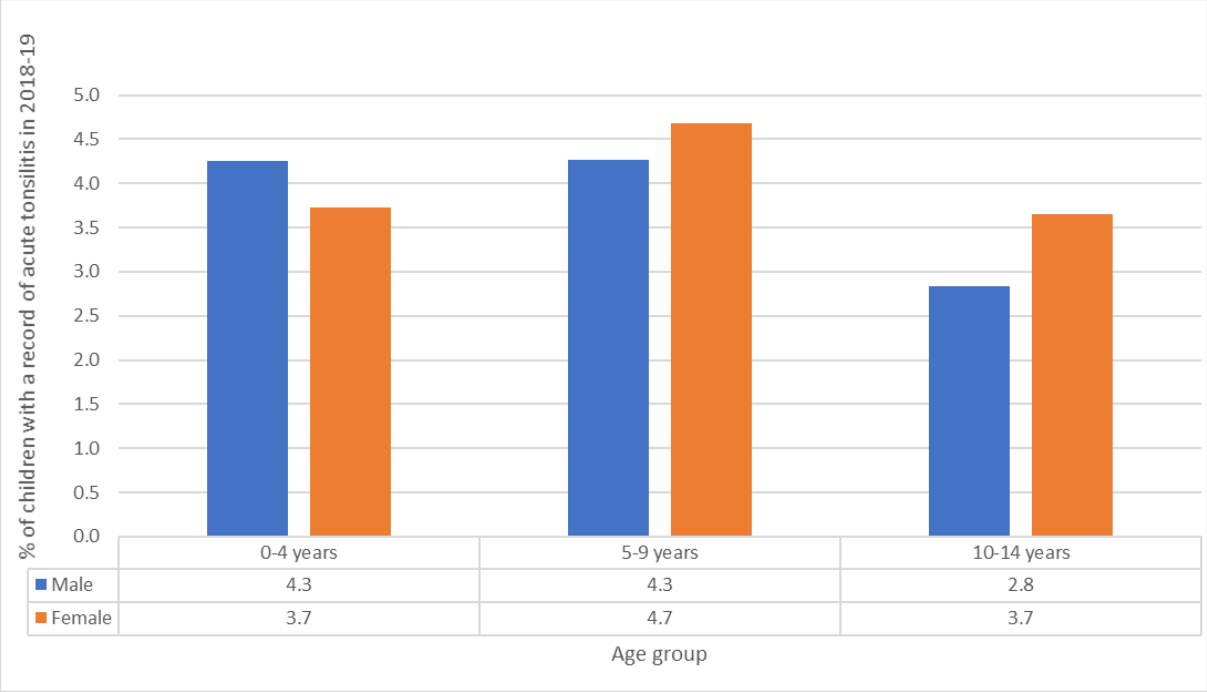


FIGURE 6.3 RECORDED RATES OF ACUTE URTI BY AGE AND SEX IN CHILDREN AGED 0-14 YEARS, (WEIGHTED) MEDICINEINSIGHT 2018–19

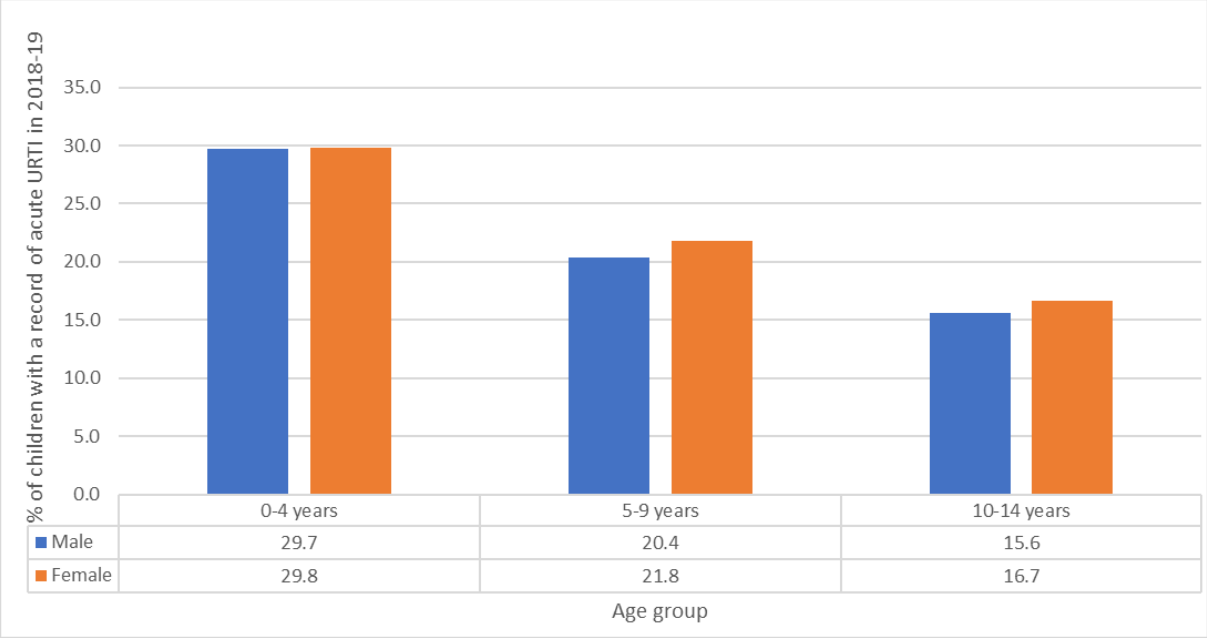


FIGURE 6.4 RECORDED RATES OF ASTHMA BY AGE AND SEX IN CHILDREN AGED 0–14 YEARS (WEIGHTED), MEDICINEINSIGHT 2018–19

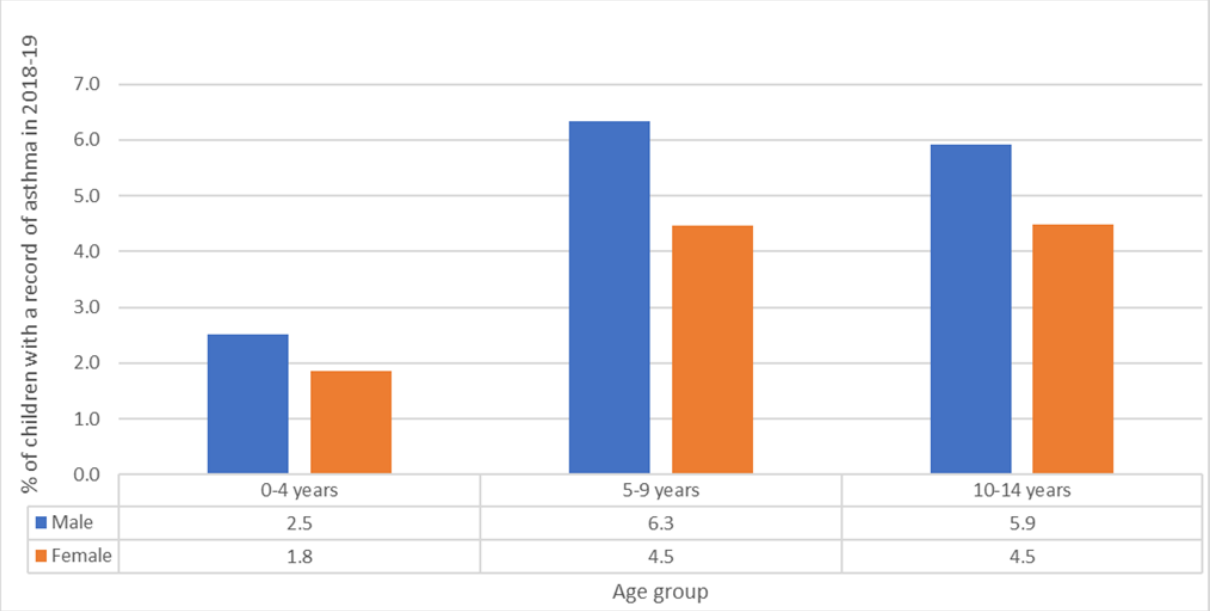
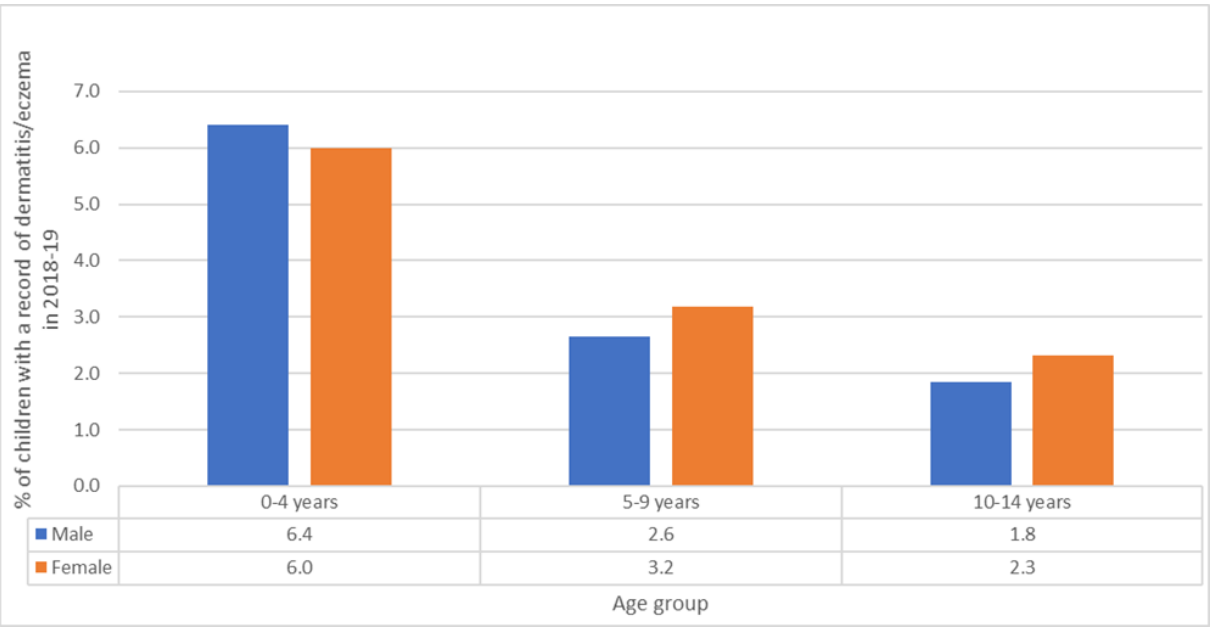


FIGURE 6.5 RECORDED RATES OF DERMATITIS/ECZEMA BY AGE AND SEX IN CHILDREN AGED 0–14 YEARS (WEIGHTED), MEDICINEINSIGHT 2018–19



6.3. Conditions per 100 GP clinical encounters with children

For every 100 GP clinical encounters with children aged 0–14 years (Table 6.3):

- 37.1 were with a child with acute URTI recorded in 2018–19
- 13.7 with a child with otitis media recorded in 2018–19
- 6.6 with a child with acute tonsillitis recorded in 2018–19
- 6.7 with a child with asthma recorded in 2018–19
- 6.9 with a child with dermatitis/eczema recorded in 2018–19.

These rates are similar to BEACH data, where acute URTI was the most common condition managed per encounter in children under 15 years from 2012–15.[25] However, differences between the ways that clinical encounters and conditions managed are defined in the BEACH and MedicineInsight datasets mean that a direct comparison of rates is not appropriate.

TABLE 6.3 ENCOUNTERS WITH CHILDREN AGED 0–14 WITH SELECTED CONDITIONS RECORDED IN 2018–19 PER 100 GP CLINICAL ENCOUNTERS (WEIGHTED), IN MEDICINEINSIGHT 2018–19

	MedicineInsight condition recorded in 2018–19	
	Encounters with children with conditions recorded per 100 GP clinical encounters with children in 2018–19[a]	95% CI
Acute otitis media	13.7	(11.9, 15.6)
Acute tonsillitis	6.6	(5.6, 7.7)
Acute URTI	37.1	(32.0, 42.3)
Asthma	6.7	(5.8, 7.5)
Dermatitis/eczema	6.9	(5.9, 7.9)

a While patients may have a history of a condition, it may not necessarily be managed at every encounter. In addition, patients may present at an encounter with more than one condition.

6.4. Annual GP clinical encounter rate for children with selected conditions (ever recorded)

Unsurprisingly, the average number of GP clinical encounters in 2018–19 for children with each selected condition was significantly greater than the average annual GP clinical encounter rate for the entire study cohort of children aged 0-14 years (3.3). Table 6.4 presents the mean number of GP clinical encounters in 2018–19 for children with a selected condition recorded in 2018–19.

Children with a record of acute otitis media during the year had the highest mean annual encounter rate (6.0) followed by dermatitis/eczema (5.9), tonsillitis (5.5), acute URTI (5.4) and asthma (5.2).

TABLE 6.4 AVERAGE NUMBER OF GP CLINICAL ENCOUNTERS IN 2018–19 PER CHILD WITH A SELECTED CONDITION, AGE- AND SEX-ADJUSTED, MEDICINEINSIGHT 2018–19

	MedicineInsight 2018–19, unweighted (N = 519,319)	
	Average number of encounters	(95% CI)
All patients	3.3	
Patient condition (ever recorded)		
Acute otitis media	6.0	(5.8, 6.2)
Acute tonsillitis	5.5	(5.3, 5.7)
Acute URTI	5.4	(5.2, 5.5)
Asthma	5.2	(5.1, 5.4)
Dermatitis/eczema	5.9	(5.7, 6.0)

Vignette 1: supporting quality improvement

Using MedicineInsight to inform a quality improvement activity on asthma in children

To help GPs continue to provide quality care, NPS MedicineWise provides MedicineInsight quality improvement (QI) reports to participating general practices on their patterns of prescribing and patient care, alongside aggregate data from all MedicineInsight practices. The provision of practice-level data enables GPs in participating practices to reflect on how their practice compares to best practice guidance and that of their peers.

In this vignette we present aggregated data from the 2020 QI report delivered to MedicineInsight GPs aimed at improving the diagnosis and management of children with asthma in Australian primary care. The vignette focuses on management of asthma in children aged 6–11 years with asthma.

The definitions used to identify patients in the QI report differ slightly from those used to define patients with asthma in the main GPIR.[h] To facilitate practice discussion, the QI report used a definition of asthma which included regular patients currently prescribed an asthma medicine or with a reference to asthma in one of the diagnosis fields in the last 2 years. The GPIR definition used the diagnosis or reason for encounter or prescription fields to identify people with asthma, not the medicines list itself. For this reason, the aggregated data presented in this vignette are not directly comparable to information about asthma contained in the main report.

Background

Asthma is responsible for considerable morbidity and health care costs in Australia, affecting approximately 11% of the population.[6] Treatment of asthma is a stepwise approach with the aim of relieving symptoms and preventing them from recurring. Reliever medicines, such as short-acting beta$_2$ agonists (SABAs), provide rapid relief of symptoms while preventer medicines are designed for daily use to minimise symptoms and reduce the risk of future symptomatic episodes ('flareups' or exacerbations). Preventers include the inhaled corticosteroids (ICS) or the combination of ICS and a long-acting beta$_2$ agonist (LABA).[23,26]

Clinically, there are differences between diagnosing and managing asthma for younger children, older children, adolescents and adults.[23] Australian guidelines recommend using SABA relievers as needed for most children with mild asthma.[23] However, for some children who require a regular preventer, low-dose ICS or montelukast can be used in addition to a reliever, or for a few children, a stepped-up regular preventer such as high-dose ICS or ICS plus a LABA should be used if good control is not achieved despite good adherence and correct inhaler technique. This analysis focuses on medicines used to manage asthma in children aged 6–11 years.

Methods

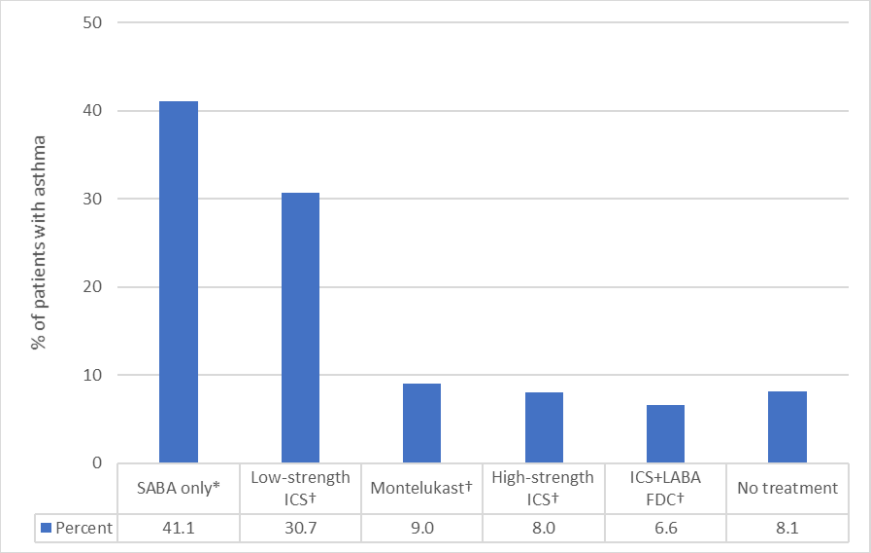
Using MedicineInsight data for the November 2019 download, we assessed medicines used to manage mild to moderate asthma in regular patients aged 6–11 years. Patients with asthma were identified and those first diagnosed with asthma in the last 2 years were defined as those whose first reference to asthma ever occurred in the 2 years preceding the November 2019 MedicineInsight data download.

Results

Of the 167,195 children aged 6–11 years eligible for inclusion, 21.4% (n = 35,778) were identified as having asthma and 29.4% (n = 10,505) were first diagnosed in the last 2 years. More than 40% of the 6–11-year old children who had asthma were currently prescribed SABA medicines only (Figure V1.1). The other medicines (+/- SABA) prescribed for children with asthma included low-strength ICS (31%), montelukast (9%) and high-strength ICS (8%). Although 8% of patients had no treatment recorded, it is possible that these patients might have been using over-the-counter (OTC) salbutamol, or been prescribed asthma medicines at another non-MedicineInsight practice, or that their asthma might have resolved.

[h] For the purpose of the practice report a 'regular patient' was a patient aged 6–11 years who had attended the practice at least three times in the last 2 years and who was not deceased or inactive; a 'patient with asthma' was currently prescribed an asthma medicine or had a coded or free text entry related to asthma recorded in any diagnosis, reason for visit/encounter or reason for prescription field in the last 2 years.

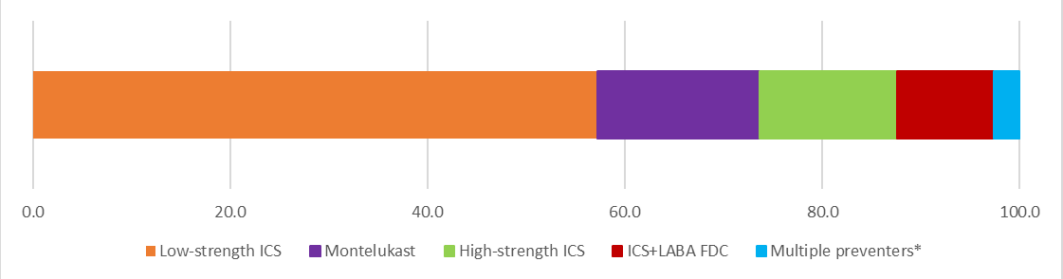
FIGURE V1.1:TREATMENTS CURRENTLY PRESCRIBED TO PATIENTS WITH ASTHMA AGED 6–11 YEARS (N = 35,778)



FDC: Fixed dose combination; ICS: Inhaled corticosteroids; LABA: Long-acting beta$_2$ agonist; SABA: Short-acting beta$_2$ agonist.
* SABA only: prescription SABA, or OTC SABA if added to the patient's current medicines.
† With or without SABA. Patients can appear in more than one group
Patients may appear in multiple groups, unless they are in SABA only or no treatment groups which are mutually exclusive. Although guidelines refer to dose, we are unable to calculate dose from the data, thus have substituted the term 'dose' with 'strength' and aligned the categorisations.

Among patients first diagnosed with asthma in the last 2 years, 45.4% (n = 4774) had a prescribed preventer recorded. In line with guideline recommendations,[23] our findings show that among patients diagnosed with asthma in the last 2 years and prescribed a preventer, the majority were prescribed low-strength ICS (57.2%) as a first-line preventer followed by montelukast (16.5%) (Figure V1.2). The data indicate that around 1 in 4 patients were prescribed high-strength ICS or ICS + LABA FDC as first-line preventer.

FIGURE V1.2: FIRST-LINE PREVENTER FOR PATIENTS DIAGNOSED WITH ASTHMA IN THE LAST 2 YEARS (N = 4774)



FDC: Fixed dose combination; ICS: Inhaled corticosteroids; LABA: Long-acting beta$_2$ agonist.
* Multiple preventers: two or more of the included categories on the same day

Discussion

The quality improvement activity focused on the guideline recommendations for therapy, including first-line preventers and stepping up, using the MedicineInsight data as a tool to discuss individual GP practice. While aggregate data indicate that management of asthma among children aged 6–11 years in Australian general practice is largely in line with the management guidelines,[23] differences were observed for some individual general practices. One of the main messages of the NPS MedicineWise program was that patients or carers should be advised that overuse of SABA relievers may worsen asthma symptoms[27] and that they should monitor SABA usage by keeping a record of the number of canisters used or the number of times SABA is used every week. Step-up of therapy should be considered based on overall pattern of symptoms. An additional message was that low-dose ICS or montelukast are recommended as first-line treatment if a preventer is required.[23] Consistent with this message, the most commonly used preventers were low-strength ICS and montelukast. However the data suggest that about 24% of patients are initiated on high strength ICS or ICS/LABA combination therapy. It is possible that some of these patients may have been incorrectly identified as being initiated on a high strength or combination therapy if they had been started on an asthma medicine by a GP at a non-MedicineInsight practice or by a specialist.

The quality improvement program also reminded health professionals about the use of spirometry to support a diagnosis of asthma, and the importance of individualised asthma action plans and regular review of children's adherence and inhaler technique for ongoing management.

7. PRESCRIPTIONS

In summary

- MedicineInsight captures prescriptions that have been issued – whether they are private, PBS subsidised or under co-payment. In contrast, PBS data captures prescriptions when the medicine has been dispensed on the PBS (including under co-payment).
- Approximately 11.9 million issued prescriptions, and 36.7 million total (issued plus repeat) prescriptions were written by GPs in MedicineInsight practices during 2018–19.
- 70.9% of MedicineInsight patients were prescribed a medicine at least once during 2018–19.
- While a third of patients only had one or two prescriptions issued, 6.6% of patients had 15 or more prescriptions issued during 2018–19.
- The average number of prescriptions increases as patients get older, and is higher in areas of socio-economic disadvantage.
- Medicines to treat the nervous system (ATC N; antidepressants, analgesics, antiepileptics) were the most commonly issued prescriptions in 2018–19. However, cardiovascular medicines (ATC C; lipid-modifying medicines, antihypertensives) were the most commonly prescribed total (issued plus repeat) medicines.
- Opioids (N02A) accounted for 10.6% of all issued prescriptions while lipid-lowering medicines (C10A) accounted for 9.8% of total prescriptions.
- The overwhelming majority of medicines are subsidised by the Australian Government under the PBS or the RPBS (84.7%).
- On average, 100 MedicineInsight encounters result in 78.8 issued prescriptions and 240.6 total prescriptions.
- Prescribing of anti-infectives, antidepressants and opioids increases with patient age.

This chapter describes:

- the distribution of numbers of prescriptions per patient in 2018–19
- the average number of issued prescriptions according to patient demographics
- the number and proportion of prescriptions in 2018–19, issued and total, by Anatomical Therapeutic Chemical (ATC) Level 1 (anatomical subgroup), compared to national PBS data
- the number and proportion of prescriptions in 2018–19 for the top 30 ATC Level 3 (pharmacological subgroup) categories, issued and total
- the number and proportion of PBS/RPBS prescriptions and private prescriptions in 2018–19, by ATC Level 1 and ATC Level 3
- issued and total prescriptions by ATC Level 1 per 100 encounters
- issued and total prescriptions by ATC Level 3 (top 30 only) per 100 encounters
- the average number of prescriptions per patient by sex and age for two high volume ATC level 1 categories and two high volume ATC level 3 categories.

All prescriptions ordered by general practice staff in the clinical information software – private, PBS and RPBS – that could be assigned to a unique ATC code have been included. There were an additional 834,000 issued prescriptions recorded in the database which could not be assigned an ATC code by NPS MedicineWise because they either did not have an active ingredient recorded or had an active ingredient which could be assigned to multiple ATC codes. Prescriptions without an assigned unique ATC code were not included in the analyses below. For reference, the list of the 20 most common medicines where an active ingredient was recorded but for which an ATC code has not yet been assigned in our dataset are included in Appendix 6 (Table A6.1). The single most commonly ordered medicine which could not be assigned a unique ATC code was hydrocortisone (0.2% of all issued prescriptions).

MedicineInsight captures prescribing data, not dispensing data. Thus, a medicine may be recorded as having been prescribed, but there is no guarantee that the medicine was dispensed by a pharmacist to the patient or that the patient took the medicines as advised.

The data is reported by issued prescriptions which are prescriptions provided to the patient and which may or may not include repeat prescriptions. In contrast, total prescription data provides information on the total number of prescriptions that are generated as a result of an issued prescription – that is the issued prescription and the repeat prescriptions written for a patient to fill over the following months before returning to the GP to be issued another prescription.

Data on total prescriptions are most informative with regards to cost to the PBS, and overall use of a particular medicine by the population. In contrast, data on issued prescriptions provides insights into the impact that writing prescriptions has upon GP workload.

7.1. Prescription numbers

There were almost 12 million issued prescriptions and just under 36.7 million total (issued plus repeat) prescriptions with an assigned ATC code recorded in MedicineInsight during 2018–19 for ~2.9 million patients. Among the eligible patients, 70.9% (n = 2,050,817) had at least one recorded prescription during 2018–19 and 29.1% (n = 842,715) had no record of a prescription.

The average number of issued prescriptions recorded per patient was 3.9 (95% CI 3.8 to 4.0) while the average number of total prescriptions (issued plus repeats) per patient was 11.9 (95% CI 11.3 to 12.5) (Table 7.1).

TABLE 7.1 AVERAGE NUMBER OF ISSUED PRESCRIPTIONS RECORDED BY PATIENT CHARACTERISTIC (UNWEIGHTED AND WEIGHTED), MEDICINEINSIGHT 2018–19

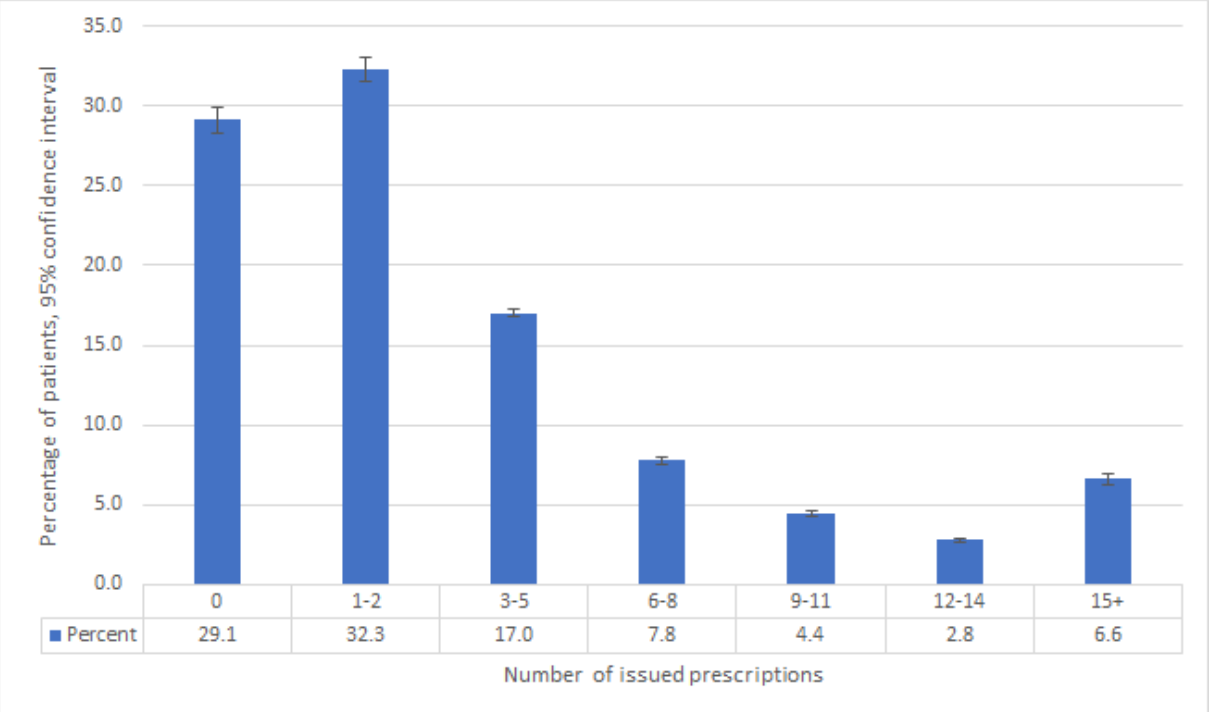
Characteristic	MedicineInsight unweighted data		MedicineInsight weighted data	
	Average[a]	(95% CI)	Average[a]	(95% CI)
All patients	4.1	(4.0, 4.3)	3.9	(3.8, 4.0)
Sex				
Male	3.8	(3.7, 3.9)	3.6	(3.4, 3.7)
Female	4.4	(4.3, 4.6)	4.2	(4.0, 4.4)
Age group (years)				
0–9	1.3	(1.2, 1.3)	1.3	(1.2, 1.3)
10–19	1.4	(1.4, 1.5)	1.4	(1.3, 1.4)
20–29	2.2	(2.1, 2.2)	2.0	(1.9, 2.1)
30–39	2.6	(2.5, 2.7)	2.4	(2.3, 2.5)
40–49	3.6	(3.4, 3.7)	3.3	(3.2, 3.5)
50–59	4.8	(4.6, 4.9)	4.5	(4.4, 4.7)
60–69	6.5	(6.4, 6.7)	6.3	(6.1, 6.4)
70–79	9.2	(9.0, 9.5)	8.9	(8.7, 9.2)
80–89	12.3	(12.0, 12.6)	12.0	(11.7, 12.3)
90+	13.2	(12.7, 13.7)	12.8	(12.2, 13.3)
Rurality				
Major city	3.8	(3.6, 4.0)	3.6	(3.5, 3.8)
Inner regional	4.7	(4.4, 5.1)	4.7	(4.4, 5.0)
Outer regional	4.6	(4.3, 4.9)	4.4	(4.1, 4.7)
Remote/very remote	3.8	(3.2, 4.3)	3.6	(3.1, 4.1)
State/Territory				
NSW	4.3	(4.0, 4.5)	3.8	(3.5, 4.1)

Characteristic	MedicineInsight unweighted data		MedicineInsight weighted data	
	Average[a]	(95% CI)	Average[a]	(95% CI)
VIC	4.1	(3.8, 4.4)	4.0	(3.7, 4.3)
QLD	4.0	(3.7, 4.2)	3.9	(3.6, 4.1)
WA	3.6	(3.3, 4.0)	3.6	(3.3, 4.0)
TAS	5.2	(4.6, 5.8)	4.5	(4.5, 5.7)
SA	4.4	(3.7, 5.1)	4.1	(3.6, 4.7)
ACT	3.7	(3.2, 4.2)	3.6	(3.2, 4.1)
NT	3.0	(2.7, 3.4)	2.7	(2.3, 3.0)
Socio-economic status (SEIFA IRSAD quintile)				
1 (most disadvantaged)	5.1	(4.8, 5.4)	4.8	(4.6, 5.1)
2	4.6	(4.3, 4.8)	4.4	(4.1, 4.7)
3	4.3	(4.0, 4.5)	4.1	(3.8, 4.3)
4	3.7	(3.6, 3.9)	3.7	(3.5, 3.9)
5 (most advantaged)	3.3	(3.2, 3.5)	3.3	(3.1, 3.5)

[a] The average was based on all patients including those who did not have a prescription recorded.

Just over a fifth of MedicineInsight patients had six or more issued prescriptions recorded during 2018–19 and 6.6% had 15 or more issued prescriptions recorded (Figure 7.1).

FIGURE 7.1 NUMBER OF ISSUED PRESCRIPTIONS RECORDED PER PATIENT (WEIGHTED), MEDICINEINSIGHT 2018–19



The average number of recorded prescriptions per annum for an individual patient increases with age (Table 7.1, Figure 7.2), rising from 2.0 (95% CI 1.9 to 2.1) for patients aged 20–29 years to 8.9 (95% CI 8.7 to 9.2) in the 70–79 age group. This reflects the higher disease burden among older people and is consistent with the increasing use of medicines with increasing age reported in the 2016 ABS Survey of Health Care.

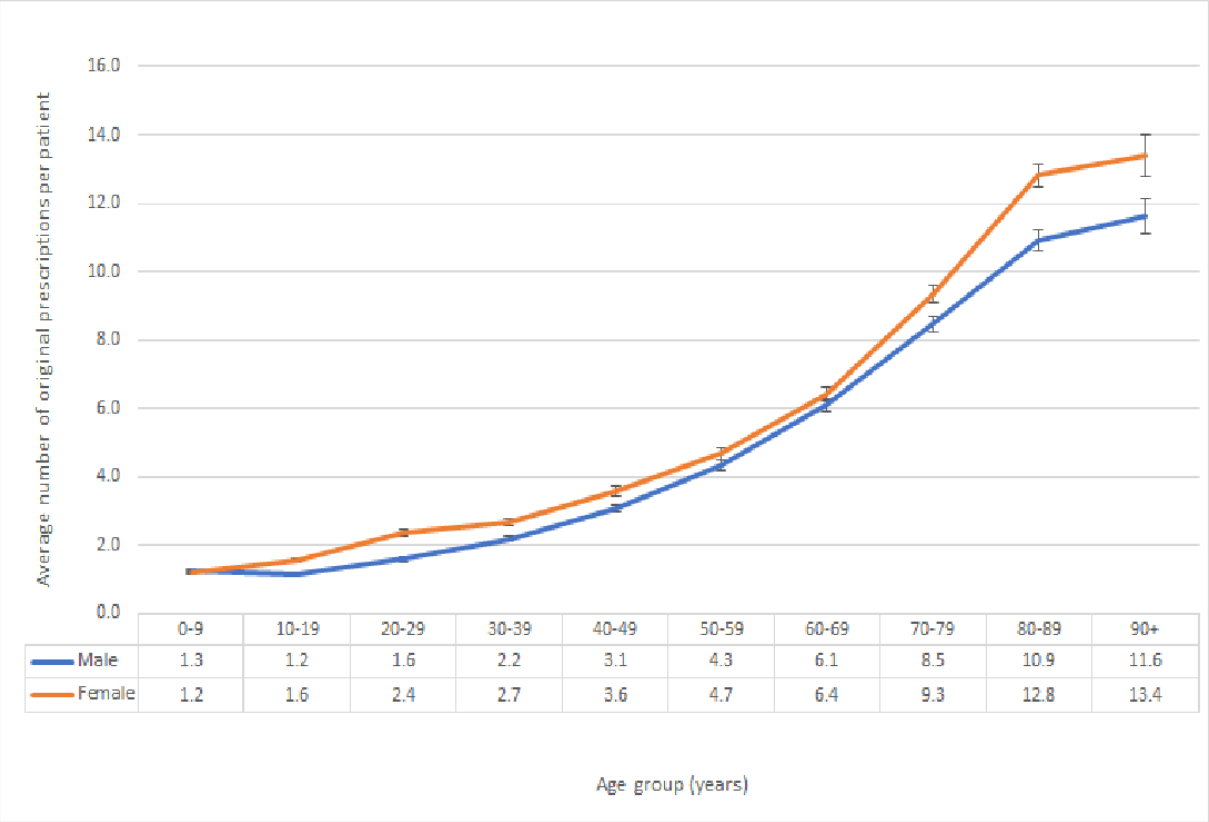
MedicineInsight patients from the NT had a significantly lower average number of recorded prescriptions (2.7, 95% CI 2.3 to 3.0) than the national average (Table 7.1). In contrast, the number of

prescriptions was significantly higher among patients from Tasmania when compared to the national average. This may reflect the different age profiles of each state. The NT has a lower median age (33 years), and Tasmania has an older median age (42 years) than the national median age of 37 years.[28]

The average number of recorded prescriptions increases with socio-economic disadvantage (Table 7.1). The average number of medicines prescribed for patients in the most advantaged group is 3.3 (95% CI 3.1 to 3.5) compared with 4.8 (95% CI 4.6 to 5.1) for the most disadvantaged group. This is likely to reflect higher disease burdens in more disadvantaged communities.[11]

Over all age groups, the recorded number of prescriptions for women is higher than for men (Figure 7.2).

FIGURE 7.2 AVERAGE NUMBER OF ISSUED PRESCRIPTIONS RECORDED PER PATIENT BY AGE GROUP AND SEX (WEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	1.3	1.2	1.6	2.2	3.1	4.3	6.1	8.5	10.9	11.6
Female	1.2	1.6	2.4	2.7	3.6	4.7	6.4	9.3	12.8	13.4

7.2. Prescriptions per medicine type

Just under 12 million issued prescriptions with assigned ATC codes were prescribed to MedicineInsight patients in 2018–19 (Table 7.2). If total prescriptions – issued and repeat prescriptions – are included, then there were just under 36.7 million prescriptions recorded for MedicineInsight patients in this cohort. During the same period, there were approximately 205 million prescriptions dispensed on the PBS (ATC Level 1 including under co-payment prescriptions).[29] MedicineInsight captures prescriptions that have been written – whether they are private, PBS-subsidised or under co-payment – while the PBS data captures prescriptions when the medicine has been dispensed on the PBS or is under co-payment. Given 84.7% of MedicineInsight prescriptions were PBS-subsidised (see Table 7.3), this suggests that GPs participating in MedicineInsight practices were responsible for ordering up to 10.4% of the prescriptions dispensed on the PBS in 2018–19 (assuming that all of the medicines prescribed were actually dispensed).[29] This is consistent with the practices included in this report representing 13.2% of all patients who visited a GP nationally in 2018–19.

At ATC level 1, medicines for the nervous system (which includes analgesics, antidepressants and medicines to treat epilepsy and Parkinson disease) accounted for the largest proportion of medicines

prescribed for MedicineInsight patients in terms of issued prescriptions (28.0%). However, cardiovascular medicines accounted for the largest proportion of medicines ordered for MedicineInsight patients in terms of the total volume of prescriptions (31.2%; Table 7.2). The differences between the proportions of medicines seen when comparing issued prescription data with total prescription data may be due to several factors. These include:

- the nature of the condition being treated. A higher total of prescriptions will be recorded for a chronic condition which requires regular, ongoing medicines (antihypertensives or lipid-lowering medicines) than for acute or intermittent conditions (such as antibiotics for infections or medicines for acute pain).
- PBS restrictions which limit the number of repeats that can be written for a particular medicine class. For example, prescribers must seek permission from Services Australia to prescribe repeats for many opioids and benzodiazepines, whereas PBS prescriptions for antidepressants may allow for three (one issued prescription and two repeats) or six months (one issued and five repeats) of treatment before the patient needs to return to the GP for another prescription.

At ATC level 1, the proportions of total prescriptions ordered in MedicineInsight practices closely match the proportions of prescriptions dispensed on the PBS (Table 7.2). Cardiovascular medicines accounted for 31% of total prescriptions prescribed to MedicineInsight patients and prescriptions dispensed on the PBS. Medicines for the nervous system, which include the analgesics, are the next most common prescriptions, accounting for 23.6% of total MedicineInsight prescriptions and 22.0% of PBS prescriptions, while medicines for the alimentary tract and metabolic system accounted for 13.8% and 15.8% of total prescriptions for MedicineInsight and the PBS, respectively.

There were some differences between the MedicineInsight and PBS prescribing data (Table 7.2). This is likely to reflect the nature of prescribing for patients seen in primary care compared with the medicines dispensed on prescriptions from all types of prescribers (including specialists, other health professionals and medicines dispensed under the PBS from a hospital). For example, medicines from the ATC G (genitourinary system and sex hormones) group account for 4.0% of total prescriptions prescribed for MedicineInsight patients but only 1.9% of dispensed PBS medicines. This is most likely to be because this group includes contraceptives, many of which are not listed on the PBS. In contrast, medicines to treat cancer (ATC L group), which are most likely to be prescribed in a specialist setting, are less commonly ordered for MedicineInsight patients (0.4%) than dispensed on the PBS (2.0%).

Other possible explanations for differences between MedicineInsight and PBS figures are:

- MedicineInsight includes private prescriptions which are not captured by the PBS (see section 7.3)
- MedicineInsight captures information on all prescriptions that are written, but these may not necessarily all be dispensed.

TABLE 7.2 NUMBER AND PROPORTION (%) OF MEDICINEINSIGHT ISSUED AND TOTAL PRESCRIPTIONS FOR ATC LEVEL 1 (UNWEIGHTED AND WEIGHTED) COMPARED TO NUMBER AND PROPORTION (%) OF ALL PBS MEDICINES DISPENSED, 2018–19[29]

ATC level 1	Medicine class	Issued prescriptions			Total prescriptions			PBS 2018–19[a]	
		Unweighted data		Weighted data	Unweighted data		Weighted data		
		No.	%	% (95% CI)	No.	%	% (95% CI)	No.	%
C	Cardiovascular system	2,119,446	17.7	17.8 (17.3, 18.4)	11,426,004	31.2	31.2 (30.6, 31.7)	64,250,367	31.3
N	Nervous system	3,448,005	28.8	28.0 (27.4, 28.7)	8,639,574	23.6	23.6 (23.1, 24.0)	45,095,412	22.0
A	Alimentary tract and metabolism	1,353,550	11.3	11.2 (11.0, 11.4)	5,065,031	13.8	13.8 (13.7, 14.0)	32,317,335	15.8
J	Anti-infectives for systemic use	1,862,340	15.6	16.2 (15.5, 16.8)	2,767,743	7.5	7.5 (7.2, 7.9)	12,677,862	6.2
R	Respiratory system	578,292	4.8	4.9 (4.8, 5.0)	2,382,851	6.5	6.5 (6.4, 6.6)	11,623,422	5.7

ATC level 1	Medicine class	Issued prescriptions			Total prescriptions			PBS 2018–19[a]	
		Unweighted data		Weighted data	Unweighted data		Weighted data		
		No.	%	% (95% CI)	No.	%	% (95% CI)	No.	%
G	Genitourinary system and sex hormones	479,659	4.0	3.9 (3.8, 4.1)	1,457,840	4.0	4.0 (3.8, 4.1)	3,974,290	1.9
M	Musculoskeletal system	542,616	4.5	4.5 (4.4, 4.6)	1,322,665	3.6	3.6 (3.5, 3.7)	6,900,821	3.4
B	Blood and blood forming organs	335,433	2.8	2.8 (2.6, 2.9)	1,249,770	3.4	3.4 (3.3, 3.5)	9,900,560	4.8
D	Dermatologicals	569,999	4.8	5.0 (4.8, 5.2)	976,637	2.7	2.7 (2.6, 2.8)	2,883,777	1.4
H	Systemic hormonal preparations, excl. sex hormones and insulins	384,538	3.2	3.2 (3.1, 3.3)	731,403	2.0	2.0 (2.0, 2.0)	3,563,577	1.7
S	Sensory organs (eye/ear)	188,225	1.6	1.7 (1.6, 1.8)	416,315	1.1	1.1 (1.1, 1.2)	7,308,929	3.6
L	Antineoplastic and immunomodulating agents	48,469	0.4	0.4 (0.4, 0.4)	162,595	0.4	0.4 (0.4, 0.5)	4,182,151	2.0
P	Antiparasitic products, insecticides and repellents	45,456	0.4	0.4 (0.4, 0.4)	64,444	0.2	0.2 (0.2, 0.2)	77,328	0.0
V	Various	1150	0.01	0.01 (0.01, 0.01)	3213	0.01	0.01 (0.01, 0.01)	197,700	0.1
	Total	**11,957,178**	**100**		**36,666,085**	**100**		**204,953,531[b]**	**100**

a Excludes under co-payment prescriptions. These accounted for another 93,863,877 prescriptions but these are not reported according to ATC class. There were approximately 296 million prescriptions dispensed if under co-payment prescriptions are also counted
b Excludes 134,948 prescriptions that do not have an ATC code and are designated as 'unless otherwise classified'.

At ATC level 3,[i] opioids accounted for the largest proportion of medicines ordered for MedicineInsight patients in terms of issued prescriptions (10.6%). The high proportion of issued prescriptions compared with total prescriptions for opioids is due to PBS restrictions which largely limit opioids prescriptions to a single supply without any repeats.[j] It may also be related to their use in the short-term management of acute pain. Lipid-lowering medicines (ie, statins and ezetimibe) accounted for the largest proportion of medicines ordered for MedicineInsight patients in terms of total prescriptions (9.8%; Table 7.3).

Consistent with high rates of dyslipidaemia seen in general practice (see Chapter 4), the lipid-modifying medicines (C10A and C10B) together accounted for 5.5% of the volume of issued prescriptions and 10.8% of the volume of total prescriptions (Table 7.3). Medicines to treat hypertension appeared six times in the list of the top 30 ATC level 3 drug classes (C07A, C08C, C09A, C09B, C09C, C09D) and together accounted for 9.3% of the volume of issued prescriptions and 17.2% of the volume of total prescriptions.

Table 7.3 includes the top 30 ATC 3 medicines as ranked by total prescriptions. However, there are a number of classes of medicines that make the top 30 medicines by issued prescriptions but not by total prescriptions. These included the macrolide antibiotics (J01F; 1.6% of all issued prescriptions), thyroid preparations (H03A; 1.1%), vaccines for viral diseases (J07B; 0.8%), medicines typically used for the management of osteoporosis (M05B; 0.8%) and propulsives used to control nausea and vomiting (A03F; 0.8%). This can be related to their use in the short-term management of acute conditions (antibiotics, propulsives), one-off use (vaccines) or large pack sizes (thyroid preparations).

Prescription numbers (issued and total) for all ATC3 drug classes prescribed in MedicineInsight practices during 2018–19 are included in Appendix 6.

[i] At level 3, the ATC classification system indicates the therapeutic or pharmacological subgroup a medicine falls into. For example, N06A indicates that the medicine works on the nervous system (N), from the psychoanaleptic therapeutic subgroup (N06) and is an antidepressant.
[j] Applications for increased quantities and/or repeats must be authorised by the Department of Human Services.

TABLE 7.3 NUMBER AND PROPORTION (%) OF ISSUED AND TOTAL PRESCRIPTIONS FOR TOP 30 ATC LEVEL 3 CLASSES RECORDED (UNWEIGHTED AND WEIGHTED), MEDICINEINSIGHT 2018–19

ATC level 3	Medicine class	Issued prescriptions			Total (issued plus repeat) prescriptions[b]			Average number of prescriptions[c] per issued script
		Unweighted data[a]		Weighted data	Unweighted data[a]		Weighted data	
		No.	%	% (95% CI)	No.	%	% (95% CI)	
N06A	Antidepressants	805,392	6.7	6.4 (6.3, 6.6)	3,719,302	10.1	9.7 (9.5, 10.0)	4.6
C10A	Lipid modifying agents, single agent	585,914	4.9	5.0 (4.9, 5.2)	3,483,621	9.5	9.8 (9.6, 10.0)	5.9
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	648,072	5.4	5.3 (5.2, 5.5)	2,779,072	7.6	7.5 (7.4, 7.6)	4.3
N02A	Opioids	1,325,534	11.1	10.6 (10.3, 11.)	1,757,605	4.8	4.6 (4.5, 4.8)	1.3
R03A	Adrenergics, inhalants	341,595	2.9	2.8 (2.7, 2.9)	1,685,514	4.6	4.5 (4.4, 4.6)	4.9
C09C	Angiotensin II receptor blockers, single agent	257,680	2.2	2.2 (2.1, 2.3)	1,466,355	4.0	4.1 (4.0, 4.2)	5.7
A10B	Blood glucose lowering drugs, excluding insulins	260,466	2.2	2.2 (2.1, 2.3)	1,401,999	3.8	3.9 (3.8, 4.0)	5.4
C09A	ACE inhibitors, single ingredient	247,350	2.1	2.0 (2.0, 2.1)	1,400,042	3.8	3.8 (3.7, 3.9)	5.7
B01A	Antithrombotic agents	259,606	2.2	2.2 (2.1, 2.3)	1,148,050	3.1	3.1 (3.0, 3.2)	4.4
C07A	Beta blocking agents	207,462	1.7	1.7 (1.6, 1.8)	1,089,455	3.0	2.9 (2.9, 3.0)	5.3
J01C	Beta-lactam antibacterials, penicillins	754,310	6.3	6.6 (6.3, 7.0)	990,626	2.7	2.8 (2.7, 3.0)	1.3
N03A	Antiepileptics	224,902	1.9	1.8 (1.8, 1.9)	977,976	2.7	2.6 (2.5, 2.6)	4.3
C09D	Angiotensin-II receptor blockers, combinations	166,789	1.4	1.4 (1.4, 1.5)	954,130	2.6	2.7 (2.6, 2.8)	5.7
M01A	Anti-inflammatory and anti-rheumatic products, non-steroids	349,656	2.9	2.9 (2.8, 3.0)	885,211	2.4	2.4 (2.3, 2.5)	2.5
C08C	Selective calcium channel blockers with mainly vascular effects	156,529	1.3	1.3 (1.3, 1.4)	878,874	2.4	2.4 (2.3, 2.5)	5.6
D07A	Corticosteroids, single agent	340,275	2.8	3.0 (2.9, 3.1)	637,934	1.7	1.8 (1.7, 1.9)	1.9
J01D	Other beta-lactam antibacterials	375,751	3.1	3.2 (3.1, 3.4)	532,893	1.5	1.5 (1.4, 1.6)	1.4
G03A	Hormonal contraceptives for hormonal use	211,444	1.8	1.6 (1.5, 1.7)	507,548	1.4	1.3 (1.2, 1.3)	2.4
N05A	Antipsychotics	199,886	1.7	1.6 (1.6, 1.7)	485,631	1.3	1.3 (1.2, 1.4)	2.4
C09B	ACE inhibitors, combinations	82,954	0.7	0.7 (0.7, 0.7)	473,047	1.3	1.3 (1.3, 1.4)	5.7
H02A	Corticosteroid for systemic use, single agent	240,998	2.0	2.0 (1.9, 2.1)	452,508	1.2	1.2 (1.2, 1.3)	1.9
N05C	Hypnotics and sedatives	306,210	2.6	2.7 (2.6, 2.8)	449,355	1.2	1.3 (1.2, 1.3)	1.5
R03B	Other drugs for obstructive airway diseases, inhalants	89,499	0.7	0.8 (0.7, 0.8)	419,117	1.1	1.1 (1.1, 1.2)	4.7
G04B	Urologicals	90,044	0.8	0.8 (0.8, 0.8)	365,324	1.0	1.1 (1.0, 1.1)	4.1
J01A	Tetracyclines	154,156	1.3	1.3 (1.3, 1.4)	364,379	1.0	1.0 (1.0, 1.1)	2.4
N05B	Anxiolytics	325,025	2.7	2.8 (2.6, 2.9)	352,611	1.0	1.0 (0.9, 1.0)	1.1
C10B	Lipid modifying agents, combinations	59,419	0.5	0.5 (0.5, 0.6)	344,055	0.9	1.0 (1.0, 1.1)	5.8
G03C	Progestogens	95,960	0.8	0.8 (0.8, 0.9)	310,828	0.8	0.9 (0.8, 0.9)	3.2
N02B	Other analgesics and antipyretics	81,930	0.7	0.7 (0.6, 0.7)	300,866	0.8	0.8 (0.7, 0.8)	3.7
M04A	Antigout preparations	90,186	0.8	0.7 (0.7, 0.8)	279,213	0.8	0.8 (0.7, 0.8)	3.1
	Subtotal[d]	**9,334,994**	**78.2**		**31,168,908**	**85.0**		

a Proportions (%) are given for the top 30 ATC level 3 classes only.
b Total prescriptions include issued and repeat prescriptions.
c Both issued and repeat prescriptions.
d Subtotal for the top 30 ATC level 3 classes.

7.3. Private and government-subsidised issued prescriptions

Medicines prescribed by GPs may be subsidised by the PBS or RPBS or they may be private prescriptions, in which case the consumer pays full price. As can be seen in Table 7.4, 84.7% of issued prescriptions with an assigned ATC code are subsidised by the PBS or RPBS. However, there were two ATC level 1 medicine classes in which more than 40% of issued prescriptions are privately prescribed. These are:

- dermatological medicines (ATC D) which include medicines for cold sores, topical antifungals and corticosteroids
- genitourinary system and sex hormones (ATC G) which include hormonal contraceptives and medicines for erectile dysfunction.

TABLE 7.4 NUMBER AND PROPORTION (%) OF PBS/RPBS AND PRIVATE ISSUED PRESCRIPTIONS FOR ATC LEVEL 1 (UNWEIGHTED AND WEIGHTED), MEDICINEINSIGHT 2018–19

ATC level 1	Medicine class	PBS/RPBS			Private		
		Unweighted data		Weighted data	Unweighted data		Weighted data
		No.	% within class	% within class (95% CI)	No.	% within class	% within class (95% CI)
A	Alimentary tract and metabolism	1,149,899	85.0	84.9 (84.0, 85.9)	203,651	15.0	15.1 (14.1, 16.0)
B	Blood and blood forming organs	293,346	87.5	87.7 (87.0, 88.4)	42,087	12.5	12.3 (11.6, 13.0)
C	Cardiovascular system	2,096,569	98.9	98.8 (98.8, 98.9)	22,877	1.1	1.2 (1.1, 1.2)
D	Dermatologicals	312,272	54.8	55.1 (53.7, 56.5)	257,727	45.2	44.9 (43.5, 46.3)
G	Genitourinary system and sex hormones	291,015	60.7	58.3 (57.4, 59.3)	188,644	39.3	41.7 (40.7, 42.6)
H	Systemic hormonal preparations, excl. sex hormones and insulins	375,062	97.5	97.4 (97.1, 97.8)	9476	2.5	2.6 (2.2, 2.9)
J	Anti-infectives for systemic use	1,575,189	84.6	84.6 (83.8, 85.5)	287,151	15.4	15.4 (14.5, 16.2)
L	Antineoplastic and immunomodulating agents	30,400	62.7	65.7 (63.1, 68.2)	18,069	37.3	34.3 (31.8, 36.9)
M	Musculoskeletal system	502,055	92.5	92.1 (91.1, 93.1)	40,561	7.5	7.9 (6.9, 8.9)
N	Nervous system	2,924,857	84.8	84.1 (83.6, 84.7)	523,148	15.2	15.9 (15.3, 16.4)
P	Antiparasitic products, insecticides and repellents	387,14	85.2	85.5 (84.2, 86.9)	6742	14.8	14.5 (13.1, 15.8)
R	Respiratory system	454,761	78.6	77.5 (76.2, 78.8)	123,531	21.4	22.5 (21.2, 23.8)
S	Sensory organs (eye/ear)	132,527	70.4	69.8 (68.4, 71.3)	55,698	29.6	30.2 (28.7, 31.6)
V	Various	1115	97.0	96.3 (94.5, 98.1)	35	3.0	3.7 (1.9, 5.5)
	Total all classes	10,177,781	85.1	84.7 (84.2, 85.3)	1,779,397	14.9	15.3 (14.7, 15.8)

Table 7.5 and Appendix 6 provide more detail about the private and PBS splits for issued prescriptions within each ATC level 3 category. The hypnotics and sedatives (N05C) – which include benzodiazepines, barbiturates, and melatonin – were the most likely to be prescribed privately (43.5%). Other classes with higher levels of private prescribing were the dermatological topical corticosteroids (D07A; 22.2%) and systemic hormonal contraceptives (G03A; 20.0%). This reflects that many of these medicines, including the oral contraceptives, are not PBS-subsidised.

The proportion of opioids and hypnotics and sedatives that are privately prescribed appears to have risen slightly since 2017–18. In 2017–18, 13.0% of all opioids and 40.3% of all hypnotics were privately prescribed but in 2018–19 this increased to 17.3% and 43.5%, respectively. This may reflect a move towards private use of these medicines in response to codeine being changed from an over-the-counter medicine to a prescription-only medicine in February 2018, noting that data from the TGA indicates that the national sales of codeine have fallen in response to the upscheduling.[30]

A breakdown of PBS/RPBS subsidised and private prescriptions (issued only) for all ATC 3 drug classes prescribed in MedicineInsight practices during 2018–19 is included in Appendix 6.

TABLE 7.5 NUMBER AND PROPORTION (%) OF PBS/RPBS AND PRIVATE ISSUED PRESCRIPTIONS FOR TOP 30 ATC LEVEL 3 CLASSES RECORDED (UNWEIGHTED AND WEIGHTED), MEDICINEINSIGHT 2018–19

ATC level 3	Medicine class	PBS/RPBS			Private		
		Unweighted data		Weighted data	Unweighted data		Weighted data
		No.	% within class	% within class (95% CI)	No.	% within class	% within class (95% CI)
N02A	Opioids	1,107,189	83.5	82.7 (81.8, 83.5)	218,345	16.5	17.3 (16.5, 18.2)
N06A	Antidepressants	781,470	97.0	96.8 (96.5, 97.0)	23,922	3.0	3.2 (3.0, 3.5)
J01C	Beta-lactam antibacterials, penicillins	743,240	98.5	98.4 (98.1, 98.8)	11,070	1.5	1.6 (1.2, 1.9)
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	635,132	98.0	97.9 (97.7, 98.0)	12,940	2.0	2.1 (2.0, 2.3)
C10A	Lipid modifying agents, single agent	580,462	99.1	99.0 (98.9, 99.2)	5,452	0.9	1.0 (0.8, 1.1)
J01D	Other beta-lactam antibacterials	372,422	99.1	99.2 (98.9, 99.4)	3,329	0.9	0.8 (0.6, 1.1)
M01A	Anti-inflammatory and anti-rheumatic products, non-steroids	314,220	89.9	89.2 (87.9, 90.6)	35,436	10.1	10.8 (9.4, 12.1)
R03A	Adrenergics, inhalants	338,188	99.0	98.9 (98.7, 99.1)	3,407	1.0	1.1 (0.9, 1.3)
D07A	Corticosteroids, single agent	264,510	77.7	77.8 (76.6, 79.0)	75,765	22.3	22.2 (21.0, 23.4)
N05B	Anxiolytics	284,202	87.4	87.1 (86.4, 87.9)	40,823	12.6	12.9 (12.1, 13.6)
N05C	Hypnotics and sedatives	174,201	56.9	56.5 (55.0, 58.1)	132,009	43.1	43.5 (41.9, 45.0)
A10B	Blood glucose lowering drugs, excluding insulins	253,574	97.4	97.4 (97.1, 97.7)	6,892	2.6	2.6 (2.3, 2.9)
B01A	Antithrombotic agents	236,179	91.0	91.1 (90.5, 91.7)	23,427	9.0	8.9 (8.3, 9.5)
C09C	Angiotensin II receptor blockers, single agent	257,162	99.8	99.8 (99.7, 99.9)	518	0.2	0.2 (0.1, 0.3)
C09A	ACE inhibitors, single ingredient	246,658	99.7	99.7 (99.6, 99.8)	692	0.3	0.3 (0.2, 0.4)
H02A	Corticosteroid for systemic use, single agent	238,245	98.9	98.9 (98.6, 99.2)	2,753	1.1	1.1 (0.8, 1.4)
N03A	Antiepileptics	200,667	89.2	89.1 (88.5, 89.8)	24,235	10.8	10.9 (10.2, 11.5)
G03A	Hormonal contraceptives for hormonal use	173,653	82.1	80.0 (78.8, 81.2)	37,791	17.9	20.0 (18.8, 21.2)
C07A	Beta blocking agents	206,710	99.6	99.6 (99.6, 99.7)	752	0.4	0.4 (0.3, 0.4)
N05A	Antipsychotics	174,654	87.4	87.5 (86.4, 88.5)	25,232	12.6	12.5 (11.5, 13.6)
J01F	Macrolides, lincosamides and streptogramins	163,164	88.8	88.4 (86.8, 89.9)	20,522	11.2	11.6 (10.1, 13.2)
C09D	Angiotensin-II receptor blockers, combinations	166,326	99.7	99.7 (99.6, 99.8)	463	0.3	0.3 (0.2, 0.4)
C08C	Selective calcium channel blockers with mainly vascular effects	156,069	99.7	99.7 (99.6, 99.7)	460	0.3	0.3 (0.3, 0.4)
J01A	Tetracyclines	137,657	89.3	89.1 (88.1, 90.0)	16,499	10.7	10.9 (10.0, 11.9)
H03A	Thyroid preparations	127,145	95.1	94.7 (93.9, 95.5)	6,509	4.9	5.3 (4.5, 6.1)
A03F	Antispasmodics and anticholinergics in combination with other drugs	91,201	90.0	90.0 (89.2, 90.8)	10,083	10.0	10.0 (9.2, 10.8)
G03C	Progestogens	80,461	83.8	84.3 (83.6, 85.1)	15,499	16.2	15.7 (14.9, 16.4)
C03C	High-ceiling diuretics	92,513	96.7	96.7 (96.4, 97.0)	3,137	3.3	3.3 (3.0, 3.6)
M05B	Drugs affecting bone structure and mineralisation	91,009	97.9	97.8 (97.5, 98.1)	1,909	2.1	2.2 (1.9, 2.5)
J01E	Sulfonamides and trimethoprim	90,730	99.3	99.2 (99.1, 99.4)	622	0.7	0.8 (0.6, 0.9)

7.4. Prescriptions per 100 encounters

On average, for every 100 GP clinical encounters, 70 issued prescriptions are generated (Table 7.6).

As expected, the number of prescriptions per 100 encounters increases as patients become older (Table 7.6). Once patients are 60 years or older almost every encounter is associated with a prescription being written (~100 prescriptions per 100 encounters). In comparison, just over a third of

encounters involving children 0–9 years are associated with a prescription being written. The rate of medicine prescribing also increased with increasing socio-economic disadvantage.

Medicines are less commonly prescribed during encounters in major cities than in other areas of Australia (Table 7.6). They are most commonly prescribed during encounters in remote areas. This could reflect easier access to other non-pharmacological interventions and allied health services in major cities. Alternatively, it could be that people in the most remote areas, who visit their general practice less frequently (Chapter 3) or rely upon visiting health services, may present with a number of problems during a consultation and thus are more likely to be prescribed a medicine or are prescribed medicines that may be needed to save the patient returning. Rate of prescribing were also significantly higher than the national average in Tasmania, again possibly reflecting its older population.

TABLE 7.6 RATE OF ISSUED PRESCRIPTIONS PER 100 ENCOUNTERS BY PATIENT CHARACTERISTIC (UNWEIGHTED AND WEIGHTED), MEDICINEINSIGHT 2018–19

Characteristic	Unweighted data		Weighted data	
		(95% CI)		(95% CI)
All patients	72.1	(70.5, 73.8)	70.0	(68.3, 71.7)
Sex				
Male	71.1	(69.4, 72.8)	69.2	(67.5, 70.9)
Female	73.0	(71.3, 74.7)	70.7	(69.0, 72.4)
Age group (years)				
0–9	37.3	(35.8, 38.9)	36.6	(35.1, 38.1)
10–19	47.2	(45.7, 48.6)	45.6	(44.3, 46.9)
20–29	60.6	(58.7, 62.5)	58.4	(56.6, 60.2)
30–39	61.8	(60.0, 63.7)	60.0	(58.4, 61.5)
40–49	72.2	(70.3, 74.2)	69.8	(68.1, 71.5)
50–59	86.2	(84.2, 88.2)	83.6	(81.7, 85.4)
60–69	102.1	(99.7, 104.5)	99.8	(97.6, 102.0)
70–79	108.6	(105.5, 111.8)	106.9	(104.3, 109.6)
80–89	109.6	(106.3, 112.8)	108.4	(105.6, 111.2)
90+	105.7	(102.1, 109.3)	103.5	(99.8, 107.2)
Rurality				
Major city	68.3	(66.5, 70.2)	66.8	(65.0, 68.6)
Inner regional	75.9	(73.0, 78.7)	75.3	(72.2, 78.5)
Outer regional	81.5	(77.0, 85.9)	80.8	(76.4, 85.2)
Remote/very remote	94.6	(79.7, 109.4)	86.1	(80.0, 92.2)
State/Territory				
TAS	85.8	(77.7, 93.8)	85.3	(77.3, 93.3)
SA	74.0	(66.7, 81.2)	72.9	(66.4, 79.3)
VIC	72.7	(69.7, 75.8)	71.8	(68.5, 75.0)
ACT	70.8	(63.4, 78.3)	70.7	(63.4, 78.1)
NSW	73.6	(70.8, 76.3)	69.4	(66.2, 72.6)
QLD	69.0	(66.4, 71.7)	68.7	(65.8, 71.5)
NT	68.8	(60.2, 77.4)	65.8	(57.6, 73.9)
WA	64.8	(60.2, 69.5)	64.9	(60.8, 68.9)
Socio-economic status (SEIFA IRSAD quintile)				
1 (most disadvantaged)	80.6	(77.5, 83.6)	77.3	(74.7, 79.9)
2	78.3	(75.0, 81.6)	76.4	(72.3, 80.4)

Characteristic	Unweighted data		Weighted data	
		(95% CI)		(95% CI)
3	70.9	(68.5, 73.3)	68.7	(66.1, 71.2)
4	68.6	(66.7, 70.4)	67.8	(65.7, 69.9)
5 (most advantaged)	66.6	(64.5, 68.7)	66.6	(64.6, 68.7)

7.5. Prescriptions per 100 encounters by ATC codes

On average, for every 100 GP clinical encounters, almost 79 issued prescriptions are generated (Table 7.7). The prescriptions provided during these encounters are sufficient to generate almost 241 prescriptions per 100 encounters – ie, each GP-patient encounter results in 2.4 issued and repeat prescriptions. The three most frequently prescribed medicine classes for issued prescriptions per 100 encounters were medicines for the nervous system (which include the analgesics; 22.1 per 100 encounters), medicines for the cardiovascular system (14.1 prescriptions per 100 encounters) and anti-infective medicines for systemic use (12.7 per 100 encounters). The most frequently recorded medicine classes for total prescriptions were cardiovascular medicines (76.0 prescriptions per 100 encounters), medicines for the nervous system (55.0 per 100 encounters) and medicines for the alimentary tract and metabolism (33.1 per 100 encounters).

TABLE 7.7 ISSUED AND TOTAL PRESCRIPTIONS RECORDED PER 100 ENCOUNTERS*, ATC LEVEL 1 (WEIGHTED), MEDICINEINSIGHT 2018–19

ATC level 1	Medicine class	Issued prescriptions			Total (issued plus repeat) prescriptions[a]		
		Rate per 100 encounters	(95% CI)	Rank	Rate per 100 encounters	(95% CI)	Rank
C	Cardiovascular system	14.1	(12.8, 15.3)	2	76.0	(69.2, 82.9)	1
N	Nervous system	22.1	(19.9, 24.3)	1	55.0	(49.9, 60.2)	2
A	Alimentary tract and metabolism	8.8	(8.0, 9.7)	4	33.1	(30.2, 36.1)	3
J	Anti-infectives for systemic use	12.7	(11.3, 14.1)	3	18.8	(16.9, 20.8)	4
R	Respiratory system	3.8	(3.5, 4.2)	6	15.5	(14.2, 16.9)	5
G	Genitourinary system and sex hormones	3.1	(2.8, 3.4)	8	9.6	(8.7, 10.5)	6
M	Musculoskeletal system	3.6	(3.2, 3.9)	7	8.6	(7.8, 9.4)	7
B	Blood and blood forming organs	2.2	(2.0, 2.4)	10	8.2	(7.5, 8.9)	8
D	Dermatologicals	3.9	(3.6, 4.3)	5	6.6	(6.0, 7.2)	9
H	Systemic hormonal preparations, excl. sex hormones and insulins	2.5	(2.3, 2.8)	9	4.8	(4.3, 5.2)	10
S	Sensory organs (eye/ear)	1.3	(1.2, 1.5)	11	2.8	(2.6, 3.1)	11
L	Antineoplastic and immunomodulating agents	0.3	(0.3, 0.3)	13	1.0	(0.9, 1.1)	12
P	Antiparasitic products, insecticides and repellents	0.3	(0.3, 0.4)	12	0.4	(0.4, 0.5)	13
V	Various	0.0	(0.0, 0.0)	14	0.0	(0.0, 0.0)	14
	Total	**78.8**	**(71.3, 86.3)**		**240.6**	**(219.3, 262.0)**	

* The rate of prescriptions per 100 encounters was calculated individually for each ATC level 1 and ATC level 3 class of medicines by dividing the number of prescriptions (issued or total) recorded at any time during 2018–19, by the total number of encounters for all patients multiplied by 100, with the caveat that prescriptions are not linked directly to an encounter in MedicineInsight but to patients.
a Total prescriptions – issued and repeat prescriptions

As expected, when ranked by issued prescription rate or total prescription rate at ATC level 3, medicines for long-term conditions such as dyslipidaemia, GORD and depression were the most frequently prescribed total prescriptions (Table 7.8).

TABLE 7.8 ISSUED AND TOTAL PRESCRIPTIONS RECORDED PER 100 ENCOUNTERS (WEIGHTED), ATC LEVEL 3, MEDICINEINSIGHT 2018–19

ATC level 3	Medicine class	Issued prescriptions			Total (issued plus repeat) prescriptions[a]		
		Rate per 100 encounters	(95% CI)	Rank	Rate per 100 encounters	(95% CI)	Rank
C10A	Lipid modifying agents, single agent	4.0	(3.6, 4.3)	5	23.6	(21.4, 25.7)	1
N06A	Antidepressants	5.1	(4.6, 5.6)	3	23.4	(21.2, 25.6)	2
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	4.2	(3.8, 4.6)	4	18.1	(16.4, 19.7)	3
N02A	Opioids	8.4	(7.5, 9.2)	1	11.1	(10.0, 12.3)	4
R03A	Adrenergics, inhalants	2.2	(2.0, 2.4)	9	10.8	(9.9, 11.8)	5
C09C	Angiotensin II receptor blockers, single agent	1.7	(1.6, 1.9)	13	9.9	(9.0, 10.7)	6
A10B	Blood glucose lowering drugs, excluding insulins	1.7	(1.6, 1.9)	12	9.4	(8.5, 10.3)	7
C09A	ACE inhibitors, single agent	1.6	(1.5, 1.8)	15	9.1	(8.2, 9.9)	8
B01A	Antithrombotic agents	1.7	(1.5, 1.9)	14	7.5	(6.9, 8.2)	9
C07A	Beta blocking agents	1.3	(1.2, 1.5)	18	7.0	(6.4, 7.7)	10
J01C	Beta-lactam antibacterials, penicillins	5.2	(4.6, 5.8)	2	6.8	(6.1, 7.6)	11
C09D	Angiotensin II receptor blockers, combinations	1.1	(1.0, 1.2)	22	6.5	(5.9, 7.1)	12
N03A	Antiepileptics	1.4	(1.3, 1.6)	17	6.2	(5.7, 6.8)	13
C08C	Selective calcium channel blockers with mainly vascular effects	1.0	(0.9, 1.1)	24	5.8	(5.3, 6.3)	14
M01A	Anti-inflammatory and antirheumatic products, non-steroids	2.3	(2.0, 2.6)	8	5.8	(5.2, 6.3)	15
D07A	Corticosteroids, single agent	2.4	(2.1, 2.6)	7	4.3	(3.9, 4.7)	16
J01D	Other beta-lactam antibacterials	2.6	(2.3, 2.8)	6	3.6	(3.2, 4.0)	17
C09B	ACE inhibitors, combinations	0.6	(0.5, 0.6)	36	3.1	(2.8, 3.5)	18
N05A	Antipsychotics	1.3	(1.1, 1.4)	19	3.1	(2.8, 3.4)	19
N05C	Hypnotics and sedatives	2.1	(1.9, 2.3)	11	3.1	(2.8, 3.4)	20
G03A	Hormonal contraceptives for systemic use	1.3	(1.1, 1.4)	21	3.1	(2.7, 3.4)	21
H02A	Corticosteroids for systemic use, single agent	1.6	(1.4, 1.8)	16	2.9	(2.6, 3.2)	22
R03B	Other drugs for obstructive airway diseases, inhalants	0.6	(0.5, 0.7)	31	2.8	(2.5, 3.0)	23
G04B	Urologicals	0.6	(0.6, 0.7)	28	2.6	(2.3, 2.8)	24
J01A	Tetracyclines	1.0	(0.9, 1.2)	23	2.5	(2.2, 2.7)	25
C10B	Lipid modifying agents, combinations	0.4	(0.4, 0.5)	44	2.4	(2.2, 2.7)	26
N05B	Anxiolytics	2.2	(1.9, 2.4)	10	2.4	(2.1, 2.6)	27
G03C	Oestrogens	0.7	(0.6, 0.7)	26	2.1	(1.9, 2.3)	28
N02B	Other analgesics and antipyretics	0.5	(0.5, 0.6)	39	1.9	(1.6, 2.1)	29
J01F	Macrolides, lincosamides and streptogramins	1.3	(1.1, 1.4)	20	1.8	(1.6, 2.0)	30

a Total prescriptions – issued and repeat prescriptions

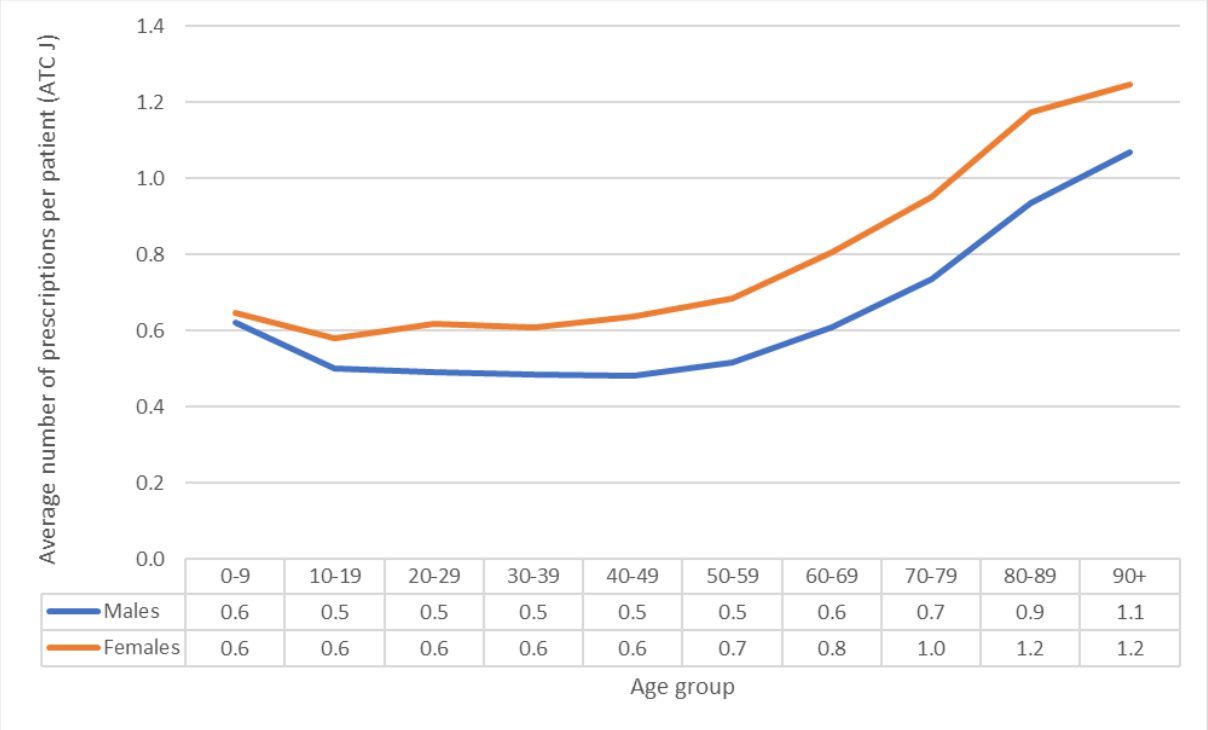
7.6. Patterns of prescribing for selected medicines

Information on the average number of prescriptions per patient, by sex and age, is provided for a number of high-volume medicine classes below. The medicine classes selected are:

- issued prescriptions for anti-infectives for systemic use (ATC J)
- total prescriptions for cardiovascular medicines (ATC C)
- issued prescriptions for opioids (ATC N02A)
- total prescriptions for antidepressants (ATC N06A).

Patterns of prescribing for the systemic anti-infectives followed a similar pattern for both males and females, although rates were slightly higher for females in all age groups (Figure 7.3). Rates of prescribing were largely similar until around aged 50–59 age group when rates began to rise for both genders. This could reflect increased rates of infections in the older age groups[11] and/or an increased readiness on the part of GPs to prescribe anti-infectives for older people due to underlying comorbidities.

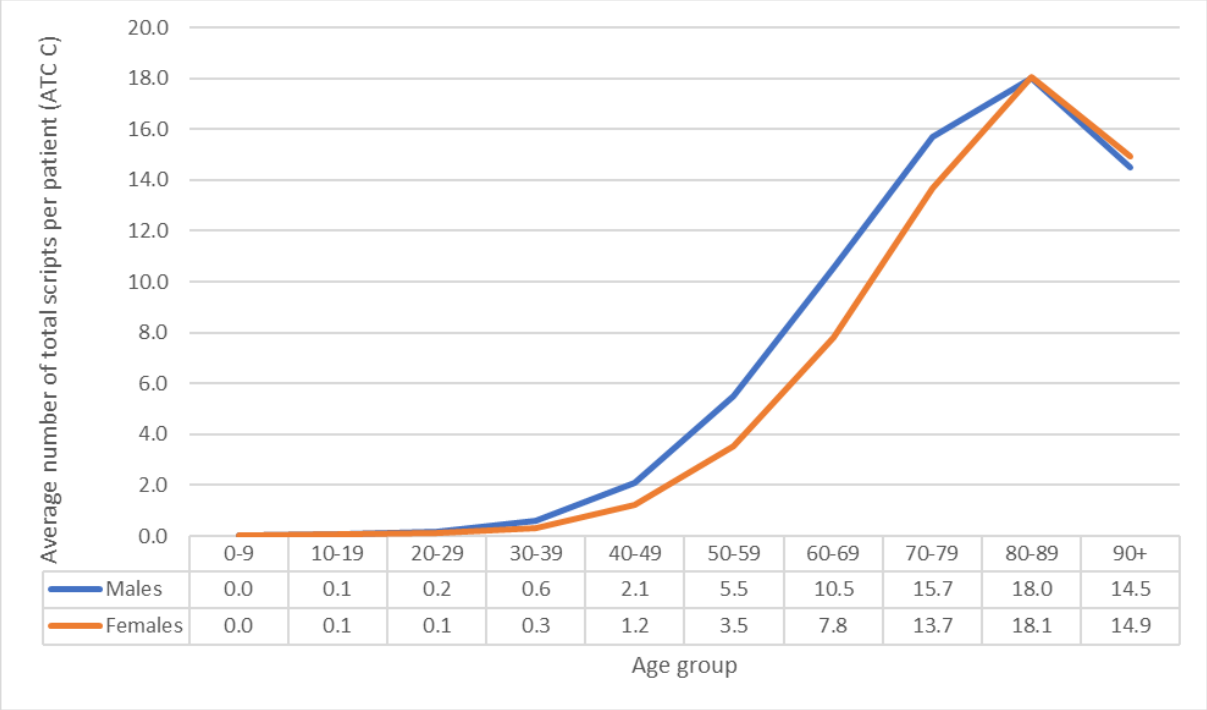
FIGURE 7.3 AVERAGE NUMBER OF ISSUED PRESCRIPTIONS PER PATIENT FOR ANTI-INFECTIVES FOR SYSTEMIC USE (ATC LEVEL 1) BY AGE GROUP AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–18



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Males	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.9	1.1
Females	0.6	0.6	0.6	0.6	0.6	0.7	0.8	1.0	1.2	1.2

Use of cardiovascular medicines increased from ages 40–49 years for both sexes before falling for those aged 90 years or older (Figure 7.4). On average, men are more likely to be prescribed a cardiovascular medicine between the ages of 30 and 80 than women are – consistent with higher reported rates of CVD in men.[11] The drop in the number of average prescriptions per patient seen in the oldest age group may be related to the health of people who reach their 90s or to health professional decisions to stop medicines due to increased risk of adverse events for older frail people (eg, stopping antihypertensives because of increased risk of falls), or to reduce pill burden for those with a reduced life expectancy.[31,32] It could also be due to fewer people in this age group having a full 12 months of data if they die part way through the study period.

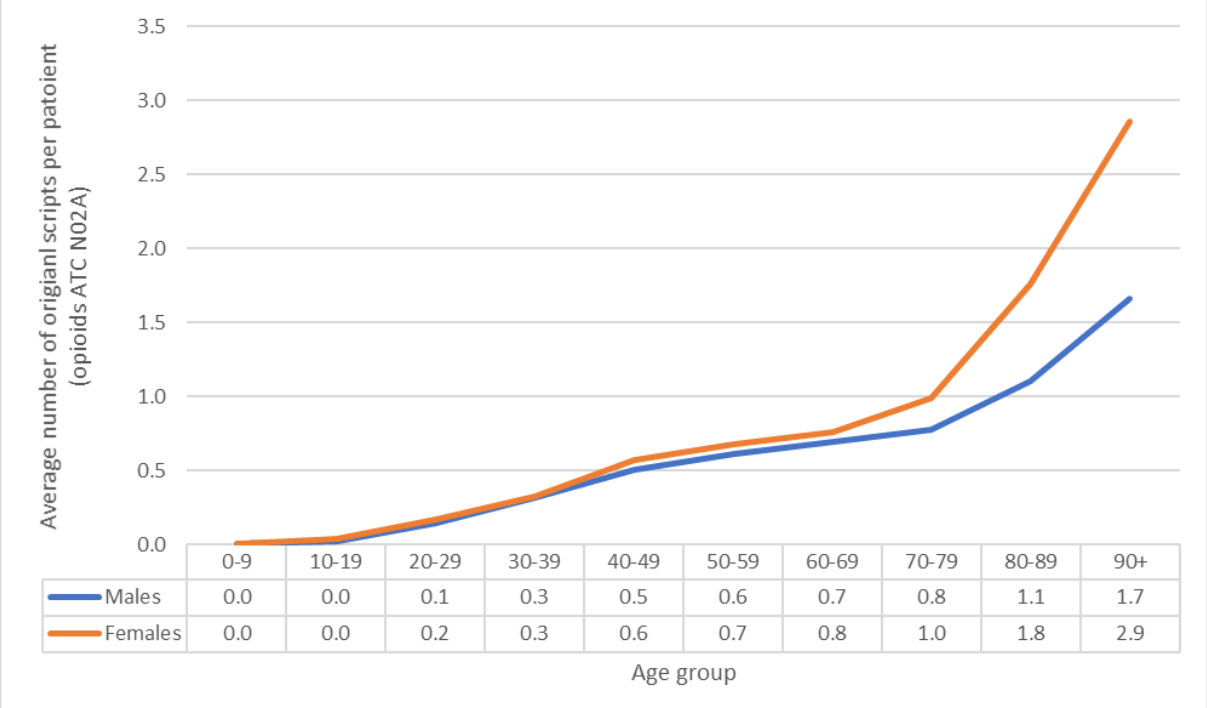
FIGURE 7.4 AVERAGE NUMBER OF TOTAL PRESCRIPTIONS PER PATIENT FOR CARDIOVASCULAR SYSTEM (ATC LEVEL 1) BY AGE GROUP AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Males	0.0	0.1	0.2	0.6	2.1	5.5	10.5	15.7	18.0	14.5
Females	0.0	0.1	0.1	0.3	1.2	3.5	7.8	13.7	18.1	14.9

Patterns of opioid prescribing are almost identical in both males and females up until the age of 60–69 years, after which women are more likely to be prescribed opioids than men are (Figure 7.5). Increased use in older age groups may reflect the use of opioids for the management of cancer pain, other pain or use during palliative and end-of-life care. The higher use in older women is likely to reflect the higher prevalence of conditions that may result in chronic pain among women than among men, such as osteoporosis, minimal trauma fractures and arthritis.[33]

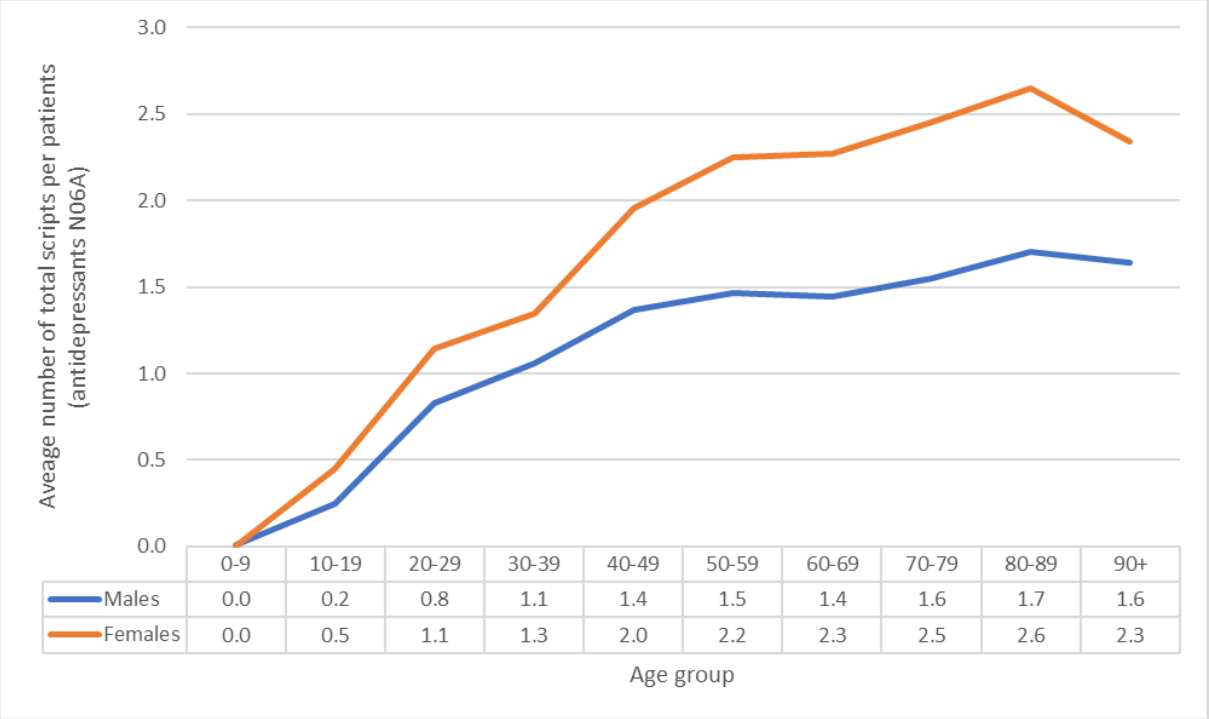
FIGURE 7.5 AVERAGE NUMBER OF ISSUED PRESCRIPTIONS PER PATIENT FOR OPIOIDS [ATC LEVEL 3 – N02A] BY AGE GROUP AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Males	0.0	0.0	0.1	0.3	0.5	0.6	0.7	0.8	1.1	1.7
Females	0.0	0.0	0.2	0.3	0.6	0.7	0.8	1.0	1.8	2.9

The prevalence of recorded depression in 2018–19 was highest in men and women aged 40–49 (see Figure 4.2 in Chapter 4), and then decreased with increasing age. In contrast, prescription of antidepressants rose with age and was highest among women aged 80–89 years (Figure 7.6). While this may reflect use for treating depression (which has been reported to be highly prevalent among residents of aged care facilities), it may also reflect use of tricyclic antidepressants for other conditions that tend to be more common in older people, such as neuropathic pain, insomnia or incontinence.

FIGURE 7.6 AVERAGE NUMBER OF TOTAL PRESCRIPTIONS PER PATIENT FOR ANTIDEPRESSANTS [ATC LEVEL 3 –N06A] BY AGE GROUP AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Males	0.0	0.2	0.8	1.1	1.4	1.5	1.4	1.6	1.7	1.6
Females	0.0	0.5	1.1	1.3	2.0	2.2	2.3	2.5	2.6	2.3

8. PATHOLOGY TESTING

In summary

- Almost 72 million atomised pathology test results were recorded in MedicineInsight in 2018–19.
- There was an average of 24.8 atomised test results per patient in 2018–19, although 57.7% of patients had no pathology tests recorded
- Age- and sex-specific rates showed an increase in the number of tests with age, and a higher average number of tests for women compared to men. This was particularly apparent for women of reproductive age, and could be due to testing related to pregnancy.
- Patients in the top 10% by pathology tests requested had more than 70 atomised pathology test results during 2018–19. They were more likely to have chronic conditions such as type 2 diabetes and CKD and were also older.
- Using haemoglobin, creatinine and alanine aminotransferase as proxy measures, the percentage of patients aged 20 years or older who had an FBC was 42.0%, a kidney function test was 42.2% and a liver function LFT was 41.0%, respectively.
- Among patients with diagnosed diabetes who had their HbA_{1c} level checked during 2018–19, 50.7% had at least one result which was higher than 53 mmol/mol (7.0%).
- Fewer than 10% of patients who had at least one TSH test had a result that fell outside the reference range
- A quarter of patients with a vitamin D test had a result that fell outside the reference range.

This chapter reports on atomised pathology test results recorded in MedicineInsight in 2018–19 and describes the following:

- for selected pathology tests, the percentage of patients with results recorded and average number of test results per 100 patients
- average number of atomised tests according to patient demographics
- age and sex-specific average numbers of pathology tests
- distribution of number of pathology tests per patient
- age and sex-specific distribution of patients in the top 10% by pathology test volume
- proportion and relative risk of selected conditions in patients in the top 10% by pathology test volume
- for selected pathology tests, the percentage (%) of patients with results outside the reference range.

8.1. Pathology test results by patient

There were 71,859,739 separate pathology test results recorded in MedicineInsight for 2017–18, or an average of 24.8 atomised test results per patient using unweighted data.

Only 42.3% of patients (1,669,298) had one or more atomised pathology test result recorded in 2018–19, and the remaining 57.7% of patients had no pathology tests recorded.

Pathology test results may come into the CIS from sources outside of the general practice, and the results may not reflect tests ordered by each patient's GP, such as if the patient is being tested routinely as an inpatient, and the results are copied directly to the GP by the pathology laboratory. It is also important to note that each component of a pathology test result is recorded separately (atomised) in MedicineInsight. For example, a full blood count (FBC) would generate up to a dozen individual test results, such as white cell count and haemoglobin concentration. Using proxy measures, such as haemoglobin as a measure of an FBC, can give an indication of the volume per patient of particular panels of commonly ordered tests. This is shown in Table 8.1, which gives the proportion of patients who had results for selected pathology tests, and the average number of these test results per 100 patients.

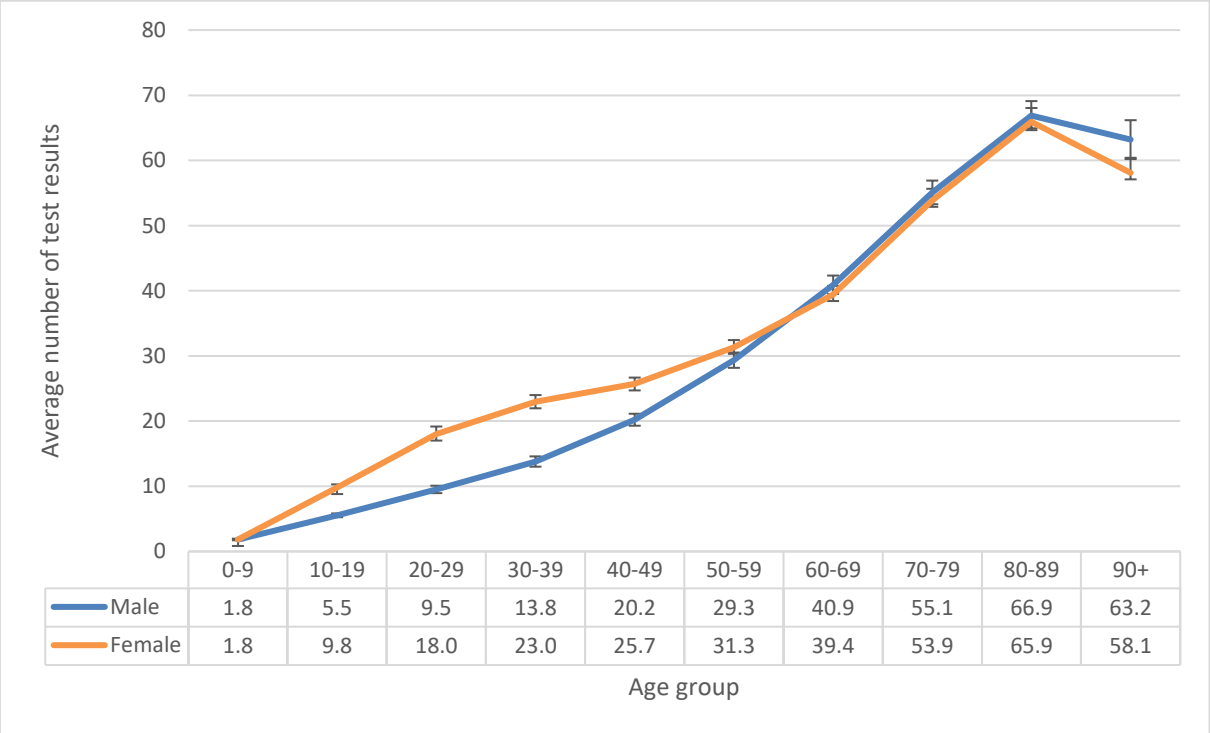
TABLE 8.1 SELECTED PATHOLOGY TEST RESULTS PER PATIENT, MEDICINEINSIGHT 2018–19

Pathology test result	MedicineInsight 2018–19 (unweighted; N = 2,893,532)		MedicineInsight 2018–19 (weighted)	
	% patients with result recorded	Average number of tests per 100 patients (95% CI)	% patients with result recorded	Average number of tests per 100 patients (95% CI)
Full blood count (FBC)[a]	34.9	58.5 (56.0, 61.1)	34.1	56.0 (53.5, 58.5)
Liver function tests (LFTs)[b]	33.6	53.8 (51.3, 56.3)	33.2	52.4 (50.0, 54.9)
Kidney function test (urea, electrolytes and creatinine; UECs)[c]	30.3	50.6 (47.6, 53.7)	28.6	46.9 (43.7, 50.2)
Lipids[d]	27.1	37.4 (35.0, 39.9)	27.5	38.3 (35.8, 40.7)
TSH	22.4	28.4 (27.2, 29.6)	21.6	27.1 (25.7, 28.5)
Ferritin	20.5	26.6 (25.6, 27.7)	19.9	25.6 (24.4, 26.8)
Vitamin B_{12}	12.4	13.9 (13.2, 14.5)	12.1	13.5 (12.8, 14.3)
Vitamin D	11.0	12.7 (12.0, 13.3)	11.0	12.6 (11.9, 13.4)

[a] Haemoglobin was used as a proxy for FBC; [b] ALT was used as a proxy for LFTs; [c] Sodium was used as a proxy for UECs; [d] Total cholesterol was used as a proxy for lipids

Figure 8.1 shows the average number of pathology test results per patient by age and sex. There was a steady increase in the average number of test results with age, peaking for both men and women aged 80–89 years. There was also an increased number of test results for women of reproductive age compared to men of the same age.

FIGURE 8.1 AVERAGE NUMBER OF PATHOLOGY TEST RESULTS PER PATIENT BY AGE GROUP AND SEX (WEIGHTED), MEDICINEINSIGHT 2018–19



Females had significantly more pathology test results than males (26.3 versus 22.1), although rates were similar between men and women in older age groups (from 50–89 years, Figure 8.1). As would be expected given the increasing prevalence of health conditions with increasing age, the proportion of testing increased with increasing age.

Rates of pathology tests per patient were similar regardless of whether the region was metropolitan, regional or remote (Table 8.2). The number of tests per patient increased with socio-economic disadvantage, with patients from more disadvantaged areas having more pathology test results per patient than patients from more advantaged areas. The NT had the fewest average number of pathology test results per patient (14.6). The rate of testing in the ACT, SA and Queensland was double that of the NT.

TABLE 8.2 AVERAGE NUMBER OF PATHOLOGY TEST RESULTS BY PATIENT DEMOGRAPHICS (UNWEIGHTED AND WEIGHTED), MEDICINEINSIGHT 2018–19

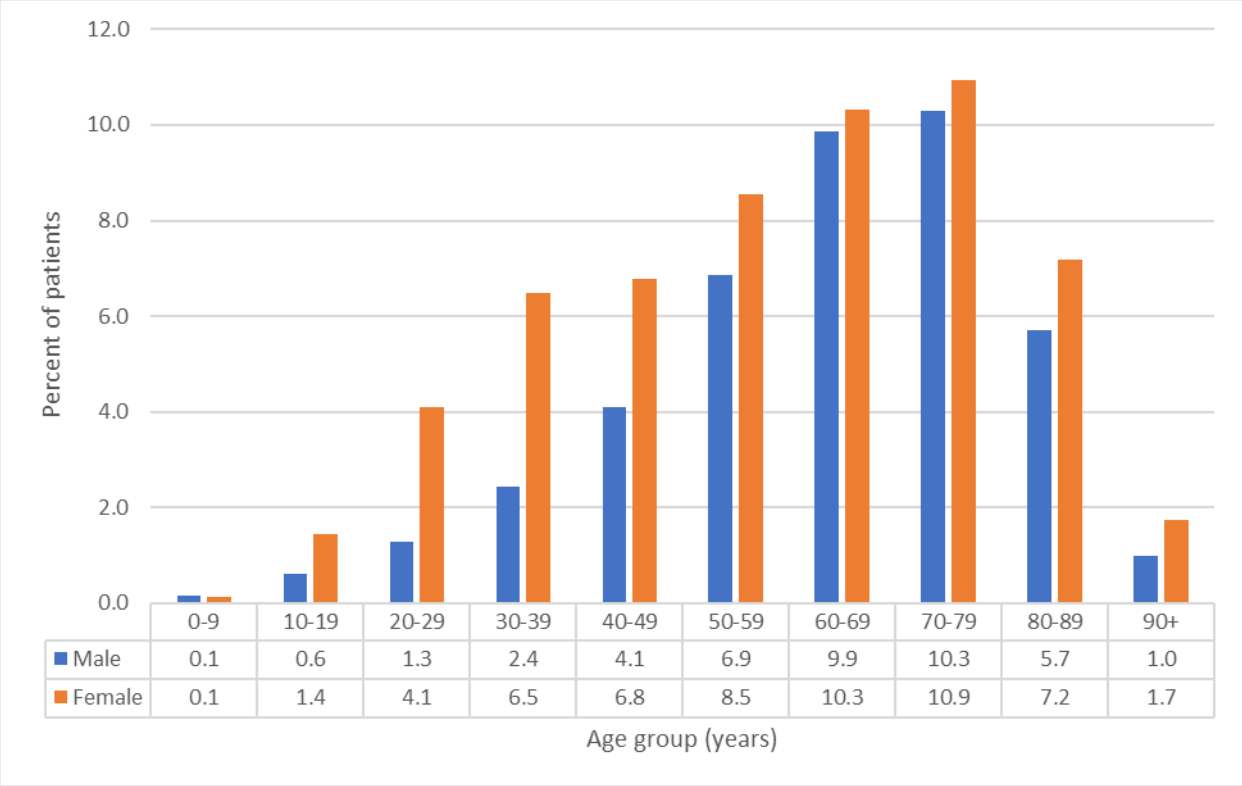
Patient characteristics	Average number of test results per patient, unweighted (95% CI)	Average number of test results per patient, weighted (95% CI)
All patients	**24.8 (23.7, 26.0)**	**24.3 (23.1, 25.4)**
Sex		
Male	22.6 (21.5, 23.7)	22.1 (21.0, 23.2)
Female	26.7 (25.6, 27.9)	26.3 (25.1, 27.5)
Age group (years)		
0–9	1.9 (1.8, 2.0)	1.8 (1.7, 1.9)
10–19	7.8 (7.5, 8.2)	7.7 (7.3, 8.1)
20–29	14.6 (13.8, 15.5)	14.2 (13.3, 15.0)
30–39	19.1 (18.3, 20.0)	18.8 (17.9, 19.6)
40–49	23.3 (22.4, 24.1)	23.1 (22.2, 24.0)
50–59	30.5 (29.5, 31.4)	30.4 (29.3, 31.5)
60–69	40.7 (39.5, 42.0)	40.1 (38.8, 41.5)
70–79	55.3 (53.6, 57.0)	54.5 (52.7, 56.2)
80–89	66.6 (64.5, 68.6)	66.3 (64.3, 68.4)
90+	59.2 (57.0, 61.3)	59.8 (57.5, 62.2)
Rurality		
Major cities	24.0 (22.7, 25.2)	23.4 (22.0, 24.7)
Inner regional	26.7 (24.1, 29.3)	26.9 (24.5, 29.3)
Outer regional	25.7 (24.2, 27.2)	26.3 (23.6, 29.0)
Remote/very remote	21.3 (18.5, 24.1)	21.5 (18.2, 24.8)
State/Territory		
ACT	30.2 (25.7, 34.6)	29.5 (25.3, 33.7)
NSW	26.3 (24.4, 28.1)	24.5 (22.4, 26.6)
NT	16.8 (14.6, 18.9)	14.6 (12.9, 16.4)
QLD	27.6 (25.8, 29.5)	27.2 (25.6, 28.9)
SA	31.7 (27.6, 35.8)	30.1 (26.2, 34.1)
TAS	23.5 (21.3, 25.7)	23.2 (21.0, 25.3)
VIC	21.6 (19.4, 23.7)	21.4 (19.4, 23.5)
WA	21.1 (19.4, 22.7)	21.3 (19.5, 23.1)
Socio-economic status (SEIFA IRSAD quintile)		
1 (most disadvantaged)	27.6 (25.6, 29.5)	27.4 (24.9, 29.9)
2	26.0 (24.1, 28.0)	25.8 (23.6, 27.9)
3	25.1 (23.5, 26.6)	24.2 (22.7, 25.7)
4	23.6 (22.1, 25.0)	23.6 (22.3, 25.0)
5 (most advantaged)	23.0 (21.6, 24.5)	22.9 (21.4, 24.4)

8.2. Top 10% of patients by pathology test volume

Analysis of the top 10% of patients receiving pathology tests showed that these patients had more than 70 test results, were more likely to be female (57.7% vs 42.3%) and were more likely to be aged 60–79 years (Figure 8.2). Consistent with Figure 8.1, female patients of reproductive age more

commonly had more than 70 pathology test results compared to male patients of the same age, which may be due to pregnancy-related testing.

FIGURE 8.2 AGE AND SEX DISTRIBUTION OF PATIENTS IN THE TOP 10% OF PATIENTS BY PATHOLOGY TEST VOLUME (WEIGHTED), MEDICINEINSIGHT 2018–19



The proportion of patients with a record of the selected non-communicable conditions in the top 10% of tested patients (with more than 70 atomised pathology tests) was compared with that among patients without the condition (Table 8.3). There was a significantly higher proportion of patients on the top 10% of tested patients for every condition investigated. The likelihood of being in the top 10% of tested patients was particularly high for people who had a record of CKD (4.4 times more likely), a record of rheumatoid arthritis (3.9 times more likely) or a record of diabetes (type 2 or unspecified; 3.7 times more likely).

TABLE 8.3 PROPORTION AND RISK OF HAVING OVER 70 PATHOLOGY TEST RESULTS FOR PATIENTS WITH SELECTED CHRONIC CONDITIONS (WEIGHTED), MEDICINEINSIGHT 2018–19

Condition recorded in 2018–19	% patients with condition in 'top 10% of tested'	% patients without condition in 'top 10% of tested'	Unadjusted relative risk (95% CI)	Age- and sex-adjusted relative risk (95% CI)
Asthma	14.0	10.0	1.4 (1.4, 1.5)	1.5 (1.4, 1.5)
Atrial fibrillation	45.4	9.8	4.6 (4.4, 4.9)	2.5 (2.3, 2.7)
Breast cancer	30.7	10.0	3.1 (2.9, 3.3)	1.6 (1.3, 2.0)
CVD	42.1	9.7	4.3 (4.1, 4.6)	2.6 (2.5, 2.8)
Chronic kidney disease	65.8	9.9	6.6 (6.3, 7.0)	4.4 (4.2, 4.7)
COPD	37.5	9.8	3.8 (3.6, 4.0)	2.0 (1.9, 2.1)
Dermatitis/eczema	10.0	10.1	1.0 (0.9, 1.1)	1.3 (1.3, 1.4)
Diabetes (gestational)	23.5	10.1	2.3 (2.1, 2.6)	1.9 (1.8, 2.1)

Condition recorded in 2018–19	% patients with condition in 'top 10% of tested'	% patients without condition in 'top 10% of tested'	Unadjusted relative risk (95% CI)	Age- and sex-adjusted relative risk (95% CI)
Diabetes (type 1)	31.9	10.0	3.2 (3.0, 3.4)	2.8 (2.7, 3.0)
Diabetes (type 2/NOS)	46.2	9.2	5.0 (4.8, 5.3)	3.7 (3.6, 3.9)
Dyslipidaemia	28.9	9.5	3.1 (2.9, 3.2)	2.7 (2.6, 2.9)
GORD	27.9	9.6	2.9 (2.8, 3.1)	2.2 (2.1, 2.2)
Heart failure	61.1	9.9	6.2 (5.9, 6.5)	3.3 (3.0, 3.6)
Hypertension	27.5	9.0	3.0 (2.9, 3.2)	2.8 (2.7, 2.9)
Low back pain	22.3	9.6	2.3 (2.2, 2.4)	1.9 (1.8, 1.9)
Migraine	16.4	10.0	1.6 (1.6, 1.7)	1.6 (1.6, 1.6)
Osteoarthritis	31.8	9.6	3.3 (3.2, 3.5)	2.3 (2.2, 2.5)
Osteoporosis	39.4	9.7	4.1 (3.8, 4.3)	3.3 (3.1, 3.5)
Prostate cancer	42.0	10.0	4.2 (3.9, 4.5)	1.7 (1.1, 2.6)
Rheumatoid arthritis	60.0	10.0	6.0 (5.7, 6.3)	3.9 (3.7, 4.0)
Stroke	40.6	10.0	4.1 (3.8, 4.3)	2.3 (2.1, 2.4)

8.3. Test results that are outside reference ranges

Pathology testing is a tool that, along with clinical examination and a thorough patient history, assists GPs to make diagnoses or to monitor treatment. However, there are also concerns that pathology and other forms of testing are being overused with potential adverse consequences for patients.[34]

Table 8.4 shows:

- the proportion of patients aged 20 years or older who have been tested at least once for the specified pathology tests
- the proportion of patients who had at least one result that was outside the reference range for a specified test as a proportion of all patients
- the proportion of patients who had at least one result that was outside the reference range for a specified test as a proportion of the patients who underwent that particular pathology test.

The thresholds for determining whether results were outside reference ranges were taken from the Royal College of Pathologists of Australasia's Manual (https://www.rcpa.edu.au/Manuals/RCPA-Manual) and RACGP and Diabetes Australia's General practice management of type 2 diabetes: 2016–18.[35,36] It should be noted that we included patients if they had a result outside the reference range at least once during the year but did not attempt to collect information on follow-up tests. It is possible that later test results may have improved in response to lifestyle changes on the part of the patient or active management by the GP.

Using haemoglobin, creatinine and alanine aminotransferase as proxy measures (see section 8.1), the percentage of patients aged 20 years or older who had an FBC was 42.0%, a kidney function test was 42.2% and a liver function LFT was 41.0%, respectively.

More than two-thirds of patients diagnosed with any type of diabetes had a record of having their HbA_{1c} level checked during 2018–19. For half of those checked, at least one result was higher than 53 mmol/mol (7.0%) suggesting that they may have benefited from clinical review. It should be noted that we did not collect additional information about these patients, including whether they were reviewed by the GP or whether they had follow-up tests. It should also be borne in mind that while 53 mmol/mol is the general target for people with type 2 diabetes, recommended HbA_{1c} levels differ according to individual patient characteristics.

RACGP guidelines suggest that people at high risk of developing type 2 diabetes should be screened using the AUSDRISK tool. Patients with a high AUSDRISK score should then have HbA_{1c} (or fasting blood glucose) testing. If this indicates that an individual is unlikely to have diabetes, but the person is still considered to be at high risk, HbA_{1c} can be repeated at three-yearly intervals.[36] Only 10.3% of MedicineInsight patients without a diagnosis of diabetes had a HbA_{1c} test, suggesting that patients who are not considered to be at high risk of diabetes are unlikely to be receiving inappropriate HbA_{1c} tests. Only a fifth of those who were tested were found to have a result above the ≥ 48mmol/mol (6.5%) threshold generally considered to be indicative of diabetes. These results do not indicate that these patients have been left undiagnosed. We did not collect analyse information on follow-up testing and HbA_{1c} testing must be repeated before the diagnosis of type 2 diabetes is made.[36] Therefore, it is possible that we have identified patients who are still in the process of being diagnosed or who were not considered to have type 2 diabetes after confirmatory testing.

Most patients who had at least one TSH test during the year did not have any results that fell outside the reference range. Just over a quarter of patients had their TSH levels tested and almost 90% of those tested had results that were entirely within the reference range. As we did not investigate whether any of these people had been diagnosed with a thyroid condition, it is unclear whether these tests were undertaken to monitor these conditions. However, rates of thyroid testing in Australia have been increasing, leading to concerns that at least some of these tests may not be clinically necessary.[37]

Among the 13.5% of MedicineInsight patients who had a vitamin D test, almost three-quarters had no results that were outside reference range.

TABLE 8.4 PROPORTION OF PATIENTS (20 YEARS AND OLDER) WITH AT LEAST ONE TEST RESULT AND WITH AT LEAST ONE TEST RESULT OUTSIDE THE REFERENCE RANGE DURING 2018–19 FOR SPECIFIED TESTS, MEDICINEINSIGHT 2018–19

	MedicineInsight 2018–19 (unweighted) Number of all eligible male or female patients aged 20+ years (N_{tot}) = 2,224,108			
Pathology test result	**Number of tested patients***	**Patients with 1+ result for the specified test as a percentage (95% CI) of all patients (N_{tot})**	**Patients with 1+ test result outside the reference range for the specified test as a percentage (95% CI) of all patients (N_{tot})**	**Patients with 1+ test result outside the reference range for the specified test as a percentage (95% CI) of tested patients**
Haemoglobin (< 130 g/L in men < 120 g/L in women†)[35]	933,885	42.0 (40.5, 43.4)	4.8 (4.6, 5.1)	11.5 (11.2, 11.8)
Alanine aminotransferase (ALT; > 40 U/L in men and > 30 U/L in women)[35]	912,281	41.0 (39.6, 42.5)	8.8 (8.5, 9.1)	21.6 (20.9, 22.2)
Creatinine (> 110 umol/L in men and > 90 umol/L in women)	938,838	42.2 (40.7, 43.7)	4.1 (3.9, 4.3)	9.7 (9.3, 10.1)
eGFR (< 60 mL/min/1.73m^2)[35]	920,219	41.4 (39.9, 42.9)	4.9 (4.6, 5.2)	11.8 (11.3, 12.3)
HbA_{1c} in patients with diagnosed diabetes of any kind (N = 182,936; ≥ 53 mmol/mol [7.0%]))[35,36]	124,206	67.9 (66.8, 69.0)	34.4 (33.7, 35.1)	50.7 (49.9, 51.4)
HbA_{1c} in patients with no recorded diagnosis of diabetes (N = 2,041,172; ≥ 48 mmol/mol [6.5%])[35,36]	210,721	10.3 (9.7, 11.0)	0.2 (0.2, 0.2)	2.1 (1.8, 2.3)
Low thyroid stimulating hormone (TSH; < 0.4 mIU/L)[35]	607,387	27.3 (26.2, 28.4)	1.3 (1.2, 1.3)	4.6 (4.5, 4.7)
High thyroid stimulating hormone (TSH; > 4.0 mIU/L)[35]	607,387	27.3 (26.2, 28.4)	2.0 (1.9, 2.1)	7.2 (7.0, 7.5)
Vitamin D (< 50 nmol/L)[35]	300,803	13.5 (12.8, 14.2)	3.8 (3.5, 4.1)	28.2 (26.6, 29.8)
Ferritin (< 20 µg/L in women of childbearing age and < 30 in post-menopausal women and in men)[35]	542,928	24.4 (23.5, 25.3)	3.1 (3.0, 3.2)	12.8 (12.5, 13.2)

* Number of tested patients is the number of MedicineInsight patients (males and females) aged 20 years or older who have a record of at least one of the specified pathology tests. The percentage of patients with a record of a pathology test will be higher than that reported in Table 8.1 because patients aged 0–19, who are less likely to be tested, have been excluded

†For this analysis the threshold for women who are pregnant of < 110 g/L was not used. Instead the general threshold for women of < 120 g/L was applied to all women within the sample

Vignette 2: Assisting decision makers

Using MedicineInsight data to understand the utilisation of three-dimensional breast tomosynthesis (3DBT) in the general practice setting

Three-dimensional breast tomosynthesis (3DBT) is a relatively new digital mammography technology that produces a 3D image of the breast by using several x-rays obtained at different angles. In the diagnostic/symptomatic setting, 3DBT is used to investigate breast conditions such as inflammation and infection, benign or malignant neoplasms and trauma. In the screening, asymptomatic setting, it is used to detect unsuspected cancer. From 1 November 2018, two new MBS interim items for 3DBT were introduced (59302 &59305) to provide funding while the Medical Services Advisory Committee (MSAC) considered an application for its long-term funding (MSAC application 1567).

To inform the DoH and MSAC, MedicineInsight data was used to describe the utilisation of 3DBT in general practice since its listing on the MBS. The report focused on the potential clinical reasons for ordering 3DBT, information which is not available from other data sources. We described the sociodemographic characteristics of the 3DBT general practice patient cohort, their personal and family histories of cancer and presenting symptoms and signs.

Methods

This descriptive longitudinal study used data obtained from the MedicineInsight June 2019 download and included 441 Australian general practice sites that met the standard data quality criteria. The 2,904,380 patients with at least three clinical encounters recorded between 1 June 2017 and 31 May 2019 were included in the study's general population. The **3DBT cohort** included 7491 patients who had at least one 3DBT request and/or result recorded from 1 October 2018 (the month prior to the MBS listing of 3DBT to account for requests issued by GPs in anticipation of the listing) to 31 May 2019. The index date was defined for each patient as the date of their first 3DBT request or result during the study period. Historical records outside of the study period were included when identifying patient demographics, family and personal history of breast and other cancers prior to 3DBT request.

Patients were defined as having any of the conditions or symptoms described in Table V2.1, if they had a relevant coded or free text entry in one or more of the following fields in the clinical information system: 'Diagnosis', 'Reason for visit', 'Reason for prescription', 'Requested tests', 'Test reason', 'Result name'.

TABLE V2.1: CLINICAL DEFINITIONS USED TO IDENTIFY PERSONAL/FAMILY HISTORY OF CANCER AND SYMPTOMATIC MEDICINEINSIGHT PATIENTS

Condition	Definition
History of breast cancer	Patients were defined as having a history of breast cancer if they had a relevant coded (Docle, Pyefinch) or free text entry in one of the diagnosis or tests fields prior to the index date. Relevant terms included: breast / mammary / lobular AND adenocarcinoma / cancer / carcinoma / DCIS / ductal carcinoma in situ / metastases / metastasis / metastatic.
Family history of breast cancer	Patients were defined as having a family history of breast cancer if they had a relevant record at any time (before or after the index date) in one or more of the diagnosis or test fields. Relevant terms included those for breast cancer and: FH, Family history, parent, mother, sister, aunt, grandma.
History of other relevant cancer	Patients were defined as having history of a relevant cancer if they had a record of ovarian, prostate, or pancreatic cancer before the index date in one or more of the diagnosis or test fields.
Symptomatic	Patients were defined as symptomatic if they had a relevant term recorded in the 0–90 days prior to the index date in one or more of the diagnosis or test fields. Relevant terms included: (breast and dense / pain / tender / lump / mass / nodule / dimple / inflammation / swelling / swollen / irritation / redness / scaliness / thickening / change / abnormal(ity)), (nipple and abnormal(ity) / change / discharge / retraction / inversion), ? / query breast cancer recurrence.

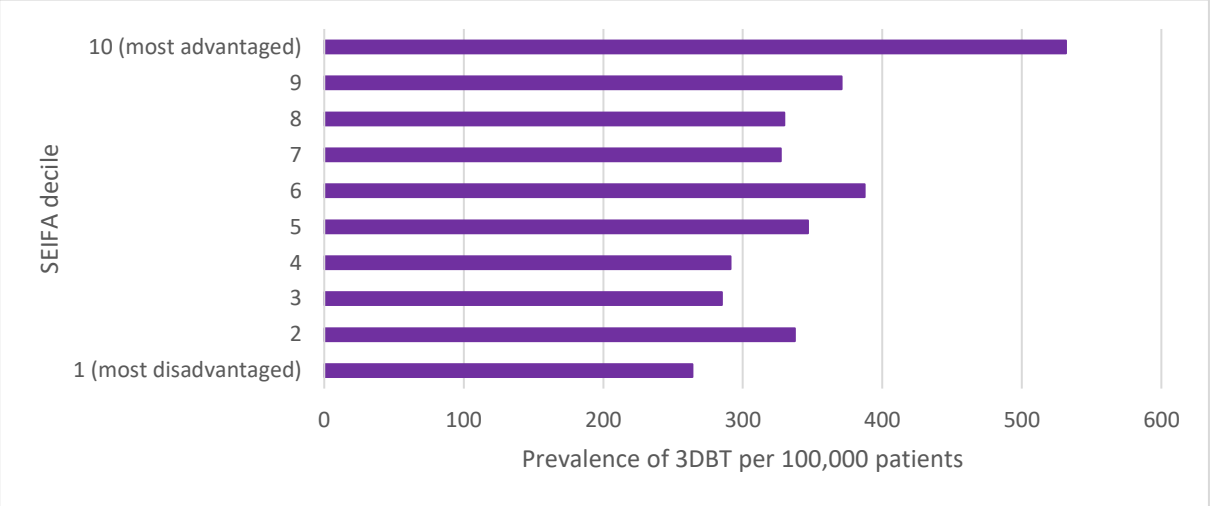
Results

Among the 7,491 patients with a 3DBT recorded, 92.5% had a bilateral scan, 4.5% had a unilateral scan, 0.5% had both a unilateral and a bilateral 3DBT recorded, and laterality status could not be ascertained for 2.5% of patients.

Sociodemographic profile

- Of the 3DBT cohort, 99.5% were women, 50% were aged 40–59 years old, and 65.5% were from major cities.
- For every 100,000 eligible female patients in the MedicineInsight dataset, 628 had a 3DBT recorded.
- For every 100,000 female patients aged 50 years or over, 1015 had a 3DBT recorded.
- For every 100,000 female patients aged less than 50 years, 379 had a 3DBT recorded.
- Patients residing in the most socio-economically advantaged areas were more likely to have a 3DBT recorded than patients in the least advantaged areas (Figure V2.1).

FIGURE V2.1:SOCIO-ECONOMIC-SPECIFIC PREVALENCE OF 3DBT REQUEST/RECORD PER 100,000 PATIENTS IN THE GENERAL STUDY POPULATION



Risk-factor profiles

- Female patients aged less than 50 years were more likely to have a 3DBT recorded if they were overweight or obese, rather than underweight (Table V2.2).
- A fifth of patients with a 3DBT recorded had a personal history of breast cancer recorded prior to the 3DBT scan and over a third were considered symptomatic in the 90 days prior to the 3DBT scan (Table V2.3).
- Just under half of the patients with a 3DBT recorded had a history of menopausal hormonal therapy and/or oral contraceptive pill.

TABLE V2.2: THE FEMALE AGE- AND BMI-SPECIFIC PATIENT PREVALENCE OF 3DBT IN THE GENERAL POPULATION

Characteristic	Female general study population		Female 3DBT study population		Female patient prevalence of 3DBT
	Number	% (95% CI)	Number	% (95% CI)	Per 100,000 (95% CI)
BMI class (females aged 0–49)					
Underweight	3637	2.2 (2.0, 2.3)	11	1.1 (0.5, 1.7)	302 (131, 474)
Normal	61,947	36.8 (35.4, 38.1)	336	33.1 (29.9, 36.3)	542 (459, 626)
Overweight	44,205	26.2 (25.8, 26.7)	290	28.6 (25.6, 31.5)	656 (546, 766)
Obese	58,739	34.9 (33.5, 36.2)	378	37.2 (33.9, 40.6)	644 (550, 737)
(missing)	(552,325)		(1717)		
BMI class (females aged 50+)					
Underweight	2688	1.3 (1.2, 1.4)	24	1.0 (0.7, 1.4)	893 (554, 1232)
Normal	55,084	26.7 (26.1, 27.4)	628	27.0 (24.8, 29.2)	1140 (986, 1295)
Overweight	65,975	32.0 (31.7, 32.3)	753	32.3 (30.4, 34.3)	1141 (1008, 1274)
Obese	82,347	40.0 (39.1, 40.8)	923	39.6 (37.1, 42.2)	1121 (1012, 1229)
(missing)	(259,036)		(2391)		

*3DBT prevalence for females aged 0-49 years, where BMI not missing: 602 (528–676); **3DBT prevalence for females aged 50+ years, where BMI not missing: 1,130 (1,021–1,238)

TABLE V2.3: PERSONAL HISTORY OF BREAST CANCER AND OTHER RELEVANT CANCERS (OVARIAN, PROSTATE OR PANCREATIC) AND PRESENCE OF BREAST SYMPTOMS AMONG PATIENTS IN THE 3DBT COHORT

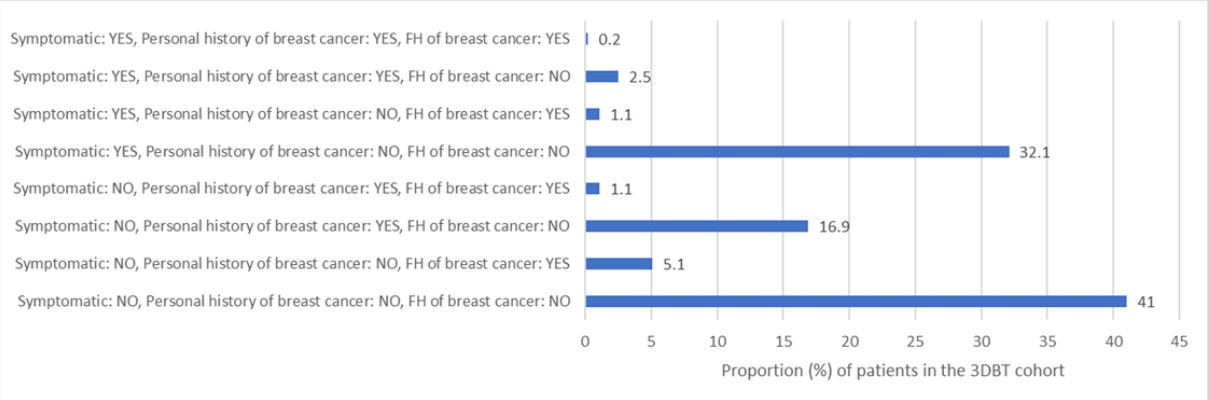
Characteristic	3DBT study population	
	Number	% (95% CI)
All patients	7491	
Cancer history		
Breast cancer only	1526	20.4 (18.7, 22.0)
Other relevant cancer only	32	0.4 (0.3, 0.6)
Both breast cancer and other relevant cancer	25	0.3 (0.2, 0.5)
Neither breast nor other relevant cancer	5908	78.9 (77.2, 80.5)
Symptomatic*		
Yes	2688	35.9 (33.6, 38.2)
No	4803	64.1 (61.8, 66.4)

* Breast symptoms (recorded 0–90 days prior to 3DBT)

Indications for use

- The majority of patients (59%) had a relevant indication for 3DBT, including being symptomatic or having a personal or family history of breast cancer (Figure V2.2).
- Just under a third of 3DBT patients were symptomatic but had no personal or family history of breast cancer.
- Just under a quarter of the 3DBT cohort had a personal and/or family history of breast cancer but weren't symptomatic.
- Two-fifths of patients had no relevant indication for 3DBT recorded in the MedicineInsight dataset.
- Importantly, symptoms and personal or family history recorded in fields not available to MedicineInsight (such as within progress notes or specialist/hospital communications) could lead to an underestimate of 3DBT testing according to specified indications in general practice.

FIGURE V2.2: PROPORTION (%) OF PATIENTS IN THE 3DBT COHORT WITH THE MUTUALLY EXCLUSIVE RISK FACTOR PROFILES



9. RISK FACTORS

In summary

- In order to better understand the characteristics of MedicineInsight data, we have investigated the completeness rates of the MedicineInsight dataset, over several years, on three important health risk factors; smoking, alcohol use, and body mass index (BMI). Recording of weight as a separate component was also investigated.
- Smoking status was recorded ever for 84.0% of patients in 2018–19, an increase of 1.1% from 2017–18.
- Alcohol use was ever recorded for 21.5% of patients over 18 years of age in 2018–19, a decrease of 0.6% from 2017–18. Alcohol use was more frequently recorded for females than males (23.4% vs 19.0%). Patients aged 80 years and over had substantially higher rates of recording of alcohol use compared to younger patients.
- In the 24-month period from 1 July 2017 to 30 June 2019, BMI (or height and weight) was recorded for 33.9% of patients of all ages. Weight was recorded for 41.9% of patients of all ages.

This chapter reports on the completeness of MedicineInsight data on three important health risk factors:

- smoking status recorded ever in the MedicineInsight 'patient' data table for patients aged 18 years and over
- alcohol use recorded ever in the MedicineInsight 'alcohol status' data table for patients aged 18 years and over
- body mass index (BMI) or both height and weight recorded, as well as weight recorded separately, in the past 24 months (since 1 July 2017) in the MedicineInsight 'Observations' data table for patients of all ages.

9.1. Smoking status recorded

The data field 'smoking status' is not yet available longitudinally in MedicineInsight, and it reflects whether the patient has ever had this variable documented in their medical record. Smoking status was recorded for most patients in MedicineInsight. Completeness rates of recording smoking status in all patients aged 18 years and over were slightly higher in 2018–19 at 84.0%, compared to 2017–18, at 82.9% (Table 9.1).

Young males had the lowest rates of recording of smoking status (63.7% of those aged 10–19 and 74.5% of those aged 20–29), despite being one of the most at-risk groups in terms of smoking behaviour, with the ABS NHS reporting smoking rates of 17.5% in 18–24 year old males.[6] Completeness rates for recording of smoking status were very similar between males and females aged between 50 and 89 years, over 85%.

TABLE 9.1 COMPLETENESS RATES OF SMOKING STATUS RECORDED BY PATIENT AGE AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19 COMPARED WITH GPIR 2017–18

	Age group	2018–19		2017–18
		No.	%	%
Total patients		**1,921,989**	**84.0**	**82.9**
Females	10-19*	25,945	70.0	68.2
	20-29	181,117	80.0	79.2
	30-39	198,741	84.1	83.2
	40-49	177,089	86.3	85.4
	50-59	171,124	87.3	86.3
	60-69	153,129	87.0	86.0
	70-79	111,588	87.6	86.5

	Age group	2018–19		2017–18
	80-89	55,371	87.2	85.9
	90+	16,061	80.2	79.1
Total females		**1,090,165**	**84.6**	**83.7**
Males	10-19*	17,520	63.7	60.8
	20-29	114,813	74.5	73.9
	30-39	136,832	80.6	79.8
	40-49	138,131	84.6	83.6
	50-59	139,600	87.3	85.9
	60-69	131,948	87.4	86.3
	70-79	100,546	87.6	86.3
	80-89	43,482	87.7	86.4
	90+	8,952	83.5	81.8
Total males		**831,824**	**83.1**	**82.0**

*For recording of smoking status, this includes patients aged 18–19 only

9.2. Alcohol use recorded

As with smoking, alcohol use is not recorded longitudinally in MedicineInsight, and reporting rates are based on whether it has ever been recorded in the patient's medical record. Alcohol use was reported for 21.5% of patients aged 18 years and over in MedicineInsight (Table 9.2), and reporting rates of alcohol use were slightly lower in 2018–19 compared to 2017–18 (22.1%).

Alcohol use was more frequently recorded for female patients than males (23.4% vs 19.0%), and recording rates were higher in patients aged 80 years and over (> 30.0%).

TABLE 9.2 COMPLETENESS RATES OF ALCOHOL USE RECORDED BY PATIENT AGE AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19 COMPARED WITH GPIR 2017–18

	Age group	2018–19		2017–18
		No.	%	%
Total patients		**491,445**	**21.5**	**22.1**
Females	10-19*	8188	22.1	21.3
	20-29	49,828	22.0	22.4
	30-39	56,740	24.0	25.0
	40-49	44,601	21.7	22.3
	50-59	40,779	20.8	21.5
	60-69	37,678	21.4	21.7
	70-79	33,112	26.0	25.7
	80-89	23,088	36.4	36.1
	90+	6844	34.2	34.2
Total females		**300,858**	**23.4**	**23.8**
Males	10-19*	5085	18.5	17.6
	20-29	25,835	16.8	17.6
	30-39	29,773	17.5	19.3
	40-49	30,348	18.6	20.0
	50-59	29,344	18.4	19.8
	60-69	27,215	18.0	19.1
	70-79	24,308	21.2	21.7
	80-89	15,368	31.0	31.1
	90+	3311	30.9	30.7
Total males		**190,587**	**19.0**	**20.1**

*For recording of alcohol use, this includes patients aged 18–19 only

9.3. BMI and weight recorded

BMI (or height and weight) was recorded for 33.9% of patients of all ages in MedicineInsight in the 24-month period from 1 July 2017 to 30 June 2019 (Table 9.3). According to the RACGP Redbook clinical

guidelines,[38] BMI should be measured for adults every two years, and for children at times of child health surveillance or immunisation. Adults at increased risk (for example, with a history of CVD or gout) and Aboriginal and Torres Strait Islander people should be assessed every 12 months, and adults with identified risk (those who are overweight and obese) should be assessed every 6 months. Overall BMI recording rates were the same for males and females (33.9%), and children under 10 years of age had higher rates of BMI completeness than patients aged between 10 and 49 years. The highest rates of recording of BMI (or height and weight) were seen in male and female patients aged 80–89 years (56.9%).

TABLE 9.3 COMPLETENESS RATES OF BMI OR EQUIVALENT RECORDED BY PATIENT AGE AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19 COMPARED WITH GPIR 2017–18

	Age group	2018–19		2017–18
		No.	%	%
Total patients		**981,272**	33.9	35.1
Females	0-9	63,083	35.6	37.8
	10-19*	34,471	22.2	23.6
	20-29	61,379	27.1	28.4
	30-39	70,700	29.9	31.0
	40-49	65,482	31.9	33.3
	50-59	68,147	34.8	35.7
	60-69	68,460	38.9	39.5
	70-79	61,462	48.2	48.9
	80-89	35,777	56.4	55.5
	90+	8160	40.8	38.7
Total females		**537,121**	**33.9**	**35.0**
Males	0-9	69,261	36.1	38.1
	10-19*	31,419	21.6	22.1
	20-29	31,960	20.8	22.3
	30-39	43,624	25.7	27.8
	40-49	54,617	33.5	35.3
	50-59	60,677	38.0	39.5
	60-69	62,684	41.5	42.4
	70-79	56,338	49.1	49.3
	80-89	28,554	57.6	56.6
	90+	5017	46.8	45.3
Total males		**444,151**	**33.9**	**35.2**

Note: BMI records were assessed in the period 1 July 2017 to 30 June 2019.

Recording of weight was not reported in the 2017–18 GPIR. However, in the 24-month period from 1 July 2017 to 30 June 2019, weight was recorded more frequently than BMI, for 41.9% of patients of all ages (Table 9.4). Weight was recorded for over 50% of patients aged under 10 years of age, and similarly to BMI recording, the highest rates of recording of weight was for male and female patients aged 80–89 years (65%).

TABLE 9.4 COMPLETENESS RATES OF WEIGHT RECORDED BY PATIENT AGE AND SEX (UNWEIGHTED), MEDICINEINSIGHT 2018–19

	Age group	2018–19	
		No.	%
Total patients		**1,213,698**	**41.9**
Females	0-9	98,110	55.4
	10-19	50,037	32.3
	20-29	73,596	32.5
	30-39	86,783	36.7
	40-49	76,184	37.1
	50-59	79,450	40.5
	60-69	79,867	45.4
	70-79	70,855	55.6
	80-89	41,291	65.1

	Age group	2018–19	
		No.	%
	90+	10,651	53.2
Total females		**666,824**	**42.1**
Males	0-9	106,698	55.7
	10-19	45,155	31.0
	20-29	35,743	23.2
	30-39	49,182	29.0
	40-49	61,865	37.9
	50-59	70,242	43.9
	60-69	73,914	48.9
	70-79	65,376	56.9
	80-89	32,460	65.5
	90+	6,239	58.2
Total males		**546,874**	**41.7**

Note: Weight records were assessed in the period 1 July 2017 to 30 June 2019.

While most patients aged 18 years and over in MedicineInsight have smoking status recorded, reporting rates of alcohol use, BMI and weight are relatively low. Some GPs may record information on BMI, smoking or alcohol use in different places within their CISs, such as the progress notes (which are not available to MedicineInsight), and this can have a significant effect on completeness rates in MedicineInsight data, which may not accurately reflect clinical practice.

Vignette 3: Evaluating programs

Evaluating the 'Chronic pain: opioids and beyond' program

In 2015 NPS MedicineWise launched the national 'Chronic pain: opioids and beyond' visiting program in response to increased prescriptions of opioids between 2010 and 2015 despite limited evidence of benefit for chronic non-cancer pain and the resulting potential for misuse and harm.[11,39] The overarching goal of the program was to improve well-being among patients with chronic non-cancer pain managed in general practice. This vignette describes the evaluation findings for part of this program.

Methods

Times series analysis was undertaken using data extracted from MedicineInsight practices before and after the launch of the program (June 2010 to May 2018). This involved using MedicineInsight data to compare the prescribing habits of GPs who participated in the MedicineInsight program, and who had also actively participated in the visiting program, with the prescribing habits of GPs who did not actively participate in the visiting program, and thus served as controls.[k]

Active participation was defined as the GP participating in at least one of the program activities: clinical audit, educational visit, interactive case study or case-based small group meeting. The evaluation explored the impact of the active elements of the program on prescribing of opioid medicines for chronic non-cancer pain and encounters with chronic non-cancer pain patients.

Both groups of GPs received personalised letters comparing their PBS prescribing patterns to those of their peers, an NPS MedicineWise newsletter on appropriate use of opioids and information on how to access consumer health resources developed for the program. However, only the GPs in the intervention group received one of the active interventions.

Comparisons between the control and intervention GPs were adjusted for the location of their practice, average patient numbers and average encounter numbers.

Results

There were 1,899 GPs in the intervention group and 586 GPs in the control group. The intervention GP group had a pool of 103,797 eligible patients and the control GP group had 13,516 eligible patients. The profiles of each GP group were consistent over the two periods, but the GP control group were more likely to practice in NSW or work in practices in major cities compared with the GP intervention group in both periods.

On average, the intervention GPs saw more patients with chronic non-cancer pain (76.6 pre-intervention and 74.6 post-intervention) than the control GPs (48.0 pre-intervention and 44.9 post-intervention).

The average monthly growth in volume of opioid prescriptions for patients with chronic non-cancer pain decreased between the pre-intervention period and the post-intervention period from 2.76% to 0.02% in the GP intervention group and from 1.78% to 0.71% in the GP control group. The actual volume of prescriptions after the active interventions was then compared with the expected volume of prescriptions in the absence of the active interventions. This suggested that the monthly volume of opioid prescriptions from the intervention GPs had been reduced by 7.5% (95% CI 2.8% to 12.0%) when compared to the control GPs.

Active participation in the visiting program was also associated with a 6.3% relative reduction (95% CI 3.0% to 9.5%) in encounters with patients with chronic non-cancer pain. Whether this reduction was because patients were referred to other health professionals or pain clinics for more appropriate management or because patients previously prescribed opioids switched to other practices is unclear.

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[k] MedicineInsight GPs who worked in general practices where at least one GP had actively participated in the visiting program were not eligible to be a control GP

10. INTERPRETATION OF THE DATA

MedicineInsight provides an important source of national longitudinal general practice data. This report provides information on activities that occur in general practices, including details of encounters, the conditions patients present with and how they are managed.

MedicineInsight contains a huge volume of data, which provides countless opportunities to analyse activities that occur within general practice, as well as to measure the health outcomes and quality of general practice care. While some data may be incomplete, and a proportion of encounters may be missing when patients attend other general practices, analysis of the MedicineInsight dataset offers many important findings. It is possible to continue to draw significant inferences about the treatment, risk factors and potential outcomes for different patient cohorts.

There are recognised limitations to MedicineInsight data, as they are real-world data entered by clinicians into CISs for the purposes of providing patient care. When interpreting the information presented in this report, the following limitations or caveats related to the MedicineInsight data should be noted.

- Information in the CIS is collected to provide clinical care to a patient, not for research purposes. All analyses are therefore dependent upon on the accuracy and completeness of data recorded in, and available for extraction from, the general practice CISs.
- Once chronic conditions are recorded in the medical record, and the patient is known to the GP, the GP may not routinely record the reason for prescribing, or the reason for visit, at each visit.
- Conditions may be underreported in MedicineInsight data, depending on recording practices. A validation study is currently underway to estimate the accuracy of condition definitions in MedicineInsight.
- Calculation of the relative proportions of different conditions assumes that non-recording of conditions occurs at random.
- Selection criteria were applied in order to maximise the likelihood that included GP encounters were for clinical reasons, however, there may be remaining misclassification of clinical versus administrative encounters, as these are sometimes difficult to distinguish in CISs. A validation study is currently underway to help improve the clinical encounter definition in MedicineInsight.
- Although patients can have more than one encounter in a day, due to the nature of the information available in CISs, only one clinical GP encounter per day per patient has been counted.
- The rates of conditions and prescriptions per 100 encounters were calculated with the caveat that conditions and prescriptions are not linked directly to GP clinical encounters in MedicineInsight but to patients. Therefore, our findings reflect all activity conducted by GPs when managing their patients, not just the activity on the days when a clinical encounter occurred.
- MedicineInsight prescriptions relate to records of GP prescribing, and therefore differ in several important ways from national PBS dispensing data. Not all prescriptions and repeats will be dispensed, so prescription counts are an overestimate of dispensed prescription counts. There may be a delay of up to 12 months between prescribing and dispensing. Specialist and hospital prescriptions are not included.
- Practices were recruited to MedicineInsight using non-random sampling, and systematic sampling differences between regions cannot be ruled out. Behaviour of MedicineInsight practices may not be reflective of non-MedicineInsight practices. Comparisons between regions should be interpreted with caution, although we have weighted the data to improve national representativeness.
- While the 2018–19 population of patients with at least one MBS-billed GP visit was used as the reference population for weighting, the MedicineInsight cohort may include patients not covered under the MBS (eg, foreign citizens, workers compensation patients).
- For confidentiality reasons we do not have access to progress notes, which may contain further information on reasons for prescriptions, reasons for encounters and diagnoses.
- Patients are free to visit multiple other practices. We do not have data on patients from non-MedicineInsight clinics. Currently we cannot identify patients who have attended multiple MedicineInsight practices.

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APPENDIX 1. METHODOLOGY

This report is based upon MedicineInsight data extracted from the data warehouse in November 2019 and includes encounters from 1 July 2018 to 30 June 2019. Decisions on sample selection and scope were guided by the following objectives:

- ensuring that our methodology follows an accepted, rigorous scientific process
- using a single set of assumptions and quality criteria to ensure data included were from a consistent cohort of patients and their GP clinical encounters
- including as much data as possible while maintaining data selection and quality criteria.

Sample selection

Consistent with the purpose of this report being to provide an overview of key features of general practice patients and activity in Australia for the period July 2018 to June 2019, patients and GP clinical encounters are the units of analysis used in the report.

Characteristics of the associated general practice sites (referred to here as sites) and general practitioners (GPs) have been provided as background information only.

To be eligible to be included, practice sites needed to meet the following data quality criteria:

- established as a practice for at least 2 years, to ensure adequate longitudinal data on patients
- no gaps of more than 1 month in the previous 2 years in data entry into key data tables (patients, diagnoses or patient history, encounters, observations, prescriptions, pathology test requests and results), and
- data available for at least 50 patients in the 2 years prior to the database build, to exclude practices that did not record clinical data in their CIS.

A multi-step hierarchical selection process was used to identify a cohort of eligible patients who had at least one GP clinical encounter in the period July 2018 to June 2019 and had high quality data recorded. The GP clinical encounters associated with these patients between July 2018 to June 2019 were identified through the same selection process. Table A1.1 outlines the selection criteria for patients and their GP clinical encounters, and further detail on these selection criteria is provided below.

TABLE A1.1 SUMMARY OF MEDICINEINSIGHT PATIENT AND GP CLINICAL ENCOUNTER SELECTION CRITERIA AND SAMPLE SIZE, 2018–19

	Inclusion/exclusion criteria	Number included
Patients with at least one clinical encounter during the study period and high quality data	Inclusions: - Patient with valid age and gender recorded - Patient identified as such in the patient status field - Patient associated with at least one clinical encounter in the study period (defined as below)	2.893,776 (2,893,532 excluding patents with indeterminate or intersex gender)
GP clinical encounters associated with included patients during the study period	Inclusions - Encounters where provider is consistently recorded as a GP Exclusions - Encounters with a non-GP or administrative visit type - Encounters with an administrative reason for encounter (RFE)	14,723,569 (for the purposes of counting GP clinical encounters)

Patients

Patient information is entered in the CIS at the practice site and each patient is given a unique digital number at each site visited. Patient loyalty data provided by the Commonwealth Department of Health indicates that 63% of all patients attend only one practice. Another 26% attend two practices and 11% attend three or more practices (data on file, Australian Government Department of Health).

Using this patient loyalty data, in combination with the estimates of the proportion of practices in MedicineInsight (6.0%), we can also model the likely number of duplicate patient-ID numbers in MedicineInsight. Assuming no change in patient behaviour, we estimate that 2.2% of patients in the MedicineInsight GPIR 2018–19 cohort have two or more unique patient-ID numbers, due to visiting more than one practice site.

Patients included in the sample were those recorded as having a valid age (0–112 years calculated as the difference between 1 July 2019 and 1 July in the patient's year of birth) and gender (male, female or intersex/indeterminate). Patients recorded as either active, inactive, visitor (ie, not usual practice) or deceased (but not emergency contact, next of kin or missing) within the patient status field and who had at least one eligible clinical encounter in the study period were included (see section 2.3 for these eligibility criteria).

Clinical encounters

Identifying GP clinical encounters in MedicineInsight data is a particular challenge because an encounter is created in the CIS whenever a patient record is opened, irrespective of whether it was opened for clinical reasons (such as a consultation) or for administrative purposes (such as reviewing or updating a patient record). Additionally, there is no identifier recorded alongside all the clinical records (eg, diagnoses or prescriptions) to indicate which encounter record they relate to. However, a date is recorded alongside all diagnoses and prescriptions allowing records to be linked to a patient on that date.

This report focuses on GP activity relating to general practice patients. For this reason, only encounters where the provider is consistently identified as a GP or GP registrar were counted. Future reports may include encounters with nurses and other health professionals, following appropriate consultation and validation of the nurse indicator in MedicineInsight. Note that although we only included encounters with GPs when calculating encounter rates, all the other information associated with non-GP encounters was retained and used in the analyses.

The selection criteria in Box 1 were applied in order to maximise the likelihood that included encounters were for clinical reasons and with a doctor.

BOX 1: ALGORITHM FOR IDENTIFYING CLINICAL ENCOUNTERS WITH A GP

An encounter was defined as clinical if at least one encounter record on a particular date met all of the following criteria:

The clinical user[I] who created the contact record is consistently identified as a doctor (GP or GP registrar) and the encounter is not an 'imported' record from another practice. To meet this criterion both the 'provider type' and the 'doctor indicator' fields (which requires a complete prescriber number) had to indicate the provider was a doctor;

AND

The visit type nominated for the encounter record does not clearly indicate the activity was administrative and was clearly related to GP activity (not with another health professional). A pre-defined list of administrative terms is consulted to determine whether the activity is administrative eg, 'email', 'practice admin', 'non-visit';

AND

The encounter reason on the encounter record does not clearly indicate the activity was administrative Another pre-defined list of administrative terms is consulted to determine whether the activity is administrative eg, 'forms', 'prescription – no consult'.

If there is no encounter record on the encounter date that meets all of these criteria, the encounter is considered non-clinical.

Capping GP clinical encounters at one per day

For the purposes of counting GP clinical encounters, only one GP clinical encounter per day per patient was counted, because of the difficulty in distinguishing true multiple encounters on the same day. Note that although the number of GP clinical encounters was capped at one, all the other information associated with the encounters on that day was retained and used in the analyses. Previous analysis has suggested that this strategy will not substantially underestimate the count of GP clinical encounters, as only 1.9% of clinical GP encounter dates incorporate more than a single clinical encounter. Although we identified certain encounters as 'clinical' for the purposes of patient selection and describing characteristics of GP clinical encounters, all patient-relevant information on any date during the financial year 2018–19 was used, even if associated with an administrative encounter.

Conditions

Conditions were selected for inclusion based upon burden of disease, if they were likely to be treated in primary care, and under advice from the Advisory Group.

MedicineInsight condition flags are developed by clinical coders and reviewed by medical advisors and indicate those records where the conditions of interest, or their relevant synonyms, are reported in MedicineInsight. Both coded conditions (entered by GPs using drop-down lists in the CIS) and non-coded conditions (free text) are searched for in all three of the 'Diagnosis', 'Reason for visit' or 'Reason for prescription' fields. The condition flags are defined in Appendix 5.

Records identified by a free text string alone are not automatically flagged but are individually reviewed by a clinical coder to determine whether the text string actually refers to the condition indicated or is present in another context (eg, a search for 'cancer' may identify 'partner died from cancer'). Each record is flagged accordingly. Records indicating 'suspected', 'query' or '?' records of the condition were not flagged as the condition, unless otherwise specified.

[I] The CIS records the clinical user associated with each encounter and this includes any staff member who logged information in the CIS, including clinical (GP, nurse, allied health) and administrative staff.

Records of medicines and tests can also be used to identify patients with a particular condition in MedicineInsight, although this strategy was not used in this report.

Patient prevalence vs recently recorded management

Depending on individual GP recording practices, a diagnosis for a current condition may have been recorded historically, but is not routinely recorded at subsequent GP clinical encounters. For example, a GP may have recorded that a patient has type 2 diabetes many years ago but because they know the patient's history, they may not continue to record this as being the reason for visit despite continuing to actively manage the condition. This can lead to an underestimate of recent management of patients, if we only report on conditions recorded during a particular year. Information on conditions by patient is typically presented in one of two ways throughout this report, to better reflect the nuances of general practice records.

Information on the proportion of patients with the condition recorded at any time in their medical record (referred to as 'ever recorded') is referred to as patient prevalence. While this method is considered the most accurate way of estimating patient prevalence for chronic conditions, such as diabetes and chronic obstructive pulmonary disease, it might overestimate the current prevalence for conditions that can resolve over time, such as depression and anxiety disorder, or with age, such as asthma and eczema.

Information on the recent management of conditions includes:

- the proportion of patients with a condition recorded at least once during the 2018–19 study period
- the number of encounters with patient with the condition recorded at least once during the 2018–19 study period per 100 clinical GP encounters
- the average number of encounters during 2018–19 for patients with selected conditions.

The patient prevalence (ever recorded) and recent management (recorded in 2018–19) of conditions presented in this report, can be used as way of describing both the maximum, and minimum, estimates of GP management of patients with these conditions, respectively.

Weighting

Weighting is a process of adjusting results from a sample survey to infer results for the in-scope total population. To do this, a weight is allocated to each sample unit; for example, a patient or an encounter. The weight is a value which indicates how many population units are represented by the sample unit. As MedicineInsight data is more robust at the patient level rather than at the encounter level and as we have access to relevant MBS patient reference data, we chose to weight to national MBS data regarding patients who have each had at least one MBS-billed GP encounter in the 2018–19 financial year (Table A1.2). The procedure is detailed below.

GPIR cohort and MBS reference population

TABLE A1.2 GPIR COHORT AND MBS REFERENCE POPULATION DEFINITIONS

GPIR 2018–19 patient cohort	Includes all patients with at least one clinical encounter, with a GP, recorded at a MedicineInsight general practice-site in 2018–19 financial year.
MBS 2018–19 patient population	Includes all patients with at least 1 MBS-billed GP attendance in 2018–19 financial year. MBS encounters were defined by the Medicare claim groups listed in Table A6.2.

The broad type of service (BTOS) codes used to define the MBS population are shown in Table A1.3. The GP consultations included GP non-referred attendances, other non-referred attendances and Enhanced Primary Care services. Practice Nurse and Aboriginal Health Worker services were excluded.

TABLE A1.3 MEDICARE CLAIM GROUPS USED TO DEFINE THE MBS PATIENT POPULATION

BTOS code	BTOS name	Group/Sub-group/item
A	Non-referred attendances GP/VR GP	A1, A7 (193,195,197), A11 (597, 599), A18, A22
M	Non-referred attendances - Enhanced Primary Care	A14, A15 (721-758), A17, A20 (subgroup 1)
B	Non-referred attendances - Other	A2, A5, A6, A7 (173), A11 (598, 600), A19, A20 (subgroup 2), A23, A27, A30

BTOS: broad type of service VR: vocationally registered

Weighting procedure

A comparison of the sociodemographic distribution of the GPIR 2018–19 cohort and the MBS 2018–19 reference population found that:

- the age distribution of the GPIR cohort and the MBS reference population were similar
- males were under-represented in the GPIR cohort
- while broadly similar in terms of age-sex distribution, females aged 20–39 years were overrepresented and males aged 20–39 years were underrepresented in the GPIR cohort
- patients from NSW and Tasmania were overrepresented and patients from SA underrepresented in the GPIR cohort, mostly due to overrepresentation of patients in Hunter New England and Tasmania PHNs, and underrepresentation in Adelaide PHN
- patients from 'major cities' and 'remote/very remote' were underrepresented and patients from 'inner regional' overrepresented in the GPIR cohort
- the SEIFA distribution of the GPIR cohort shows slight overrepresentation of the 3rd quintile, and underrepresentation of the 5th (most advantaged) quintile.

Due to the differences in the sex and PHN distributions between the GPIR cohort and the chosen MBS reference population and to mitigate potential confounding by age, sex and PHN, results were weighted by age, sex and PHN. This step improved the state, remoteness and SEIFA differences in representativeness.

The formula used to calculate patient weights is described below:

$$w_{patient\ i, age*sex*PHN\ j} = \frac{Reference\ population\ patient\ \%\ in\ [age * sex * PHN]_j}{Sample\ patient\ \%\ in\ [age * sex * PHN]_j}$$

where *w* is the weight applied to patient '*I'* from group '*j'* defined by age-sex-PHN; *Reference population %* is the proportion of the MBS patient population within the '*j'* age-sex-PHN group; and *Sample patient %* is the proportion of the MedicineInsight patient cohort within the '*j'* age-sex-PHN group.

All patients included in the GPIR cohort had valid age and sex. The age groups (in years) used for weighting are: 0–9, 10–19, 20–29, 30–39, 40–49, 50–59, 60–69, 70–79, 80–89 and 90+. Patients with indeterminate or intersex gender were included describing the baseline (unweighted) study population but excluded from all other analyses due to statistical reasons ie, small cell counts for gender stratification leading to unreliable inference and potential concerns for patient confidentiality.

All patients were assigned to a PHN on the basis of their residential postcode. The exceptions were:

- the small number of patients who resided in Western Queensland PHN as there are no MedicineInsight practices represented in this PHN. These patients were re-assigned to their practice-site postcode
- patients with a missing residential postcode who were re-assigned to their practice-site postcode.

Data that are not weighted

MedicineInsight is a collection of patient-centred datasets in which we can uniquely identify individual patients within each MedicineInsight 'practice-site' (a collection of one or more associated general practices).

GPIR practices within this report were not weighted to a national practice dataset, because (i) a definitive national practice reference dataset is not publicly available and (ii) patients can be linked only to the postcode of their 'practice site', which may occasionally differ from the postcode of some of their constituent practices.

It is currently difficult to distinguish 'clinical encounters' from 'non-clinical encounters' (eg, purely administrative entries into the medical records). We are waiting for results from the clinical encounter validation study to be completed next year. Therefore, we chose not to weight to MBS patient encounters.

Caveats

Although MedicineInsight patients may visit non-MedicineInsight and/or other MedicineInsight practices during the financial year we estimate, based on MBS patient loyalty data, that there are no more than 4 extra patient-IDs generated on average for every 100 individual patients. It is unlikely that the activities of MedicineInsight patients recorded at non-MedicineInsight practices will become available and no weighting enhancement can address this issue.

While the MBS 2018–19 population of patients with at least one billed GP visit was used as the reference population for weighting, the MedicineInsight cohort may include patients not covered under the MBS (eg, foreign citizens, workers compensation patients).

Mental health care plans

The use of GP mental health care plans (MHCP) was identified either via the MBS billing items in the CIS (only available for practice sites where the billing system is integrated with the CIS) or via free text entry in one of the three diagnosis fields recorded at any time during the 2018–19 financial year. Patients were considered to have a GP mental health treatment plan if this was mentioned in a free text entry or they had at least one of the following MBS items recorded: 272, 276, 277, 281, 2700, 2701, 2712, 2713, 2715, and 2717. This analysis was restricted to patients with a recorded diagnosis of a long-term mental illness (bipolar disorder, schizophrenia, long-term depression or a long-term anxiety disorder).

APPENDIX 2: THE MEDICINEINSIGHT PROGRAM

Recruitment of general practices and consent

General practice sites (both accredited and non-accredited) from all states and territories are recruited into the MedicineInsight program and consent to the collection of de-identified patient information. Practices included in the cohort used for this report use one of two clinical information systems (CISs), 'Best Practice' (BP) or 'Medical Director 3' (MD), which together account for the majority of general practice software systems.

Initial recruitment focused on practice sites with more than three GPs as it was considered that these practices were more likely to have electronic health records. Later, solo general practitioners and corporate organisations were included in the cohort. More recently, there has been targeted recruitment of practices into MedicineInsight to support local PHN quality improvement programs and research.

The general practice owner or authorised person for a general practice must provide a signed agreement to participate in MedicineInsight. Consistent with National Health and Medical Research Council (NHMRC) ethical guidelines for the use of health-related data, patients are not required to give written consent due to the non-identifiable nature of the data collected. This process has been approved by the Royal Australian College of General Practitioners (RACGP) ethics committee. However, general practices are required to inform patients of the practice's participation in the MedicineInsight program through poster displays and information leaflets. The posters and information leaflets contain MedicineInsight contact information (email and phone line) in case there are any patient concerns. Patients can opt out of the program through a process handled independently at the practice if they do not wish their de-identified data to be shared via MedicineInsight.

Data collection

MedicineInsight uses third-party data extraction tools to de-identify, extract and securely transmit whole-of-practice data from within each general practice's CIS. An all-of-practice data collection, containing all available historic and current de-identified electronic health records, is conducted when a practice joins MedicineInsight. The extraction tool collects incremental data regularly, allowing the development of a longitudinal database in which patients within practices can be tracked over time.

The data that MedicineInsight collects from general practice sites include:

- general practice and GP information for the administration of quality improvement activities by NPS MedicineWise
- patient demographic and clinical data entered by GPs and practice staff directly into the system, or collected in the CIS from external sources (eg, pathology test results)
- system-generated data such as start time and date of a patient encounter.

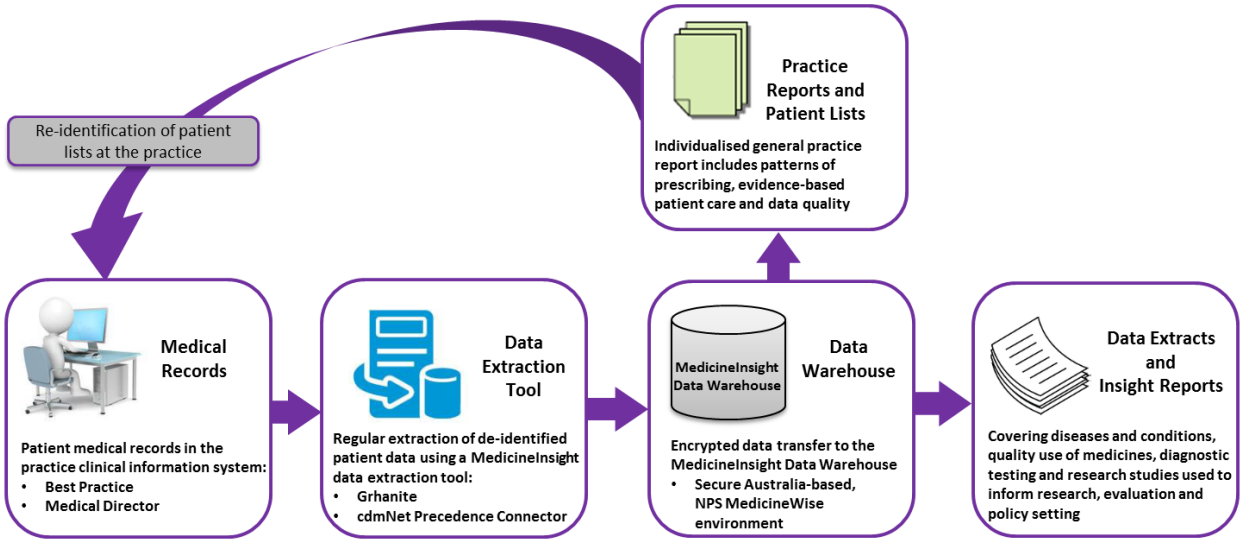
The CIS uses coding systems such as 'Docle' in MD or 'Pyefinch' in BP to code conditions entered into the system. However, it is not mandatory to use a code and clinicians can also enter terms as free text. Both coded and free-text data are extracted from the CIS. However, data are not extracted from fields such as the progress notes that may contain identifying information.

The data held in the MedicineInsight database are de-identified. However, each patient, practice site and provider has a unique identifier, enabling patient data to be matched across multiple data tables within each practice. Rigorous confidentiality controls are in place to prevent re-identification of patient data.

The data are held by NPS MedicineWise in an external, secure data warehouse. General practices are provided with transformed data via practice reports. These insights support general practices in monitoring quality improvement activities and best practice patient management over time. Subject to

Data Governance Committee approval, data extracts are also available to external parties, including researchers and government agencies. Figure A.1 summarises this process.

FIGURE A2.1 MEDICINEINSIGHT DATA COLLECTION AND EXTRACTION PROCEDURE



MedicineInsight stores data in tables containing fields in both coded and free-text formats. Table A2.1 shows the types of information currently available within MedicineInsight.

TABLE A2.1 MEDICINEINSIGHT DATA TABLES

Table [TABLE NAME]	Description	Data fields available (examples only)
PATIENT DETAILS		
PATIENT [EMI_PATIENT]	Patient-specific information.	Patient ID Gender Year of birth Year of death Indigenous status Concession/pension status Current smoking status Remoteness indicator IRSAD decile PHN
PROVIDER		
SITE [EMI_SITE]	Descriptors of practice sites.	Site ID Multi-practice flag CIS name Remoteness indicator IRSAD decile PHN
CLINICAL USER [EMI_CLINICAL _USER]		Provider ID Provider type
ENCOUNTERS		

Table [TABLE NAME]	Description	Data fields available (examples only)
ENCOUNTER [EMI_ENCOUNTER]	Information about recorded patient encounters including both clinical and administrative encounters.	Date Provider ID Encounter type Duration
ENCOUNTER REASON [EMI_ENCOUNTER_REASON]	Reason for patient encounter.	Date Reason
MEDICAL HISTORY		
DIAGNOSES [EMI_DIAGNOSIS]	Patient diagnosis.	Date Diagnosis Active flag
CONDITIONS [EMI_CONDITIONS_DETAIL] [EMI_CONDITIONS_SUMMARY]	Derived tables. Identifies specific conditions (eg, asthma, diabetes, etc) documented in any of the Diagnosis, Encounter Reason or Prescription tables.	Condition 1 Condition 2 Condition 3 … Condition n
INVESTIGATIONS		
INVESTIGATIONS REQUESTED [EMI_REQUESTED_TEST]	Details of any investigations requested through the CIS eg, pathology, radiology, ECG etc. (Does not contain any test results.)	Request date Requested test(s)
RESULTS HEADER [EMI_PATHOLOGY]	General information regarding results (eg, pathology, radiology etc) received. Includes results from requests made by the practice, or from external providers who have copied results to the practice.	Request date Requested test(s) Collection date Report date Summary normal flag
PATHOLOGY RESULTS DETAIL [EMI_PATHOLOGY_RESULT_ATOM]	Details of results for specific investigations, whether ordered individually or as a group. Includes results from requests made by the practice or from external providers who have copied results to the practice.	Result date LOINC code Result name Result value Units Normal range Abnormal flag
MEDICINES		
MEDICINE HISTORY [EMI_PRESCRIPTION]	Current and past history of medicines for a patient.	First date Last date Medicine name Medicine active ingredient Reason for prescription Ceased Dose Frequency Quantity Strength Number of repeats

Table [TABLE NAME]	Description	Data fields available (examples only)
		Restriction code (PBS/RPBS)
PRESCRIPTION ISSUED [EMI_SCRIPT_ITEM]	Each prescription printed from the CIS.	Date Medicine name Medicine active ingredient Dose Frequency Quantity Strength Number of repeats Restriction code (PBS/RPBS)
OTHER		
ALLERGIES/REACTIONS [EMI_ALLERGY_REACTION]	Allergies and adverse reactions.	Date recorded Allergy substance Reaction type
IMMUNISATIONS [EMI_IMMUNISATION]	Vaccine and immunisation details.	Vaccine name Date given Batch number Sequence number
OBSERVATIONS [EMI_OBSERVATION]	Observations recorded about the patient. eg, blood pressure, height, weight, BMI, temperature, blood sugar etc.	Observation date Observation type Observation value
MBS BILLING [EMI_BILLING_SERVICE]	Description of MBS codes billed to the patient.	Service date MBS Item number

Other Australian general practice data

MedicineInsight data can be used to supplement other sources of general practice data in Australia. Where appropriate, this report compares MedicineInsight data to these other sources. All data sources have different methods of data collection and different strengths and limitations. The following data sources are referred to in this report.

Bettering the Evaluation and Care of Health (BEACH)

The BEACH program provided a continuous study of general practice activity in Australia from 1998 to 2016 with a rolling random sample of approximately 1000 practising GPs per year recording details of 100 consecutive patient encounters on a structured paper-based record. This information was collated into an annual report providing details on GPs and patients, including: problems managed, risk factors, medications and other treatments, referrals and admissions, tests ordered, and additional sub-studies on different topics.[40] The BEACH program provided detailed cross-sectional data for the types of problems and the ways they were managed at individual encounters within a general practice. Individual patients could not be followed over time and longitudinal analysis was therefore not possible.

Pharmaceutical Benefits Scheme (PBS) data

Data from the PBS are available for all medicines dispensed in the community and to patients who are discharged from public hospitals in five states and one territory meeting PBS requirements. Data are

also available for Repatriation Pharmaceutical Benefits Scheme (RPBS) prescriptions for eligible war veterans and their families. PBS data do not include medicines prescribed for hospital inpatients or private prescriptions. Data from the PBS are limited, with only sociodemographic data routinely available for individual patients. PBS data do not include information on relevant diagnoses, test results, risk factors and service use, which are important to the interpretation of medicines data.

Medicare Benefits Schedule (MBS) data

The MBS claims data are an administrative by-product of the administration of the Medicare fee-for-service payment system. MBS data are available on eligible general practice attendances. Data are also available on pathology tests, but generally only for the three most expensive items undertaken (called 'coning'). The MBS data do not cover all services, for example those qualifying for a benefit under the Department of Veterans' Affairs (DVA) National Treatment Account or some services conducted through state and territory community-controlled health centres.

RACGP General Practice: Health of the Nation 2019

This 2019 report from the RACGP has used a number of data sources, and also draws information from an RACGP-commissioned online survey by EY Sweeney, incorporating responses from 1174 RACGP Fellows on a broad range of questions, from experiences and challenges in clinical practice to opinions of government health policy.[7]

Productivity Commission Report on Government Services 2020

The annual Report on Government Services (RoGS) provides information on the equity, effectiveness and efficiency of government services in Australia, including primary healthcare via the MBS, Department of Veterans' Affairs and initiatives such as the Practice Incentives Program (PIP) and Primary Health Networks (PHNs). It includes information on the number of general practices in Australia, rate of accredited general practices across jurisdictions, availability of GPs by region and by sex (number of FTE GPs per 100 000 people), waiting times and patient satisfaction.[41]

APPENDIX 3. DEFINITIONS OF VARIABLES USED IN THIS REPORT

Demographics

Age

MedicineInsight does not collect a patient's actual date of birth to preserve privacy. As a result, age is calculated assuming that all patients have been born on 1 July of the year of their birth and their age was calculated as of 1 July 2019. However, patients whose age was calculated to be more than 112 years were not considered valid and removed from analysis.

Gender

Information on patient gender (male, female, intersex or indeterminate) is extracted from the CIS. However, due to the small number of intersex or indeterminate patients, these patients were not included in analyses conducted from Chapter 3 onwards.

Aboriginal and/or Torres Strait Islander patients

Information on patients' Aboriginal or Torres Strait Islander status is extracted from the CIS and imported into MedicineInsight using the ABS standard classification.[42]

Socio-economic status

Socio-Economic Indexes for Areas (SEIFA) are assigned to patients and practices based on their postcodes. If patient postcode is missing, socio-economic status can be reported as missing, or can be inferred from the relevant practice site postcode. SEIFA is determined in accordance with the ABS Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) deciles.[43]

Rurality

Rurality is assigned to both practices and patients based on postcode. If patient postcode is missing, rurality can be reported as missing, or can be inferred from the relevant practice site postcode. Rurality is determined in accordance with the ABS geographical framework 'Remoteness Areas'.[44]

Conditions

There is no consistent national classification system used within general practice to code conditions, and each CIS has its own classification system. MedicineInsight extracts Docle- and Pyefinch-coded and free-text data from fields including diagnosis and medical history, the reason for encounter (ie, reason for visit or consultation) and the reason for prescription. To maintain patient confidentiality, we are unable to access or extract information from patient progress notes.

In conjunction with medical, pharmaceutical and clinical coding experts, we have developed coding algorithms to identify conditions and symptoms of interest within the MedicineInsight database, using commonly accepted clinical definitions, terms and synonyms from SNOMED CT-AU.[45,46] Both free-text and coded data extracted from the fields listed above are used to identify conditions. Please refer to Appendix 5 for more detailed definitions of conditions used in this report.

While clinicians may record in the CIS whether a condition is 'active' or 'inactive', based on experience from delivering practice reports, it appears that this information is not regularly updated within the CIS, thus may not be reliable. For this analysis, conditions are included irrespective of whether they are marked as 'active' or 'inactive' in the CIS.

When reporting data on conditions ‘ever’ experienced by patients, one or more conditions have been assigned to each patient if each condition was recorded in at least one of the above-listed fields in any encounter record, including records from 2018–19 and from previous years.

Prescriptions

Prescription data are restricted to medicines prescribed by GPs using their CIS to print the prescription. These prescriptions include medicines that are partly or wholly government-rebated from the PBS and RPBS, and also private (non-rebated) prescriptions. Private prescriptions are those paid for entirely by the patient or their private health insurer as they do not meet PBS/RPBS requirements related to the medicine prescribed, its indication for use, the amount supplied or the number of repeats. Prescription data do not necessarily indicate whether a medicine was dispensed or used by the patient. Dispensing data for rebatable medicines are available from the PBS.

Prescription data are available for both ‘issued’ prescriptions and a stated number of repeats recorded in the CIS. Whenever a new (but not necessarily first-time) prescription is recorded, this is counted as an ‘issued’ prescription. When reporting the volume of prescriptions, the number of issued prescriptions and the total number of prescriptions, including both issued and repeats, are both used. For example, when a prescription for a medicine with five repeats is entered in the CIS it will be counted once when the analysis focuses on issued prescriptions and will be counted six times when the analysis is for the issued-plus-repeat prescriptions, which we refer to here as the total number of prescriptions.

All medicines recorded, whether by generic or brand name, will be grouped to one of the 14 categories of the ATC level 1.

Pathology tests

Most Australian practices receive pathology test results electronically, transferred directly into the CIS from pathology providers. There are three potential sources of information about pathology within the CIS – tests requested, result summaries and the associated result details – which are all linked to the patient. This report uses the pathology test result details as not all tests requested are recorded electronically. The result summaries and result details also include data from tests ordered by specialists or doctors outside the practice, when they have requested that a GP receive a copy of a result.

Most of the common pathology test results are recorded using Logical Observation Identifiers Names and Codes (LOINC), and contain the detailed results, often including whether the result is normal or abnormal depending on the normal ranges for that laboratory. Each component of a pathology test result is recorded separately, eg, for full blood counts there would be over a dozen separate test results documented, such as white blood cell count, haemoglobin, and so on.

APPENDIX 4. EXCLUSION TERMS FOR GP CLINICAL ENCOUNTERS

TABLE A4.1 SUMMARY LIST OF 'VISIT TYPES' EXCLUDED FOR THE PURPOSES OF DEFINING A CLINICAL GP ENCOUNTER

Physio Consultation	Nursing	MBS Session 06/06	ECC Outreach Session
ECC Tertiary Liaison	Nurse consultation	MBS Session 03/06	ATAPs Session 11/12
Administrative (clinical)	Practice Nurse Surgery Consultation	MBS Session 04/06	ATAPs Session 01/06
Allied Health	Practice Nurse Consultation	MBS Session 01/6	ATAPs Session 01/6
Medical Records	Nurse encounter	MBS Session 02/6	ATAPs Session 02/6
Patient Consent	PRACTICE NURSE	MBS Session 07/10	ATAPs Session 03/6
Reception Colleen	Surgery visit - Nurse	MBS Session 05/06	ATAPs Session 04/6
Social Worker	Nursing consultation	MBS Session 03/6	ATAPs Session 05/06
Nurse Consult	Nurse Attendance	MBS Session 08/10	ATAPs Session 05/6
Nursing Consult	Registered Nurse	MBS Session 04/6	ATAPs Session 06/06
Practice Nurse	Nursing Staff consult	MBS Session 05/6	ATAPs Session 06/6
Pathology Recall by RN	Practice Consultation	MBS Session 09/10	ATAPs Session 07/12
Nurse Consultation	Infusion bay - Nurse	MBS Session 10/10	ATAPs Session 08/12
Nursing Visit	Nurse admin	Access Session	ATAPs Session 09/12
Nurse	Tristar Konnect	Engagement Session	ATAPs Session 12/12
Treatment Room - RN	MHIS	Medicare check	ECC Consultation
Nurse Visit	MBS Session 01/06	STEP Session	
Nurse visit	MBS Session 02/06	ECC Session	

TABLE A4.2 SUMMARY LIST OF "REASONS FOR ENCOUNTER" TERMS EXCLUDED (IN A SINGLE ENCOUNTER PER DAY, WHERE THERE WERE NO ASSOCIATED MISSING OR OTHER VALID RFE TERMS) FOR THE PURPOSES OF DEFINING A CLINICAL GP ENCOUNTER:

'aboriginalhealthwork'	'ipsvocationalworker'	'prescriptionnoconsul',
'administrationoffice'	'jvenpeerworker'	'prescriptionrenewaln'
'administrativeproced'	'leftmessage'	'primaryhealthworker'
'ahpaccliasonofficer'	'letterposted'	'psychologist'
'ahpaccworker'	'letterwrittennoconsu'	'recall'
'ain'	'medicalstudent'	'recalladded'
'alliedhealthassistan'	'mentalhealthnurse'	'recallattempt'
'carecoordinator'	'midwife'	'recallcomplete'
'cc'	'nonurgentrecall'	'recallhasbeendealtwi'
'chaperone'	'notesandrecordreview'	'recallpathology'
'chartreview'	'nurse'	'receptionist'
'childhealthworker'	'nurseassistant'	'recordandnotesreview'
'chineseaccesssupport'	'nursepractitioner'	'referralletternocons'
'clinicalservicesmana'	'nursesupportofpatien'	'registerednurse'
'communityhealthworke'	'nursingstudent'	'remindermanagement'
'counsellor'	'occupationaltherapis'	'repeatprescriptionno'
'dermagenconsultant'	'onrecallappointment'	'researchassistant'
'diabeteseducator'	'optometrist'	'researcher'

'didnotattend'	'papremindersent'	'reviewfilenoconsulta'
'dietitian'	'pathologyrequestnoco'	'seniorcasemanager'
'een'	'peerworker'	'socialworker'
'eennurse'	'phonecall'	'telephoneadvice'
'en'	'phonecallfailedattem'	'telephoneconsultatio'
'endorsedenrollednurs'	'phoneresultsconsulta'	'telephoneconversatio'
'enrollednurse'	'physiotherapist'	'telephoneresultscons'
'exercisephysiologist'	'podiatrist'	'triagetelephone'
'failedtoattend'	'practicemanager'	'urgentrecall'
'familyservicesworker'	'practicenurse'	'youthpeerworker'
'filereview'	'practicenurseeen'	
'ftafailedtoattend'	'practicenursern'	

APPENDIX 5. CONDITION CODING

Patients were defined as having a condition if they had a relevant coded (Docle, Pyefinch) or free text entry recorded in one of the three diagnosis fields ('Diagnosis', 'Reason for visit' or 'Reason for prescription' fields). Relevant terms for each condition are shown below (Table A5.1).

Records identified by a free text string alone are not automatically flagged but are individually reviewed by a clinical coder to determine whether the text string actually refers to the condition indicated or is present in another context (eg, a search for 'cancer' may identify ‘partner died from cancer'). Each record is flagged accordingly. Records indicating ‘suspected’, ‘query’ or ‘?’ records of the condition were not flagged as the condition, unless otherwise specified.

TABLE A5.1: CONDITION CODING

Condition	
Acute otitis media	Includes: acute pharyngitis, bacterial pharyngitis, (infection or inflammation) of pharynx or larynx, laryngitis, pain in throat, pharyngitis, rhinitis, sore throat, throat pain, upper respiratory congestion, upper respiratory tract congestion, upper respiratory tract infection or urti,
Acute tonsillitis	Includes: (bacterial or follicular tonsillitis or pustular or recurrent) tonsillitis, infection – tonsil, throat infection, tonsillitis, quinsy, tonsillar abscess
Acute upper respiratory tract infection	Bipolar disorder, bipolar (affective or spectrum) disorder, bipolar (1 or 2) disorder, manic depressive (illness or psychosis)
Anxiety disorder	Includes: adjustment disorder with anxiety, adjustment disorder with mixed anxiety and depressed mood, anxiety, anxiety (generalised or neurosis or phobia or PTSD or social), anxiety disorder, anxiety with panic attacks, anxiety/depression, depressive anxiety disorder, GAD, generalised anxiety disorder, mixed anxiety depression, nervous anxiety, neurotic anxiety, phobic anxiety disorder, social anxiety disorder, social phobia or substance induced anxiety disorder. Excludes (when recorded in isolation): anxiety feeling, adjustment disorder, (parental or performance or separation) anxiety, neurosis, OCD, PTSD, phobias or panic disorders
Asthma	Includes: allergic asthma, allergy induced asthma, asthma, asthma action plan, asthma care plan, asthma cycle of care, asthma exacerbation, asthma review, exercise induced asthma, exertional asthma, occupational asthma, Samter’s triad or thunderstorm asthma. Excludes (when recorded in isolation): wheezy bronchitis
Atrial fibrillation	Includes: AF, A FIB, atrial f, atrial fibrillation, atrial fibrillation (isolated episode or paroxysmal or ablation or non-valvular or valvular), fibrillation or rapid atrial fibrillation
Bipolar disorder	Patients were defined as having bipolar disorder if they had a relevant coded (Docle, Pyefinch) or free text entry recorded in one of the three diagnosis fields. Relevant terms included: bipolar, bipolar disorder, bipolar (affective or spectrum) disorder, bipolar (1 or 2) disorder, manic depressive or manic depressive (illness or psychosis)
Breast cancer	Includes: breast (adenocarcinoma or cancer or carcinoma), breast ca, (colloid or intraductal or lobular) carcinoma, DCIS, disseminated peritoneal adenocarcinoma, ductal carcinoma(in situ or infiltrating), infiltrating lobular carcinoma of breast, lobular ca, lobular carcinoma in-situ, mammary carcinoma, mucinous cystadenocarcinoma, Paget's disease of breast, peritoneal mucinous carcinomatosis, pseudomyxoma peritonei or signet ring cell carcinoma of breast
Cardiovascular disease	Includes: atherosclerosis, coronary heart disease (including myocardial infarction and angina), peripheral vascular disease, stroke and transient ischaemic attack.

Condition	
Chronic kidney disease	Includes: anaemia - chronic renal failure, capd, catheterisation of peritoneum, chronic kidney disease or CKD (all stages), chronic renal disease (all stages), chronic renal failure, chronic renal failure – hyperparathyroidism, chronic renal insufficiency, continuous ambulatory peritoneal dialysis, CRF, dialysis, haemodialysis, hemodialysis, peritoneal catherisation for dialysis, peritoneal dialysis renal dialysis or surgery - abdomen - dialysis - catheterisation
COPD	Includes: acute exacerbation of copd, cal, chronic airways limitation, chronic bronchitis, chronic obstructive airways disease, chronic obstructive pulmonary disease, coad, copd, emphysema
Dementia	Includes: alzh, alzheimer disease, behavioural and psychological symptoms of dementia, binswanger (disease or encephalopathy), demen, dementia, (early onset or frontotemporal or jakob creutzfeldt or korsakoff or lewy-body or multi infarct or pick or semantic or subcortical or substance-induced or vascular or young onset) dementia, major neurocognitive disorder due to alzheimer disease, parkinson disease with lewy body dementia, psychosis (korsakoff or dementia related), senile dementia with psychosis, subcortical arteriosclerotic encephalopathy
Depression	Includes: adjustment disorder with depressed +/- anxious mood, anxiety/depression, depres, depression, (endogenous or major or melancholic or minor or non melancholic or organic or postnatal or psychotic or reactive or recurrent or subsyndromal) depression or depressive disorder or depressive episode, melancholia
Dermatitis/eczema	Includes (allergic or asteatotic or atopic or chronic or contact or discoid or dyshidrotic or exfoliative or infantile or infected or nummular or varicose or venous) eczema, atopic dermatitis, autoeczematisation, dyshidrosis, eczema, eczema craquele, flexural eczema, gravitational eczema, pompholyx, pompholyx eczema, psoriatic eczema
Diabetes (type 1)	Includes: diabetes mellitus (iddm or type I or type 1), iddm, insulin dependent diabetes mellitus, juvenile onset diabetes
Diabetes (type 2/NOS)	Includes: diabetes, diabetes (controlled or cortisone induced or unstable), diabetes mellitus, diabetes mellitus (niddm, or type ii or type 2 or type 3c), latent autoimmune diabetes of adults, niddm, non insulin dependent diabetes mellitus, pancreatogenic diabetes, t2dm, t11, tii
Diabetes (gestational)	Includes: gestational (diabetes or diabetes mellitus)
Dyslipidaemia	Includes: dyslipidaemia, dyslip, familial (hypercholesterolaemia or hypercholesterolemia), hdl, high cholesterol, high cholest, high lipids, hypercholesterolaemia, hyperlipidaemia, hyperlipoproteinaemia (type 2 or type iv or type iia), hypertriglyceridaemia, hypercho, hyperlip, hypertr
GORD	Includes: acid reflux, acid regurgitation, gastro-oesophageal reflux, gor, gord, heartburn, laryngopharyngeal reflux, non-erosive reflux disease, oesophageal reflux, reflux laringitis, reflux oesophagitis
Heart failure	Includes: acute cardiac failure, biventricular heart failure, cardiac failure, CCF, chronic heart failure, congestive cardiac failure, congestive heart failure, cor pulmonale, diastolic cardiac dysfunction, diastolic heart failure, heart failure, HFmrEF, HFpEF, HFrEF, Hhgh output cardiac failure, high output heart failure, hypertensive heart failure, left heart failure, left ventricular failure, LHF (left heart failure), LVF (left ventricular failure), pulmonary oedema, RHF (right heart failure), right heart failure, right ventricular failure, RVF (right ventricular failure), systolic cardiac dysfunction, systolic heart failure, ventricular diastolic dysfunction

Condition	
Hypertension	Includes: antihypertensive agent prescription, (blood pressure or bp) and (labile or review or unstable), hbp, high blood pressure, ht, hypertension, hypertension (controlled or diastolic or essential or isolated systolic or labile or life style management or malignant or pregnancy or primary or renal or renovascular or review or unstable), pih, pregnancy induced hypertension or severe refractory hypertension
Low back pain	Includes: back (ache or injury or muscle strain or pain or spasm or strain), back and buttock pain, back and leg pain, back pain, back pain (acute or acute on chronic or buttock or degenerative spine or leg or lumbar or lumbo-sacral or sacral or radiating to buttock or radiating to leg), back pain syndrome, back pain with (radiculopathy or referred leg pain) back pain without leg pain, degenerative lumbar disc disease, foraminal stenosis, lumbar, intervertebral disc prolapse , disc prolapse, nerve root compression, loin pain, low back injury, low back pain, low back strain, lumbago, lumbar back (injury or muscle strain or pain or prolapse), lumbar (radiculopathy or spondylosis or lumbar sprain), lumbosacral back pain, lumbosacral spondylosis, lumbosacral stenosis, mechanical back pain, mechanical low back pain, mononeuropathy - sciatic nerve, sacral spinal pain, sacro-iliac joint pain, sciatic (mononeuropathy or pain), sciatica, spinal disc protrusion, spinal pain, strained back
Migraine	Includes: antimigraine prescription, botox treatment for migraine, cluster headache, migraine, migraine aura, migraineur or vascular headache
Osteoarthritis	Includes: aneurysm-osteoarthritis syndrome, ankylosing spondylitis, generalised osteoarthritis, oa, osteoarthritis, osteoarthritis (ankle or cervical spine or elbow or fingers or foot or glenohumeral joint or hands or hip or knee or lumbar spine or midfoot or neck or patellofemoral joint or sacroiliac joints or shoulder or spine or sternoclavicular joint or thoracic spine or tmj or wrist or 1st carpometacarpal joint or osteoarthritis of 1st metatarsophalangeal joint), osteoarthrosis (hip or knee), spondylosis, wear and tear arthritis
Osteoporosis	Includes: osteoporosis, osteoporosis (corticosteroid induced or no fracture or with fracture or disuse or steroid induced), pathological fracture due to osteoporosis, post menopausal osteoporosis, steroid osteopathy
Prostate cancer	Includes: prostate or prostatic (adenocarcinoma or or ca or cancer or carcinoma or carcinosarcoma), (family history or FH) of prostate cancer, signet ring cell carcinoma of prostate
Rheumatoid arthritis	Includes: arthritis (juvenile rheumatoid or rheumatoid or seronegative), caplan syndrome, jra, lipoid dermatoarthritis, lipoid rheumatism, multicentric reticulohistiocytosis, RA, rheumatoid arthritis – pneumoconiosis, seronegative rheumatoid arthritis, stills disease
Schizophrenia	Includes: (borderline or brief or brief reactive or catatonic or chronic or disorganised or hebephrenic or para or paranoid) schizophrenia, personality disorder (schizoid or schizotypal), residual schizophrenia, schizoaffective disorder, schizophrenia, schizophreniform disorder, undifferentiated schizophrenia
Skin cancer	Includes: basal cell carcinoma, basal cell carcinoma (infiltrative or micronodular or morphoeic or nodular or perineural invasion or pigmented or superficial), BCC, rodent ulcer, SCC, squamous cell carcinoma, screening - for skin cancer, skin cancer, skin cancer (checkup or screening), skin cancer in-situ Excludes: melanoma
Stroke	Includes: cerebral (haemorrhage or infarction), cerebrovascular accident, cva, haemorrhage intracerebral, haemorrhagic (cva or stroke), intracerebral (bleed or haemorrhage or haemorrhage), ischaemic stroke, lacunar infarct, lacunar stroke, migrainous stroke, migranous stroke, stroke, thrombotic stroke, visual cortex stroke

APPENDIX 6. ADDITIONAL ANALYSES

Patients by PHN

Primary Health Network	MedicineInsight patients 2018–19 Unweighted		MedicineInsight patients 2018–19, Weighted	National data 2018–19[1]	
	Number	%	%	Number	%
Adelaide	61,474	2.1	5.0	1,101,862	5.0
Australian Capital Territory	72,798	2.5	1.7	362,891	1.7
Brisbane North	100,116	3.5	4.1	886,494	4.0
Brisbane South	109,939	3.8	4.7	1,030,443	4.7
Central and Eastern Sydney	124,837	4.3	6.0	1,303,946	5.9
Central Queensland, Wide Bay, Sunshine Coast	123,859	4.3	3.6	781,433	3.6
Country SA	14,897	0.5	2.0	443,408	2.0
Country WA	86,837	3.0	2.0	442,382	2.0
Darling Downs and West Moreton	68,839	2.4	2.4	518,356	2.4
Eastern Melbourne	107,954	3.7	6.2	1,348,906	6.1
Gippsland	36,191	1.3	1.2	256,641	1.2
Gold Coast	99,507	3.4	2.5	554,221	2.5
Hunter New England and Central Coast	438,740	15.2	5.2	1,143,903	5.2
Murray	120,612	4.2	2.5	557,685	2.5
Murrumbidgee	17,620	0.6	1.0	214,703	1.0
Nepean Blue Mountains	16,584	0.6	1.6	350,371	1.6
North Coast	91,007	3.1	2.2	476,716	2.2
North Western Melbourne	204,758	7.1	7.0	1,533,662	7.0
Northern Queensland	53,464	1.8	2.8	603,150	2.7
Northern Sydney	44,713	1.5	3.7	819,687	3.7
Northern Territory	33,681	1.2	0.9	187,861	0.9
Perth North	104,110	3.6	4.3	949,105	4.3
Perth South	153,652	5.3	4.1	886,479	4.0
South Eastern Melbourne	88,647	3.1	6.3	1,384,122	6.3
South Eastern NSW	92,337	3.2	2.5	556,722	2.5
South Western Sydney	64,243	2.2	4.3	948,337	4.3
Tasmania	187,262	6.5	2.2	475,488	2.2
Western NSW	31,566	1.1	1.2	271,523	1.2
Western Queensland	-	-	-	52,026	0.2
Western Sydney	57,126	2.0	4.1	908,098	4.1
Western Victoria	86,406	3.0	2.7	586,740	2.7
TOTAL	**2,893,776**	**100**		**21,937,361**	**100**

Medicines without unique ATC codes

Exploration of the medicines that could not be mapped to a unique ATC code was conducted using the PROC FREQ procedure for all of the prescriptions that had an active ingredient listed in the 'Medicine Active Ingredient' field but no ATC code.

TABLE A6.1 PRESCRIPTION NUMBERS FOR THE TOP 20 ACTIVE INGREDIENTS FOR WHICH AN ATC CODE WAS UNABLE TO BE ASSIGNED

Active ingredient	Number of prescriptions	Percentage of all issued prescriptions (n = 12,791,759)	Percentage of prescriptions without a unique ATC code (n = 834,581)
hydrocortisone	21,406	0.17	2.56
metronidazole	19,878	0.16	2.38
ferric carboxymaltose	18,863	0.15	2.26
bisoprolol fumarate	17,806	0.14	2.13
dutasteride, tamsulosin hydrochloride	16,154	0.13	1.94
sitagliptin, metformin	15,863	0.12	1.90
chloramphenicol	13,262	0.10	1.59
clotrimazole	12,890	0.10	1.54
olmesartan	12,650	0.10	1.52
adrenaline (epinephrine)	11,655	0.09	1.40
tiotropium bromide	10,781	0.08	1.29
dutasteride/tamsulosin	10,470	0.08	1.25
ferrous sulfate, ascorbic acid	10,394	0.08	1.25
ciprofloxacin	7958	0.06	0.95
cefuroxime axetil	7583	0.06	0.91
betahistine dihydrochloride	7263	0.06	0.87
hydroxychloroquine sulfate	6927	0.05	0.83
adapalene 0.1%, benzoyl peroxide .5%	6542	0.05	0.78
aciclovir	6442	0.05	0.77
risedronate sodium	6398	0.05	0.77

Number and proportion of prescriptions by all ATC 3 codes

TABLE A6.2 NUMBER AND PROPORTION (%) OF ISSUED AND TOTAL PRESCRIPTIONS FOR ALL ATC LEVEL 3 CLASSES RECORDED IN MEDICINEINSIGHT 2018–19 (UNWEIGHTED)

ATC code	Description	Issued prescriptions		Total prescriptions	
		No.	%	No.	%
A01A	Stomatological preparations	11,596	0.1	18,262	0.0
A02A	Antacids	16	0.0	26	0.0
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	648,072	5.4	2,779,072	7.6
A03A	Drugs for functional gastrointestinal disorders	7283	0.1	16,600	0.0
A03F	Antispasmodics and anticholinergics in combination with other drugs	101,284	0.8	133,229	0.4
A04A	Antiemetics and antinauseants	68,854	0.6	105,633	0.3
A05A	Bile therapy	1160	0.0	3468	0.0
A06A	Drugs for constipation	42,315	0.4	163,693	0.4
A07A	Intestinal anti-infectives	12,384	0.1	15,216	0.0
A07B	Intestinal adsorbents	9	0.0	26	0.0

ATC code	Description	Issued prescriptions		Total prescriptions	
		No.	%	No.	%
A07D	Antipropulsives	19,378	0.2	37,797	0.1
A07E	Intestinal anti-inflammatory agents	11,607	0.1	59,119	0.2
A07F	Antidiarrheal micro-organisms	<5	0.0	<5	0.0
A07X	Other antidiarrheals	18	0.0	36	0.0
A08A	Antiobesity preparations, excluding diet products	42,940	0.4	70,291	0.2
A09A	Digestives, including enzymes	<5	0.0	<5	0.0
A10A	Insulins and analogues	63,110	0.5	124,853	0.3
A10B	Blood glucose lowering drugs, excluding insulins	260,466	2.2	1,401,999	3.8
A11C	Vitamin A and D, including combinations of the two	34,960	0.3	75,222	0.2
A11H	Other single agent vitamin preparations	671	0.0	1873	0.0
A12A	Calcium	5234	0.0	10,596	0.0
A12B	Potassium	13,428	0.1	26,284	0.1
A12C	Other mineral supplements	8747	0.1	21,678	0.1
A14A	Anabolic steroids	<5	0.0	<5	0.0
A16A	Other alimentary tract and metabolism products	12	0.0	52	0.0
B01A	Antithrombotic agents	259,606	2.2	1,148,050	3.1
B02A	Antifibrinolytics	9410	0.1	18,687	0.1
B02B	Vitamin K and other haemostatics	105	0.0	156	0.0
B03A	Iron preparations (NB – an additional 15,391 ferric carboxymaltose issued prescriptions were identified which had no recorded ATC code)	5844	0.0	11,679	0.0
B03B	Vitamin B12 and folic acid	60,241	0.5	70,014	0.2
B03X	Other anti-anaemic preparations	189	0.0	1096	0.0
B05B	Intravenous solutions	<5	0.0	<5	0.0
B05X	Intravenous solution additives	22	0.0	49	0.0
B06A	Other haematological agents	15	0.0	38	0.0
C01A	Cardiac glycosides	18,258	0.2	35,018	0.1
C01B	Antiarrhythmics, class I and III	11,076	0.1	62,866	0.2
C01C	Cardiac stimulants excluding cardiac glycosides	188	0.0	484	0.0
C01D	Vasodilators used in cardiac diseases	43,248	0.4	232,587	0.6
C01E	Other cardiac preparations	1571	0.0	8301	0.0
C02A	Antiadrenergic agents, centrally acting	33,898	0.3	176,868	0.5
C02C	Antiadrenergic agents, peripherally acting	18,652	0.2	90,680	0.2
C02D	Arteriolar smooth muscle, agents acting on	3505	0.0	9693	0.0
C02K	Other antihypertensives	13	0.0	15	0.0
C03A	Low-ceiling diuretics, thiazides	11,976	0.1	21,927	0.1
C03B	Low-ceiling diuretics, excluding thiazides	20,601	0.2	40,040	0.1
C03C	High-ceiling diuretics	95,650	0.8	178,785	0.5
C03D	Potassium-sparing agents	24,765	0.2	122,131	0.3
C03X	Other diuretics	7	0.0	15	0.0

ATC code	Description	Issued prescriptions		Total prescriptions	
		No.	%	No.	%
C04A	Peripheral vasodilators	75	0.0	270	0.0
C05A	Agents for treatment of haemorrhoids and anal fissures for topical use	35,805	0.3	150,919	0.4
C07A	Beta blocking agents	207,462	1.7	1,089,455	3.0
C08C	Selective calcium channel blockers with mainly vascular effects	156,529	1.3	878,874	2.4
C08D	Selective calcium channel blockers with direct cardiac effects	35,890	0.3	204,950	0.6
C08E	Non-selective calcium channel blockers	171	0.0	876	0.0
C09A	ACE inhibitors, single agent	247,350	2.1	1,400,042	3.8
C09B	ACE inhibitors, combinations	82,954	0.7	473,047	1.3
C09C	Angiotensin II receptor blockers (ARBs), single agent	257,680	2.2	1,466,355	4.0
C09D	Angiotensin II receptor blockers (ARBs), combinations	166,789	1.4	954,130	2.6
C10A	Lipid modifying agents, single agent	585,914	4.9	3,483,621	9.5
C10B	Lipid modifying agents, combinations	59,419	0.5	344,055	0.9
D01A	Antifungals for topical use	49,853	0.4	74,539	0.2
D01B	Antifungals for systemic use	8871	0.1	15,062	0.0
D03A	Cicatrizants	66	0.0	140	0.0
D05A	Antipsoriatics for topical use	14,984	0.1	31,137	0.1
D05B	Antipsoriatics for systemic use	426	0.0	1127	0.0
D06A	Antibiotics for topical use	82,349	0.7	89,014	0.2
D06B	Chemotherapeutics for topical use	17,016	0.1	28,618	0.1
D07A	Corticosteroids, single agent	340,275	2.8	637,934	1.7
D07C	Corticosteroids, combinations with antibiotics	31,941	0.3	48,447	0.1
D08A	Antiseptics and disinfectants	61	0.0	113	0.0
D10A	Anti-acne preparations for topical use	14,356	0.1	30,311	0.1
D11A	Other dermatological preparations	416	0.0	1233	0.0
G01A	Anti-infectives and antiseptics, excluding combinations with corticosteroids	9385	0.1	18,962	0.1
G02A	Uterotonics	6748	0.1	9355	0.0
G02C	Other gynaecologicals	23	0.0	126	0.0
G03A	Hormonal contraceptives for systemic use	211,444	1.8	507,548	1.4
G03B	Androgens	4469	0.0	16,243	0.0
G03C	Oestrogens	95,960	0.8	310,828	0.8
G03D	Progestogens	16,035	0.1	40,151	0.1
G03F	Progestogens and oestrogens in combination	8346	0.1	37,530	0.1
G03G	Gonadotropins and other ovulation stimulants	66	0.0	233	0.0
G03H	Antiandrogens	33,277	0.3	101,733	0.3
G03X	Other sex hormones and modulators of the genital system	1,265	0.0	7385	0.0
G04B	Urologicals	90,044	0.8	365,324	1.0
G04C	Drugs used in benign prostatic hypertrophy (NB – an additional 22,110 dutasteride + tamulosin issued prescriptions were identified which had no recorded ATC code)	11,982	0.1	61,384	0.2

ATC code	Description	Issued prescriptions		Total prescriptions	
		No.	%	No.	%
H01A	Anterior pituitary lobe hormones and analogues	42	0.0	131	0.0
H01B	Posterior pituitary lobe hormones	855	0.0	3776	0.0
H01C	Hypothalamic hormones	29	0.0	154	0.0
H02A	Corticosteroids for systemic use, single agent	240,998	2.0	452,508	1.2
H03A	Thyroid preparations	133,654	1.1	253,715	0.7
H03B	Antithyroid preparations	6092	0.1	15,240	0.0
H04A	Glycogenolytic hormones	2741	0.0	5202	0.0
H05A	Parathyroid hormones and analogues	97	0.0	554	0.0
H05B	Anti-parathyroid agents	30	0.0	123	0.0
J01A	Tetracyclines	154,156	1.3	364,379	1.0
J01B	Amphenicols	16	0.0	22	0.0
J01C	Beta-lactam antibacterials, penicillins	754,310	6.3	990,626	2.7
J01D	Other beta-lactam antibacterials	375,751	3.1	532,893	1.5
J01E	Sulfonamides and trimethoprim	91,352	0.8	127,940	0.3
J01F	Macrolides, lincosamides and streptogramins	183,686	1.5	266,954	0.7
J01G	Aminoglycoside antibacterials	64	0.0	153	0.0
J01M	Quinolone antibacterials	19,925	0.2	28,667	0.1
J01X	Other antibacterials	15,576	0.1	33,034	0.1
J02A	Antimycotics for systemic use	15,981	0.1	32,329	0.1
J04A	Drugs for treatment of tuberculosis	429	0.0	770	0.0
J05A	Direct acting antiviral drugs	52,504	0.4	144,489	0.4
J07A	Bacterial vaccines (NB – an additional 23,516 meningococcal vaccine issued prescriptions were identified which had no recorded ATC code)	91,208	0.8	109,937	0.3
J07B	Viral vaccines	88,170	0.7	116,047	0.3
J07C	Bacterial and viral vaccines	19,212	0.2	19,503	0.1
L01A	Alkylating agents	131	0.0	343	0.0
L01B	Antimetabolites	19,748	0.2	28,682	0.1
L01C	Plant alkaloids and other natural products	14	0.0	14	0.0
L01D	Cytotoxic antibiotics and related substances	<5	0.0	12	0.0
L01X	Other antineoplastic agents	739	0.0	2679	0.0
L02A	Hormones and related agents	1470	0.0	3248	0.0
L02B	Hormone antagonists and related agents	9493	0.1	54,087	0.1
L03A	Immunostimulants	555	0.0	3355	0.0
L04A	Immunosuppressants	16,318	0.1	70,175	0.2
M01A	Anti-inflammatory and antirheumatic products, non-steroids	349,656	2.9	885,211	2.4
M01C	Specific antirheumatic agents	71	0.0	214	0.0
M02A	Topical products for joint and muscular pain	2379	0.0	2894	0.0
M03B	Muscle relaxants, centrally acting agents	7261	0.1	28,750	0.1
M03C	Muscle relaxants, directly acting agents	121	0.0	364	0.0

ATC code	Description	Issued prescriptions		Total prescriptions	
		No.	%	No.	%
M04A	Antigout preparations	90,186	0.8	279,213	0.8
M05B	Drugs affecting bone structure and mineralisation	92,918	0.8	125,968	0.3
M09A	Other drugs for disorders of the musculoskeletal system	<5	0.0	<5	0.0
N01A	Anaesthetics, general	33	0.0	103	0.0
N01B	Anaesthetics, local	12	0.0	20	0.0
N02A	Opioids	1,325,534	11.1	1,757,605	4.8
N02B	Other analgesics and antipyretics	81,930	0.7	300,866	0.8
N02C	Antimigraine preparations	55,472	0.5	275,767	0.8
N03A	Antiepileptics	224,902	1.9	977,976	2.7
N04A	Anticholinergic agents	988	0.0	2463	0.0
N04B	Dopaminergic agents	19,383	0.2	71,148	0.2
N05A	Antipsychotics	199,886	1.7	485,631	1.3
N05B	Anxiolytics	325,025	2.7	352,611	1.0
N05C	Hypnotics and sedatives	306,210	2.6	449,355	1.2
N06A	Antidepressants	805,392	6.7	3,719,302	10.1
N06B	Psychostimulants, agents used for ADHD and nootropics	11,751	0.1	51,716	0.1
N06D	Anti-dementia drugs	10,167	0.1	57,336	0.2
N07A	Parasympathomimetics	237	0.0	1211	0.0
N07B	Drugs used in addictive disorders	74,513	0.6	118,953	0.3
N07C	Antivertigo preparations	5823	0.0	13,426	0.0
N07X	Other nervous system drugs	747	0.0	4085	0.0
P01A	Agents against amoebiasis and other protozoal diseases	27,922	0.2	34,385	0.1
P01B	Antimalarials	8,038	0.1	14,685	0.0
P02B	Antitrematodals	244	0.0	252	0.0
P02C	Antinematodal agents	1857	0.0	2447	0.0
P03A	Ectoparasiticides, including scabicides	7395	0.1	12,675	0.0
R01A	Decongestants and other nasal preparations for topical use	60,597	0.5	131,303	0.4
R01B	Nasal decongestants for systemic use	5226	0.0	7390	0.0
R02A	Throat preparations	5	0.0	5	0.0
R03A	Adrenergics, inhalants	341,595	2.9	1,685,514	4.6
R03B	Other drugs for obstructive airway diseases, inhalants	89,499	0.7	419,117	1.1
R03C	Adrenergics for systemic use	49	0.0	140	0.0
R03D	Other systemic drugs for obstructive airway diseases	11,790	0.1	51,835	0.1
R05C	Expectorants, excluding combinations with cough suppressants	5,232	0.0	6514	0.0
R05D	Cough suppressants, excluding combinations with expectorants	20,839	0.2	22,413	0.1
R05F	Cough suppressants and expectorants, combinations	<5	0.0	<5	0.0
R06A	Antihistamines for systemic use	43,457	0.4	58,612	0.2
S01A	Anti-infectives	<5	0.0	6	0.0

ATC code	Description	Issued prescriptions		Total prescriptions	
		No.	%	No.	%
S01B	Anti-inflammatory agents	63,474	0.5	79,765	0.2
S01E	Antiglaucoma preparations and miotics	10,313	0.1	24,466	0.1
S01F	Mydriatics and cycloplegics	21,118	0.2	114,885	0.3
S01G	Decongestants and antiallergics	31	0.0	59	0.0
S01H	Local anaesthetics	743	0.0	1,805	0.0
S01J	Diagnostic agents	9	0.0	9	0.0
S01K	Surgical aids	2,389	0.0	13,936	0.0
S01L	Ocular vascular disorder agents	<5	0.0	9	0.0
S01X	Other ophthalmologicals	8,954	0.1	52,295	0.1
S02A	Anti-infectives	1,026	0.0	1,450	0.0
S02C	Corticosteroids and anti-infectives in combination	76,567	0.6	122,427	0.3
S03A	Anti-infectives	3,599	0.0	5209	0.0
V03A	All other therapeutic products	1,149	0.0	3212	0.0
V04C	Diagnostic agents	<5	0.0	<5	0.0

PBS/RPBS and private prescription breakdown by all ATC 3 codes

TABLE A6.3 NUMBER AND PROPORTION (%) OF PRIVATE AND PBS SUBSIDISED ISSUED PRESCRIPTIONS FOR ALL ATC LEVEL 3 CLASSES RECORDED IN MEDICINEINSIGHT 2018–19 (UNWEIGHTED)

ATC code	Description	PBS/RPBS		Private	
		No.	%	No.	%
A01A	Stomatological preparations	7296	62.9	4300	37.1
A02A	Antacids	0	0.0	16	100.0
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	635,132	98.0	12,940	2.0
A03A	Drugs for functional gastrointestinal disorders	330	4.5	6953	95.5
A03F	Antispasmodics and anticholinergics in combination with other drugs	91,201	90.0	10,083	10.0
A04A	Antiemetics and antinauseants	28,472	41.4	40,382	58.6
A05A	Bile therapy	1090	94.0	70	6.0
A06A	Drugs for constipation	25,400	60.0	16,915	40.0
A07A	Intestinal anti-infectives	4218	34.1	8166	65.9
A07B	Intestinal adsorbents	9	100.0	0	0.0
A07D	Antipropulsives	11,781	60.8	7597	39.2
A07E	Intestinal anti-inflammatory agents	11,061	95.3	546	4.7
A07F	Antidiarrheal micro-organisms	0	0.0	1	100.0
A07X	Other antidiarrheals	0	0.0	18	100.0
A08A	Antiobesity preparations, excluding diet products	52	0.1	42,888	99.9
A09A	Digestives, including enzymes	0	0.0	2	100.0
A10A	Insulins and analogues	62,724	99.4	386	0.6
A10B	Blood glucose lowering drugs, excluding insulins	253,574	97.4	6892	2.6
A11C	Vitamin A and D, including combinations of the two	1185	3.4	33,775	96.6
A11H	Other single agent vitamin preparations	24	3.6	647	96.4
A12A	Calcium	929	17.7	4305	82.3

ATC code	Description	PBS/RPBS		Private	
		No.	%	No.	%
A12B	Potassium	12,594	93.8	834	6.2
A12C	Other mineral supplements	2826	32.3	5921	67.7
A14A	Anabolic steroids	0	0.0	3	100.0
A16A	Other alimentary tract and metabolism products	1	8.3	11	91.7
B01A	Antithrombotic agents	236,179	91.0	23,427	9.0
B02A	Antifibrinolytics	9388	99.8	22	0.2
B02B	Vitamin K and other haemostatics	0	0.0	105	100.0
B03A	Iron preparations	3019	51.7	2825	48.3
B03B	Vitamin B12 and folic acid	44,575	74.0	15,666	26.0
B03X	Other antianaemic preparations	180	95.2	9	4.8
B05B	Intravenous solutions	0	0.0	1	100.0
B05X	Intravenous solution additives	0	0.0	22	100.0
B06A	Other haematological agents	5	33.3	10	66.7
C01A	Cardiac glycosides	18,249	100.0	9	0.0
C01B	Antiarrhythmics, class I and III	10,933	98.7	143	1.3
C01C	Cardiac stimulants excluding cardiac glycosides	0	0.0	188	100.0
C01D	Vasodilators used in cardiac diseases	42,930	99.3	318	0.7
C01E	Other cardiac preparations	1198	76.3	373	23.7
C02A	Antiadrenergic agents, centrally acting	33,719	99.5	179	0.5
C02C	Antiadrenergic agents, peripherally acting	18,518	99.3	134	0.7
C02D	Arteriolar smooth muscle, agents acting on	3497	99.8	8	0.2
C02K	Other antihypertensives	6	46.2	7	53.8
C03A	Low-ceiling diuretics, thiazides	11,954	99.8	22	0.2
C03B	Low-ceiling diuretics, excluding thiazides	20,266	98.4	335	1.6
C03C	High-ceiling diuretics	92,513	96.7	3,37	3.3
C03D	Potassium-sparing agents	24,393	98.5	372	1.5
C03X	Other diuretics	1	14.3	6	85.7
C04A	Peripheral vasodilators	19	25.3	56	74.7
C05A	Agents for treatment of haemorrhoids and anal fissures for topical use	27,922	78.0	7883	22.0
C07A	Beta blocking agents	206,710	99.6	752	0.4
C08C	Selective calcium channel blockers with mainly vascular effects	156,069	99.7	460	0.3
C08D	Selective calcium channel blockers with direct cardiac effects	35,206	98.1	684	1.9
C08E	Non-selective calcium channel blockers	169	98.8	2	1.2
C09A	ACE inhibitors, single agent	246,658	99.7	692	0.3
C09B	ACE inhibitors, combinations	82,791	99.8	163	0.2
C09C	Angiotensin II receptor blockers (ARBs), single agent	257,162	99.8	518	0.2
C09D	Angiotensin II receptor blockers (ARBs), combinations	166,326	99.7	463	0.3
C10A	Lipid modifying agents, single agent	580,462	99.1	5452	0.9
C10B	Lipid modifying agents, combinations	58,898	99.1	521	0.9
D01A	Antifungals for topical use	2184	4.4	47,669	95.6
D01B	Antifungals for systemic use	3096	34.9	5775	65.1
D03A	Cicatrizants	22	33.3	44	66.7
D05A	Antipsoriatics for topical use	13,347	89.1	1637	10.9
D05B	Antipsoriatics for systemic use	421	98.8	5	1.2

ATC code	Description	PBS/RPBS		Private	
		No.	%	No.	%
D06A	Antibiotics for topical use	2682	3.3	79,667	96.7
D06B	Chemotherapeutics for topical use	5328	31.3	11,688	68.7
D07A	Corticosteroids, single agent	264,510	77.7	75,765	22.3
D07C	Corticosteroids, combinations with antibiotics	14,797	46.3	17,144	53.7
D08A	Antiseptics and disinfectants	25	41.0	36	59.0
D10A	Anti-acne preparations for topical use	25	0.2	14,331	99.8
D10B	Anti-acne preparations for systemic use	298	71.6	118	28.4
D11A	Other dermatological preparations	5537	59.0	3848	41.0
G01A	Antiinfectives and antiseptics, excluding combinations with corticosteroids	16	0.2	6732	99.8
G02C	Other gynaecologicals	23	100.0	0	0.0
G03A	Hormonal contraceptives for systemic use	173,653	82.1	37,791	17.9
G03B	Androgens	2557	57.2	1912	42.8
G03C	Oestrogens	80,461	83.8	15,499	16.2
G03D	Progestogens	13,167	82.1	2868	17.9
G03F	Progestogens and oestrogens in combination	1922	23.0	6424	77.0
G03G	Gonadotropins and other ovulation stimulants	59	89.4	7	10.6
G03H	Antiandrogens	784	2.4	32,493	97.6
G03X	Other sex hormones and modulators of the genital system	1167	92.3	98	7.7
G04B	Urologicals	15,415	17.1	74,629	82.9
G04C	Drugs used in benign prostatic hypertrophy	1791	14.9	10,191	85.1
H01A	Anterior pituitary lobe hormones and analogues	8	19.0	34	81.0
H01B	Posterior pituitary lobe hormones	761	89.0	94	11.0
H01C	Hypothalamic hormones	24	82.8	5	17.2
H02A	Corticosteroids for systemic use, single agent	238,245	98.9	2753	1.1
H03A	Thyroid preparations	127,145	95.1	6509	4.9
H03B	Antithyroid preparations	6067	99.6	25	0.4
H04A	Glycogenolytic hormones	2739	99.9	2	0.1
H05A	Parathyroid hormones and analogues	73	75.3	24	24.7
H05B	Anti-parathyroid agents	0	0.0	30	100.0
J01A	Tetracyclines	137,657	89.3	16,499	10.7
J01B	Amphenicols	0	0.0	16	100.0
J01C	Beta-lactam antibacterials, penicillins	743,240	98.5	11,070	1.5
J01D	Other beta-lactam antibacterials	372,422	99.1	3329	0.9
J01E	Sulfonamides and trimethoprim	90,730	99.3	622	0.7
J01F	Macrolides, lincosamides and streptogramins	163,164	88.8	20,522	11.2
J01G	Aminoglycoside antibacterials	60	93.8	4	6.3
J01M	Quinolone antibacterials	11,492	57.7	8433	42.3
J01X	Other antibacterials	14,895	95.6	681	4.4
J02A	Antimycotics for systemic use	3211	20.1	12,770	79.9
J04A	Drugs for treatment of tuberculosis	229	53.4	200	46.6
J05A	Direct acting antiviral drugs	35,933	68.4	16,571	31.6
J07A	Bacterial vaccines	2035	2.2	89,173	97.8
J07B	Viral vaccines	78	0.1	88,092	99.9
J07C	Bacterial and viral vaccines	43	0.2	19,169	99.8

ATC code	Description	PBS/RPBS		Private	
		No.	%	No.	%
L01A	Alkylating agents	112	85.5	19	14.5
L01B	Antimetabolites	2219	11.2	17,529	88.8
L01C	Plant alkaloids and other natural products	14	100.0	0	0.0
L01D	Cytotoxic antibiotics and related substances	1	100.0	0	0.0
L01X	Other antineoplastic agents	610	82.5	129	17.5
L02A	Hormones and related agents	1454	98.9	16	1.1
L02B	Hormone antagonists and related agents	9346	98.5	147	1.5
L03A	Immunostimulants	551	99.3	4	0.7
L04A	Immunosuppressants	16,093	98.6	225	1.4
M01A	Anti-inflammatory and antirheumatic products, non-steroids	314,220	89.9	35,436	10.1
M01C	Specific antirheumatic agents	70	98.6	1	1.4
M02A	Topical products for joint and muscular pain	63	2.6	2316	97.4
M03B	Muscle relaxants, centrally acting agents	7201	99.2	60	0.8
M03C	Muscle relaxants, directly acting agents	121	100.0	0	0.0
M04A	Antigout preparations	89,371	99.1	815	0.9
M05B	Drugs affecting bone structure and mineralisation	91,009	97.9	1909	2.1
M09A	Other drugs for disorders of the musculoskeletal system	0	0.0	3	100.0
N01A	Anaesthetics, general	1	3.0	32	97.0
N01B	Anaesthetics, local	0	0.0	12	100.0
N02A	Opioids	1,107,189	83.5	218,345	16.5
N02B	Other analgesics and antipyretics	47,492	58.0	34,438	42.0
N02C	Antimigraine preparations	52,486	94.6	2986	5.4
N03A	Antiepileptics	200,667	89.2	24,235	10.8
N04A	Anticholinergic agents	984	99.6	4	0.4
N04B	Dopaminergic agents	18,536	95.6	847	4.4
N05A	Antipsychotics	174,654	87.4	25,232	12.6
N05B	Anxiolytics	284,202	87.4	40,823	12.6
N05C	Hypnotics and sedatives	174,201	56.9	132,009	43.1
N06A	Antidepressants	781,470	97.0	23,922	3.0
N06B	Psychostimulants, agents used for ADHD and nootropics	10,022	85.3	1729	14.7
N06D	Anti-dementia drugs	9712	95.5	455	4.5
N07A	Parasympathomimetics	237	100.0	0	0.0
N07B	Drugs used in addictive disorders	62,325	83.6	12,188	16.4
N07C	Antivertigo preparations	59	1.0	5764	99.0
N07X	Other nervous system drugs	620	83.0	127	17.0
P01A	Agents against amoebiasis and other protozoal diseases	27,416	98.2	506	1.8
P01B	Antimalarials	4678	58.2	3360	41.8
P02B	Antitrematodals	203	83.2	41	16.8
P02C	Antinematodal agents	354	19.1	1503	80.9
P03A	Ectoparasiticides, including scabicides	6063	82.0	1332	18.0
R01A	Decongestants and other nasal preparations for topical use	2190	3.6	58,407	96.4
R01B	Nasal decongestants for systemic use	13	0.2	5213	99.8
R02A	Throat preparations	0	0.0	5	100.0
R03A	Adrenergics, inhalants	338,188	99.0	3407	1.0

ATC code	Description	PBS/RPBS		Private	
		No.	%	No.	%
R03B	Other drugs for obstructive airway diseases, inhalants	88,461	98.8	1038	1.2
R03C	Adrenergics for systemic use	19	38.8	30	61.2
R03D	Other systemic drugs for obstructive airway diseases	6596	55.9	5194	44.1
R05C	Expectorants, excluding combinations with cough suppressants	80	1.5	5152	98.5
R05D	Cough suppressants, excluding combinations with expectorants	16,510	79.2	4329	20.8
R05F	Cough suppressants and expectorants, combinations	0	0.0	2	100.0
R06A	Antihistamines for systemic use	2703	6.2	40,754	93.8
R07A	Other respiratory system products	1	100.0	0	0.0
S01A	Anti-infectives	19,345	30.5	44,129	69.5
S01B	Anti-inflammatory agents	9997	96.9	316	3.1
S01E	Antiglaucoma preparations and miotics	20,846	98.7	272	1.3
S01F	Mydriatics and cycloplegics	2	6.5	29	93.5
S01G	Decongestants and antiallergics	15	2.0	728	98.0
S01H	Local anaesthetics	0	0.0	9	100.0
S01K	Surgical aids	2312	96.8	77	3.2
S01L	Ocular vascular disorder agents	2	100.0	0	0.0
S01X	Other ophthalmologicals	8798	98.3	156	1.7
S02A	Anti-infectives	101	9.8	925	90.2
S02C	Corticosteroids and anti-infectives in combination	67,688	88.4	8879	11.6
S03A	Anti-infectives	3421	95.1	178	4.9
V03A	All other therapeutic products	1115	97.0	34	3.0
V04C	Other diagnostic agents	<5	0.0	<5	100.0

APPENDIX 7. GLOSSARY AND ABBREVIATIONS

Term	Definition	Description
95% CI	95% confidence interval	A 95% confidence interval provides information about a range of values that should contain the actual rate 95% of the time (95 times out of 100), as well as information on the direction and strength of the demonstrated effect. Wider confidence intervals reflect less certainty in the estimate of the rate. Confidence intervals enable conclusions to be drawn about the statistical plausibility and clinical relevance of findings.
ABS	Australian Bureau of Statistics	Australia's national statistical agency, providing official statistics on a wide range of economic, social, population and environmental matters of importance to Australia.
ABS National Health Survey (NHS)	Australian Bureau of Statistics National Health Survey	The National Health Survey is designed to collect a range of information about the health of Australians, including: • prevalence of long-term health conditions • health risk factors such as smoking, overweight and obesity, alcohol consumption and exercise • demographic and socio-economic characteristics.
ACCHS	Aboriginal Community Controlled Health Service	
ACSQHC	Australian Commission on Safety and Quality in Health Care	This commission is responsible for leading and coordinating national improvements in safety and quality in healthcare.
ALT	alanine aminotransferase test	
AIHW	Australian Institute of Health and Welfare	National agency that provides regular information and statistics on Australia's health and welfare.
AMT	Australian Medicines Terminology	A national, standards-based approach to the identification and naming of medicines in clinical systems for Australia.
ASGS	Australian Standard Geographical Classification	Used from 2011 by the Australian Bureau of Statistics (ABS) to calculate geographical statistics. We use ASGS in this report to calculate rurality based on postcode (categorised as in major cities, inner regional, outer regional, remote and very remote areas).
ATC	Anatomical Therapeutic Chemical Classification	System used to classify medicines into groups according to certain characteristics.
AURA	Antimicrobial Use and Resistance in Australia	A national surveillance system for antimicrobial use and resistance in Australia.
Average		Measurement of the 'central' or 'typical' value of a set of values. It is the result obtained by adding together several values and dividing this total by the number of values.
BEACH	Bettering the Evaluation and Care of Health program	Cross-sectional program collecting information on GP activities in Australia.
BMI	body mass index	A measure of weight in relation to height.
BP	Best Practice	Clinical management software for the GP.
BTOS	broad terms of service	
CIS	clinical information system	A generic term to describe one of several Australian national general practice software programs used by GPs to store patient/consultation/ prescription data (of which Best Practice and Medical Director are two examples).
Condition	An illness or abnormality that interferes with a person's usual activities or wellbeing.	
CKD	chronic kidney disease	
COPD	chronic obstructive pulmonary disease	
CVD	cardiovascular disease	A collective term for diseases of the heart and blood vessels.
DoH	Australian Government Department of Health	Federal department overseeing Australia's health system.
DVA	Department of Veterans' Affairs (Australia)	Federal department responsible for delivering government programs for war veterans, defence force and federal police members and their dependents.

eGFR	estimated glomerular filtration rate	
FBC	full blood count	
FY	financial year	
GORD	gastro-oesophageal reflux disease	
GP	general practitioner	
GPIR	General Practice Insights Report	
HbA_{1c}		
HDL		
INR	International Normalised Ratio	A laboratory measurement of how long it takes blood to form a clot.
IRSAD	Index of Relative Socio-Economic Advantage and Disadvantage	A measure of the economic and social conditions of people and households within an area, including both relative advantage and disadvantage.
LDL	low-density lipoprotein	
LFT	liver function test	
LOINC	Logical Observation Identifiers Names and Codes	A universal code system for reporting laboratory and other clinical observations
MBS	Medicare Benefits Schedule	
Median		The number separating the upper and lower half of a sample of values.
MD	MedicalDirector 3	Clinical management software for the GP.
NCTS	National Clinical Terminology Service	Agency responsible for managing, developing and distributing national clinical terminologies and related tools and services to support the digital health requirements of the Australian healthcare community.
OECD	Organisation for Economic Cooperation and Development	A group of member countries that discuss and develop economic and social policy.
PBS	Pharmaceutical Benefits Schedule	Program providing subsidised prescription medicines to Australians.
PHN	Primary Health Network	
Practice site		The unit of data collection corresponding to either one practice or to several practices that share the same clinical system database. Practices combined into one site are typically under common administration or operating in the same geographical area.
RACGP	Royal Australian College of General Practitioners	
Rate		Measure or ratio of how two factors are associated with one another; eg, a proportion of patients with a condition.
RFE	reason for encounter	
RPBS	Repatriation Pharmaceutical Benefits Scheme	Program providing subsidised prescription medicines to Australians veterans and their families
SAS	Statistical Analysis Software	Statistical software program.
SEIFA	Socio-Economic Indexes for Areas	An indication of the relative socio-economic wellbeing of an area. Calculated by ABS index of relative socio-economic advantage and disadvantage.
SHIP	2010 Survey of High Impact Psychosis	
SNOMED-CT-AU	Systematized Nomenclature of Medicine – Clinical Terms – Australia	A standardised healthcare terminology including comprehensive coverage of diseases, clinical findings, therapies, procedures and outcomes used in electronic health records.
TSH		
UEC	urea electrolytes and creatinine	This test is a measure of kidney function.
URTI	upper respiratory tract infection	