MedicineInsight

General practice insights report

July 2017 – June 2018

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FOREWORD

MedicineInsight, established in 2011 with funding from the Australian Government Department of Health (DoH), supports general practice with the aim of improving patient care and assisting the development of evidence-based health policy. The willingness of general practices to share their data and the excellent data governance framework surrounding the data ensure that the data is used for public good.

This General Practice Insights Report provides a patient-focused overview of the key features of general practice patients and activity in Australia for the period 1 July 2017 to 30 June 2018, using information from 14% of Australian general practitioners. The report includes selected health conditions, the utility of MedicineInsight for disease surveillance for communicable diseases, prescription and pathology information, the completeness of risk factor information and vignettes from other research.

This is the second General Practice Insights Report using MedicineInsight data to be published and has been a collaboration with the DoH, the Australian Bureau of Statistics (ABS), the Australian Institute of Health and Welfare (AIHW) and academic general practitioners. We appreciate the ongoing support we have received from these groups and the hard work of NPS MedicineWise staff to produce this report.

We look forward to seeing more publications based on MedicineInsight becoming available over time so that these insights can be shared with wider audiences. In the coming year we will be conducting more data validation studies to better understand encounters and how we can further improve our condition coding. We will also be exploring data linkage so that useful information on health outcomes can be provided, something that is limited in the datasets currently available in Australia. MedicineInsight has become a useful dataset for insights into general practice in Australia and is being used more every year by government and academia, as well as by general practitioners for feedback on their practice. This report demonstrates that MedicineInsight has an exciting future.

Steve Morris

CEO, NPS MedicineWise

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The data presented and the views expressed in this report are those of NPS MedicineWise and do not necessarily represent the views of the organisations represented on the Advisory Group or the reviewers.

Contents

The GPIR at a glance

- The GPIR uses data from
  - **474** general practice sites, comprising 534 general practices
  - **5085** unique GP providers
  - **2,736,098** patients with **13,801,039** clinical encounters in the 12-month period from 1 July 2017 to 30 June 2018
  - Approximately **11 million** original prescriptions and **34 million** original plus repeat prescriptions in 2017–18
  - More than **65 million** pathology test results recorded in 2017–18.
- Compared to national data and rates, the GPIR includes **7**% of practices, **14**% of GPs, **13**% of Australian patients and **9**% of clinical encounters.
- Hypertension was the most prevalent of selected patient conditions. Overall 16.9% of patients had diagnoses of hypertension in their medical records.
- Hypertension (27%), arthritis (24%), depression (24%), dyslipidaemia (22%) and gastro-oesophageal reflux disease (21%) were the top 5 most common chronic conditions diagnosed in patients managed by GPs per clinical encounter.
- Influenza or influenza-like illnesses were recorded as diagnoses for 1.3% of patients in 2017–18.
- On average, there was one original prescription written for every **1.2** clinical encounters and an average of **3** prescriptions (original or repeat) per clinical encounter.
- Cardiovascular medicines (ATC level 1) accounted for the largest volume of medicines prescribed in 2017–18 (30%).
- There were almost **6** pathology test results recorded per clinical encounter.
- Approximately **2** in **5** patients had at least one pathology test recorded in 2017–18.

EXECUTIVE SUMMARY

MedicineInsight was established by NPS MedicineWise in 2011, with core funding from the Australian Government Department of Health (DoH). MedicineInsight was designed to collect general practice data to support quality improvement in Australian primary care and post-market surveillance of medicines, and it continues to grow as a valuable resource for Australian longitudinal general practice research. With data from 2.7 million patients and almost 14 million clinical encounters in the 2017–18 financial year, MedicineInsight supports public health and health services research, as well as contributing evidence for the development of health systems policy and practice.

This General Practice Insights Report (GPIR) 2017–18 provides a patient-centred overview of different facets of general practice activity and patient clinical management, including prevalence of selected common non-communicable conditions and communicable diseases. We also present data on services such as pathology testing and prescribing of medicines. This report provides information that cannot be obtained from other sources and covers aspects of general practice for which MedicineInsight data has the capacity to provide unique insights.

This report is based on the MedicineInsight October 2018 data download and includes encounters from 1 July 2017 to 30 June 2018. An Advisory Group of expert members from general practice, academia, NPS MedicineWise, DoH, Australian Bureau of Statistics (ABS) and the AIHW collaborated to establish the report's scope, definitions and weighting procedure to produce nationally representative findings about people who attended an Australian general practice in 2017–18.

This report also includes vignettes from recent research and quality improvement projects using MedicineInsight data for the purpose of demonstrating the versatility and utility of the dataset. These vignettes are based on different patient cohorts and time periods from those included in the main body of the report. We have also presented weighted results, which aim to address any potential differences in representativeness, as a result of non-random sampling and recruitment of practices to MedicineInsight.

Practices, providers and patients

This report includes data from 474 general practice sites across Australia, incorporating 534 general practices, which make up 6.6% of general practices nationally.

Over 5000 unique GP providers are included in this report, making up almost 14% of the Australian GP workforce, 60% of whom are based in major cities.

The GPIR 2017–18 contains data on over 2.7 million patients, representing 12.7% of patients who visited a GP in Australia in 2017–18. When compared with national data for patients who visited a GP in 2017–18, MedicineInsight patients are broadly representative of the Australian population, in terms of age, gender, Indigenous status, and socio-economic status.[1]

Encounters

There were 13.8 million clinical GP encounters recorded in MedicineInsight in 2017–18, or an average of 5 encounters (or visits) with a GP per patient per year. Female patients had more encounters on average than

males, and the average number of encounters per patient per year increased with age, reaching 13.6 encounters for patients over 90 years of age.

Although MedicineInsight slightly underestimates the average number of clinical encounters per patient compared to national MBS data (6.9 clinical encounters per patient in 2017–18),[1] this may be explained by the fact that 47% of Australian patients attend more than one general practice, and if patients visit other practices that do not participate in MedicineInsight, these visits are not captured in MedicineInsight data, reducing the average number of encounters per patient. National MBS data indicate that patients who attend only a single practice have an average of 4.6 clinical encounters per patient per year, which is comparable to the average number of encounters in MedicineInsight.[2]

Non-communicable conditions

During 2017–18, hypertension was the most common of the selected non-communicable conditions recorded for patients seen by GPs in MedicineInsight practices (5.1% of patients), followed by depression (4.6% of patients) and anxiety (4.2% of patients).

Patient condition prevalence in 2017–18 was explored by identifying patients who were recorded as having a particular condition at any time in their medical record (ie, before or during 2017–18). Once again, hypertension was the most prevalent of the selected non-communicable conditions (14.6% of patients), followed by depression (14.0%) and dyslipidaemia (12.7%).

The patient prevalence estimates for most of the conditions (asthma, arthritis, anxiety, cardiovascular disease, chronic obstructive pulmonary disease, osteoporosis, atrial fibrillation and chronic kidney disease) align with the 2017–18 Australian Bureau of Statistics National Health Survey,[3] or are slightly higher (depression, type 2 diabetes and heart failure).

In line with national data, the proportion of patients with hypertension and arthritis increased with age. 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. While type 2 diabetes was rare in children and adolescents, it rose sharply in patients aged 40–49 years or more.

Communicable diseases

Influenza and influenza-like illness (ILI), pertussis and chlamydia were selected for analysis in this report, based on their relevance in general practice and to investigate the utility of MedicineInsight data for sentinel disease surveillance.

MedicineInsight is a valuable source of information on the burden and management of communicable diseases in general practice. In addition to estimating disease prevalence, MedicineInsight can provide information on patient characteristics, risk factors, management and quality use of antibiotics, along with outcomes and sequelae for patients, provided this information is recorded in primary care.

In order to capture the burden of influenza and ILI in general practice, both for patients and for clinical management, MedicineInsight has developed a relatively inclusive definition for this disease. For this reason, MedicineInsight rates of influenza and ILI are not directly comparable with the National Notifiable Diseases Surveillance System (NNDSS) rates, which use a much more restrictive definition. MedicineInsight rates of

influenza and ILI are considerably higher than nationally notified rates. Surveillance of influenza is challenging, as influenza must be distinguished from other respiratory viral infections. MedicineInsight had a similar rate and pattern of influenza and ILI diagnosis per 1000 clinical encounters as previously described in published reports using MedicineInsight and other national influenza surveillance data sources.[4]

In adults, MedicineInsight is a reliable source of data for estimating rates of pertussis, with comparable, if slightly higher, rates than those provided by the NNDSS. However, in children, MedicineInsight underestimates rates of pertussis when compared to NNDSS data. This is likely, in part, a reflection of the management of the disease in hospital settings rather than general practice, as it is often more severe in children.

In contrast to pertussis and influenza, chlamydia rates were much lower in MedicineInsight than those reported in the NNDSS, possibly because patients may seek care from specialist sexual health clinics, which are not included in MedicineInsight, although trends by age and sex were comparable.

Prescriptions

Information on prescriptions is reported by original 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 original prescription). Approximately 11 million original prescriptions and 34 million original plus repeat prescriptions with unique Anatomical Therapeutic Chemical (ATC) codes were written by GPs in MedicineInsight practices during 2017–18. Almost 70% of MedicineInsight patients were prescribed a medicine at least once during 2017–18. While a third of patients only had one or two original prescriptions recorded, 6.4% of patients had 15 or more original prescriptions during 2017–18.

There was an overall average of 3.6 original prescriptions prescribed per patient in 2017–18. The average number of prescriptions per patient increased with age and with socio-economic disadvantage, consistent with higher disease burdens in these populations. Overall on average, there were 0.8 original prescriptions and 2.5 original and repeat prescriptions per clinical encounter per year.

Medicines to treat the nervous system (ATC N; antidepressants, analgesics, antiepileptics) were the most commonly prescribed original prescriptions in 2017–18 but cardiovascular medicines (ATC C; lipid-modifying medicines, antihypertensives) were the most commonly prescribed original plus repeat medicines. Opioids (N02A) accounted for 10.1% of all original prescriptions while the antidepressants (N06A) accounted for 9.8% of total prescriptions (original plus repeats).

Cardiovascular medicines featured heavily in the top 30 drug classes, with lipid-modifying medicines accounting for 10.6% of total prescriptions and six different classes of antihypertensives accounting for a further 16.3% 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 captures prescriptions when the medicine is dispensed on the PBS or is under co-payment. This report shows that an overwhelming majority of medicines (87.2%) 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.

As MedicineInsight is able to collect patient level data on health conditions and prescriptions, it is uniquely placed to explore how conditions are managed in primary care and to describe indications for prescribing. MedicineInsight data can also be used to describe prescribed daily dosage, and work is currently underway in the MedicineInsight team to process both the structured and free-text dosage information in clinical information systems (CISs) into a useable format. These types of analyses will be explored in future reports.

Pathology testing

MedicineInsight can provide data on patient conditions and sociodemographic characteristics in conjunction with pathology testing results, and it is a potential source of data on appropriate use of pathology tests in general practice. MedicineInsight is not affected by 'episodic coning' of pathology tests, where only the top three most expensive items are recorded. MedicineInsight can provide data on all pathology service results. Furthermore, MedicineInsight can provide longitudinal information on pathology testing, which can be used in future to investigate patient outcomes and to evaluate changes to GP clinical management practices.

Pathology test results were recorded for 42.2% of patients in 2017–18; there were more than 65 million pathology test results with an average of 24 test results per patient. However, it is important to note that each component of a pathology test result is recorded separately (atomised) in MedicineInsight. For example, a single GP request for a full blood count (FBC) results in up to a dozen individual test results being recorded for the patient.

Age- and sex-specific rates showed the number of test results increased with age, and a higher average number of tests for women compared to men, which was particularly apparent in women of reproductive age and likely to be due to testing related to pregnancy, iron deficiency and thyroid function.

Patients living in the most advantaged socioeconomic areas (higher SEIFA quintiles) had fewer test results on average than patients from more disadvantaged areas, correlating with the higher burden of disease borne by these patients. Patients who had more than 70 pathology test results during 2017–18 were likely to be older or have non-communicable conditions, including heart failure and chronic kidney disease.

Risk factors

This report investigated the completeness of MedicineInsight data on three important health risk factors; smoking, alcohol use, and body mass index (BMI). Some GPs may record information on BMI, smoking or alcohol use in different places in the electronic medical record (eg, in the progress notes which are not extracted by MedicineInsight) and this can have a significant impact on completeness rates.

Of the three risk factors, smoking status was the most complete and was recorded for 82.9% of patients in MedicineInsight. Rates of recording of smoking status were lowest in younger age groups, particularly in males aged 18–19 years, despite the ABS reporting relatively high smoking rates in this at-risk group, at around 17.5%.

Alcohol use was recorded for only 22.1% of patients over 18 years of age in MedicineInsight in 2017–18 and was more frequently recorded for females than males (23.8% vs 20.1%). Patients aged 80 years and over had significantly higher rates of recording of alcohol use compared to younger patients.

BMI (or height and weight) was recorded for 35.2% of all patients in MedicineInsight. Women aged 20–39 years had higher rates of BMI recorded than men of the same age, and completeness rates increased with age for both males and females up to the age of 80–89 years.

1 INTRODUCTION

This chapter describes the aims and objectives of this report, provides an overview of the report and outlines the background to MedicineInsight.

1.1 Aims and objectives

The purpose of the GPIR 2017–18 is to provide a patient-focused overview of the key features of general practice patients and activity in Australia for the period 1 July 2017 to 30 June 2018, based on the MedicineInsight October 2018 download. The report provides information that cannot be obtained from other sources, and covers aspects of general practice for which MedicineInsight data has the capacity to provide reasonable estimates.

This work builds on previous NPS MedicineWise General Practice Insights Reports,[5] and seeks to further describe and investigate how data from the MedicineInsight program can be used to describe general practice activity. This report also includes vignettes from additional recent research and quality improvement projects using MedicineInsight data, for the purpose of demonstrating the versatility and utility of the dataset. These vignettes are based on different cohorts and/or time periods from those included in the main body of the report.

1.2 Report overview

Each chapter in this report presents data on a separate facet of the clinical and sociodemographic information collected in MedicineInsight. We have started with a high-level review of the geographical distribution and number of practices and general practitioner providers in MedicineInsight, and then compared this to national data. We have then characterised MedicineInsight patients by gender, age, Indigenous status and location of residence (state or territory, rurality and SEIFA). We have also quantified differences in the number of GP encounters based on patient characteristics, including age, gender and geographical location.

We have provided insights into different aspects of general practice and patient clinical management, and have presented data on the prevalence of selected common non-communicable conditions, including:

- hypertension
- depression
- dyslipidaemia
- asthma
- arthritis (any including gout)
- anxiety
- gastro-oesophageal reflux disease (GORD)
- type 2 diabetes
- cardiovascular disease

- osteoporosis
- chronic obstructive pulmonary disease (COPD)
- atrial fibrillation
- chronic kidney disease (CKD)
- heart failure

and communicable diseases, including:

- influenza and influenza-like illness
- pertussis (whooping cough)
- sexually-transmitted chlamydia.

We have also presented data on services such as pathology testing and prescribing.

The scope, rationale and methodology for this report were developed by NPS MedicineWise, with expert input from a specially convened Advisory Group, with members from DoH, AIHW, ABS, and clinical and academic advisors from NPS MedicineWise, the University of New South Wales, the University of Melbourne, and Curtin University.

This report is not directly comparable to the GPIR 2016–17,[5] as the source of data has changed from the MedicineInsight Data Store, established during the pilot phase of the MedicineInsight program, to the new MedicineInsight Data Warehouse. This change has entailed modifications to the variables and tables available for analysis. We have also updated and improved a number of processes in our analysis. For example, we have reviewed and updated how we identify and code for conditions and further refined our definition of a 'clinical encounter'.

1.3 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 DoH, to collect general practice data to support quality improvement in Australian primary care and post-market surveillance of medicines.

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 diabetes, stroke, COPD, depression and antibiotic 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. Further details about MedicineInsight are available 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.

1.4 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. Sharing of MedicineInsight data 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.

Data are always encrypted during transit and storage, following government and industry best practice standards. MedicineInsight data are collected, used and stored strictly in line with Australian privacy laws (including mandatory data breach notification laws).

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.

2 METHODOLOGY

This chapter focuses on the scope, rationale and processes used to select the sample population for this report.

Decisions on sample selection and scope were guided by the principles of:

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

Additional detail about methodology can be found in the Appendices, including variable definitions, condition coding, weighting and statistical methods used.

2.1 Cohort selection

The selection process aimed to identify a cohort of patients and associated clinical GP encounters to use consistently throughout the report. The stand-alone vignettes use different cohorts derived specifically for the research project or topics covered.

The following criteria were applied as the first steps in the selection process for general practice sites.

i. The site must have a successful data extract in the MedicineInsight October 2018 data download.

ii. The site must meet the following data quality criteria: established for at least 2 years, no significant gaps in data tables and a reasonable volume of patients.

A sequential multi-step selection process was used to construct a cohort of patients who had at least one clinical encounter with a GP in the period 1 July 2017 to 30 June 2018 and met standard data quality checks including a valid age and gender recorded. Table 2.1 outlines the criteria used to select these patients and their clinical encounters, with further detail provided in sections 2.1.1 and 2.1.2.

Table 2.1 Summary of MedicineInsight patient and clinical encounter selection criteria and cohort size, 2017–18

	Inclusion/exclusion criteria	Number included
Patients with at least one clinical encounter during the study period and high-quality data as outlined in the inclusion criteria	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 with a GP in the study period (defined as below)	2,736,098
Clinical encounters with a GP associated with included patients during the study period	Inclusions • Encounters where provider is consistently recorded as a GP Exclusions • Encounters with an administrative or non-GP visit type • Encounters with an administrative reason for encounter (RFE)	13,801,039 for the purposes of counting clinical encounters (see section 2.1.2)

2.1.1 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.

Individuals have been identified as patients and selected for inclusion in the patient cohort if they had a valid age (0–112 years) and gender (male, female or intersex/indeterminate) recorded. The patient must be recorded as either active, inactive, visitor (not their usual practice) or deceased within the patient status field. Included patients must be associated with at least one eligible clinical GP encounter in the study period (see section 2.1.2 for these eligibility criteria). Patients who attend multiple practices sites in MedicineInsight may have multiple patient records. However, as described in Chapter 4, the estimated 3% of patients duplicated is not a significant number of patients.

2.1.2 Clinical GP encounters

A clinical encounter is generally defined as an interaction between a patient and a health professional. However, this can be difficult to identify within CIS data, as an 'encounter' occurs in the CIS whenever a patient's electronic health record is opened (referred to as an 'electronic encounter'). This may occur for clinical reasons (such as a consultation) or for administrative purposes (such as practice staff updating a patient's address or sending an SMS reminder).

The following selection criteria were applied in order to maximise the likelihood that included GP encounters were for clinical reasons.

i. Inclusion of encounters where the provider is consistently recorded as a GP

The provider associated with each encounter is recorded in the CIS and includes any staff member who logs information in the CIS, including clinical (GP, nurse, allied health) and administrative staff. In this report, we have defined GPs as those providers who are identified as doctors in both the 'provider type' and the 'doctor indicator' fields, a field derived by MedicineInsight which requires a complete prescriber number. This report focuses primarily on GP activity relating to general practice patients, hence only encounters where the provider was consistently identified as a GP were included.

ii. Exclusion of encounters with an administrative or non-GP visit type

Encounters were not considered clinical if the 'visit type' field includes a description that is clearly administrative or clearly not related to GP activity. Examples of such recorded visit types include 'practice administration', 'dietitian' and 'clinical notes provided' with the complete list of exclusions available in Appendix 3.

iii. Exclusion of encounters with an administrative or non-GP reason for encounter

Encounters were not considered clinical GP encounters, if all associated reasons for encounters (RFEs) were clearly administrative or not related to GP activity. Examples of such entries in the reason for encounter field include: 'did not attend', 'reminder management' and 'registered nurse'. These exclusions are detailed in Appendix 3.

For the purposes of providing a denominator for the number of clinical encounters, only one clinical GP encounter per day per patient has been counted. We recognise that patients can have more than one clinical GP encounter in a day, however, due to the nature of the GP CISs, activities (such as prescriptions,

observations, or diagnoses) cannot be linked to individual encounters when there is more than one encounter recorded for a patient on the same day.[i] This does not lead to a substantial underestimate of the count of GP clinical encounters, as our analysis has shown that only 1.4% of clinical GP encounter dates incorporate more than a single clinical encounter. Note that although the number of clinical encounters has been capped at one, all the other information associated with the encounters on that day has been retained and used in additional analyses. Although we have identified certain encounters as 'clinical' for the purposes of patient selection and described the characteristics of clinical encounters, all patient-relevant information on any date in the financial year (FY) 2017–18 has been used, regardless of the encounter type. For example, while we have used 13,801,039 clinical encounters when calculating specific events or conditions per 100 encounters, we have used the data (on conditions, prescriptions and pathology) available in the total number of 20,472,289 electronic encounters that were recorded in MedicineInsight in 2017–18.

[i] The data extracted from GP CISs does not include a unique identifier linking an electronic encounter to other activities that occurred during that encounter, such as prescriptions, observations or diagnoses recorded. The unique patient identifier and date are used as a proxy link between encounter records and other activities, which does not account for multiple encounters on one day.

3 PRACTICES, PROVIDERS AND PATIENTS

This chapter describes:

- characteristics of the general practices in the cohort, compared to all practices nationally, including:
    - number of general practices within each practice site
    - distribution of practices in the cohort and all practices nationally, along with percentage covered, by state, remoteness, and Primary Health Network (PHN)
- distribution of GP providers in the cohort, compared to all providers nationally by state and remoteness
- the characteristics of the patient cohort, compared to all patients nationally, including:
    - distribution of patients in the cohort and all patients nationally, and
    - percent by sociodemographic characteristics and location.

3.1 General practice sites

MedicineInsight extracts data from two general practice CISs – Best Practice (BP) and Medical Director (MD). Where individual general practices share a CIS with other practices, 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 as a result it is not possible for MedicineInsight to distinguish which general practice within a site a specific patient's record comes from.

In this report, we have data from 474 general practice sites, incorporating 534 general practices. This represents 6.6% of all general practices nationally,[6] which is a slight increase from the 5.9% of national practices included in the 2016–17 GPIR.[5] Table 3.1 provides a summary of the number of general practices for each site. More than 89% of practice sites consist of a single general practice.

Table 3.1 General practices and general practice sites, MedicineInsight 2017–18

Number of general practices within each site	General practice sites		Total number of general practices
	Number	%	
1	425	89.7	426
2	42	8.8	84
3	4	0.8	12
4–5	3	0.6	13
Total	474	100	534

Although MedicineInsight data are collected at the general practice site level, we can nonetheless compare geographical data on individual general practices with national general practice data, as in Table 3.2. While this report includes data from 6.6% of general practices nationally, there is variation in the proportion of practices by location. There has previously been particularly active recruitment of practices into MedicineInsight in Tasmania (which has 26.3% coverage) and in the Hunter New England and Central Coast PHN (20.4% coverage) in NSW. Conversely, there is under-representation of practices in South Australia (1.8% coverage) and Victoria (4.9% coverage), and there are no MedicineInsight practices in the Western Queensland PHN. The proportion of practices by rurality is similar between MedicineInsight and national data, with most practices located in major cities. MedicineInsight has a slightly larger proportion of practices

in inner and outer regional areas, and fewer practices in remote and very remote regions, compared to national data. This is mainly the result of non-random sampling and recruitment of practices. Statistical weighting of the data, developed by the ABS, has largely addressed differences in area-level representativeness of MedicineInsight practices (see Appendix 5).

Table 3.2 Geographical representation of MedicineInsight general practices 2017–18, compared to national data, 2017

General practice location	MedicineInsight 2017–18		National practices 2017[a]		% Coverage of MedicineInsight practices
Australian total	534		8065		6.6
	n	*% practices*	*N*	*% practices*	
State/Territory					
ACT	9	1.7	98	1.2	9.2
NSW	197	36.9	2809	34.8	7.0
NT	10	1.9	127	1.6	7.9
QLD	104	19.5	1604	19.9	6.5
SA	10	1.9	570	7.1	1.8
TAS	45	8.4	171	2.1	26.3
VIC	98	18.4	1990	24.7	4.9
WA	61	11.4	696	8.6	8.8
Rurality					
Major city	308	58.6	5503	68.2	5.6
Inner regional	136	25.9	1396	17.3	9.7
Outer regional	63	12.0	779	9.7	8.1
Remote/very remote	19	3.6	379	4.7	5.0
Primary Health Network (PHN)					
Adelaide	7	1.3	369	4.6	1.9
Australian Capital Territory	9	1.7	98	1.2	9.2
Brisbane North	14	2.6	308	3.8	4.5
Brisbane South	25	4.7	323	4.0	7.7
Central Queensland, Wide Bay, Sunshine Coast	25	5.2	626	7.8	4.0
Central and Eastern Sydney	28	4.7	285	3.5	9.8
Country SA	<5	<1	201	2.5	<5
Country WA	23	4.3	209	2.6	11.0
Darling Downs and West Moreton	8	1.5	175	2.2	4.6
Eastern Melbourne	18	3.4	427	5.3	4.2
Gippsland	6	1.1	95	1.2	6.3
Gold Coast	20	3.8	181	2.2	11.0
Hunter New England and Central Coast	85	15.9	417	5.2	20.4
Murray	14	2.6	221	2.7	6.3
Murrumbidgee	<5	<1	89	1.1	<5
Nepean Blue Mountains	5	0.9	129	1.6	3.9
North Coast	19	3.6	192	2.4	9.9
North Western Melbourne	36	6.7	551	6.8	6.5
Northern Queensland	9	1.7	264	3.3	3.4
Northern Sydney	14	2.6	294	3.6	4.8
Northern Territory	10	1.9	127	1.6	7.9
Perth North	18	3.4	249	3.1	7.2
Perth South	20	3.8	238	3.0	8.4
South Eastern Melbourne	16	3.0	480	6.0	3.3
South Eastern NSW	14	2.6	212	2.6	6.6
South Western Sydney	7	1.3	407	5.0	1.7
Tasmania	45	8.4	171	2.1	26.3
Western NSW	9	1.7	117	1.5	7.7
Western Queensland	0	0.0	68	0.8	0.0
Western Sydney	15	2.8	326	4.0	4.6
Western Victoria	8	1.5	216	2.7	3.7

a Healthdirect Australia. National Health Services Directory. Sydney: Healthdirect Australia, 2017.[6]

3.2 GP providers

We identified 5,085 unique GP providers in MedicineInsight for 2017–18, which represents 13.8% of practising GPs in Australia. Table 3.3 shows the geographical location of MedicineInsight GPs compared to national coverage, using data from GP Workforce Statistics for 2017–18.[7] The proportional distribution of GPs was similar to that of general practices, with the highest rates of coverage seen in Tasmania (47.8%), and the lowest in South Australia (3.1%). Most MedicineInsight GPs were based in major cities (59.7%), which is lower than the proportion observed in the national data (68.6%).

Table 3.3 Geographical distribution of MedicineInsight GPs compared to national data, 2017–18

GP location	MedicineInsight GPs 2017–18		National GPs 2017–18[a]		% Coverage of MedicineInsight GPs
Australian total	5085		36,938		13.8
	n	%	*N*	%	
State/Territory					
ACT	98	1.9	561	1.5	17.5
NSW	1826	35.9	11,169	30.2	16.3
NT	66	1.3	568	1.5	11.6
QLD	933	18.4	8,017	21.7	11.6
SA	89	1.8	2,836	7.7	3.1
TAS	437	8.6	914	2.5	47.8
VIC	988	19.4	8,999	24.4	11.0
WA	648	12.7	3,875	10.5	16.7
Rurality	(122 missing)				
Major city	2977	60.0	25,334	68.6	11.8
Inner regional	1315	26.5	6,944	18.8	18.9
Outer regional	553	10.7	3,285	8.9	16.2
Remote	138	2.72.8	1,375	3.7	10.0

a Australian Government Department of Health. GP workforce statistics – 2001-02 to 2016-17 Canberra: DoH; 2017.[7]

3.3 Patients

There were 2,736,098 patients in MedicineInsight data who met the quality and selection criteria outlined in Chapter 2, representing 12.7% of all patients who visited a GP in Australia in 2017–18.[1] Table 3.4 describes the sociodemographic characteristics of MedicineInsight patients, compared to national data. When compared with national data for patients who visited a GP in 2017–18, MedicineInsight patients are broadly representative of the Australian population, in terms of age, gender, Indigenous status, and socio-economic status. However, 22.5% of patients did not have Indigenous status recorded in the CIS. Consistent with trends seen in the national data, MedicineInsight patients were more likely to be female (54.7% female versus 45.3% male) and aged between 20 and 39 years of age (Figure 3.1). There was a very small proportion of people of intersex or indeterminate gender (< 0.1%). Because this was such a small sample size, they have not been included in further gender-specific analyses in this report.

Compared to national data and reflecting the active recruitment of practices to MedicineInsight in Tasmania, there was a higher proportion of MedicineInsight patients in Tasmania (6.6% MedicineInsight versus 2.1% national MBS data). In line with the low recruitment rate in South Australia, there was a lower proportion of MedicineInsight patients in SA (1.7%) compared with national MBS data (7.1%). Patients residing in inner regional areas were over-represented in MedicineInsight (23.1%) compared with national data (12.4%)

(Table 3.4). Statistical weighting of the data has largely addressed differences in area-level and demographic representativeness of MedicineInsight patients (see Appendix 5).

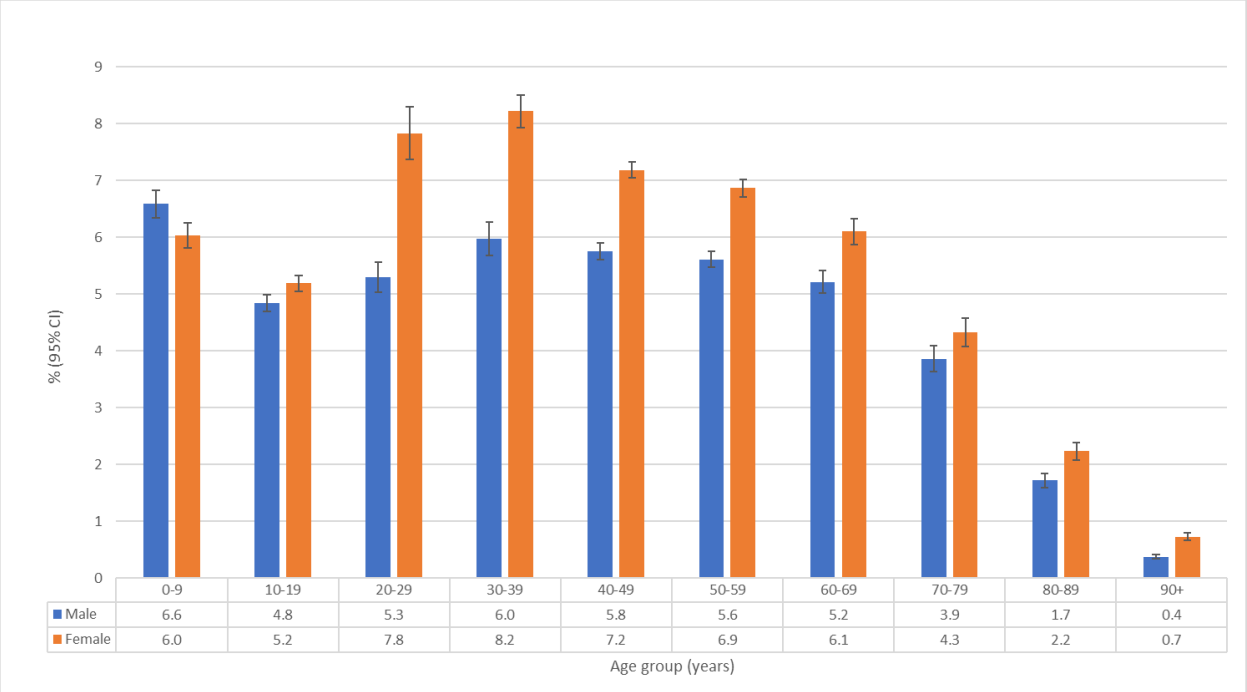
Table 3.4 Sociodemographic distribution of MedicineInsight patients compared to MBS national data, 2017–18

Patient sociodemographic characteristic	MedicineInsight patients 2017–18		Australian national data (MBS)[a] 2017–18		% Coverage of MedicineInsight patients
TOTAL	2,736,098		21,606,205		12.7%
	n	%	*N*	%	
Gender					
Male	1,238,293	45.3	10,292,317	47.6	12.0
Female	1,497,643	54.7	11,309,888	52.4	13.2
Other	162	<0.1	-	-	-
Age group (years)					
0–9	345,465	12.6	2,624,669	12.2	13.2
10–19	274,534	10.0	2,367,255	11.0	11.6
20–29	359,392	13.1	2,633,840	12.2	13.6
30–39	388,575	14.2	3,015,448	14.0	12.9
40–49	354,204	12.9	2,877,378	13.3	12.3
50–59	341,520	12.5	2,798,602	13.0	12.2
60–69	309,722	11.3	2,483,339	11.5	12.5
70–79	224,244	8.2	1,740,015	8.1	12.9
80–89	108,209	4.0	848,785	3.9	12.7
90+	30,233	1.1	212,861	1.0	14.2
Indigenous status					
Aboriginal and/or Torres Strait Islander	64,450	2.4	626,580	2.9[8]	10.3
Neither Aboriginal or Torres Strait Islander	2,054,740	75.1	20,979,625	97.1	9.8
Missing	616,908	22.5			
State/Territory					
ACT	63,451	2.3	355,286	1.6	17.9
NSW	985,457	36.0	6,954,986	32.2	14.2
NT	41,594	1.5	192,074	0.9	21.7
QLD	485,201	17.7	4,362,756	20.2	11.1
SA	46,249	1.7	1,529,482	7.1	3.0
TAS	179,646	6.6	459,167	2.1	39.1
VIC	580,856	21.2	5,515,115	25.5	10.5
WA	353,644	12.9	2,233,339	10.3	15.8
Rurality	(15,788 missing)				
Major city	1,773,287	65.2	15,412,737	71.3	11.5
Inner regional	627,894	23.1	2,681,675	12.4	23.4
Outer regional	270,558	9.9	2,656,394	12.3	10.2
Remote	48,571	1.8	850,438	3.9	5.7
Socio-economic status (SEIFA IRSAD quintile)	(708 missing)		(4856 missing)		
1 (most disadvantaged)	419,880	15.3	3,445,426	15.9	12.2
2	426,611	15.6	3,495,019	16.2	12.2
3	635,812	23.2	4,234,443	19.6	15.0
4	555,304	20.3	4,470,929	20.7	12.4
5 (most advantaged)	697,783	25.5	5,951,532	27.6	11.7
Concession Cards	(1,971,624 missing)				
Health Care Card	763,288	27.9	1,523,028[9]	7.0	50.1
DVA Health Card	8,017	0.3	190,967[10]	0.9	4.2

a MBS data from Australian Government Department of Health Total GP Non-Referred Attendances excluding Practice Nurse Items 2017–18[1]

While relatively fewer MedicineInsight patients have Department of Veteran's Affairs (DVA) Health Cards compared to the national data (0.3% vs 0.9% of patients, respectively), there are a much higher number of patients with Health Care Cards in MedicineInsight (27.9% vs 7.0%). This may be explained by the fact that a patient's Health Care Card can expire, or their status can change, and these changes may not always be updated on the practice CIS

We have provided data on patient distribution by PHN in Appendix 6.



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	6.6	4.8	5.3	6.0	5.8	5.6	5.2	3.9	1.7	0.4
Female	6.0	5.2	7.8	8.2	7.2	6.9	6.1	4.3	2.2	0.7

Figure 3.1 Age and sex distribution of MedicineInsight patients, 2017–18 (N = 2,736,098)

4 GP ENCOUNTERS

This chapter describes the characteristics of clinical GP encounters in the MedicineInsight cohort, compared to all 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, remoteness, and socio-economic status
- mean 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.

4.1 GP encounters by patient

A total of 13,801,039 clinical GP encounters were recorded in MedicineInsight in 2017–18 for 2,736,098 patients, representing an average of 5 encounters per patient for the year. However, more than half of the patients (55.3%) had 3 or fewer clinical encounters recorded. Just over 1 in 10 patients had 12 or more clinical GP encounters for the year. The relative distribution of the number of encounters per patient is illustrated in Figure 4.1.

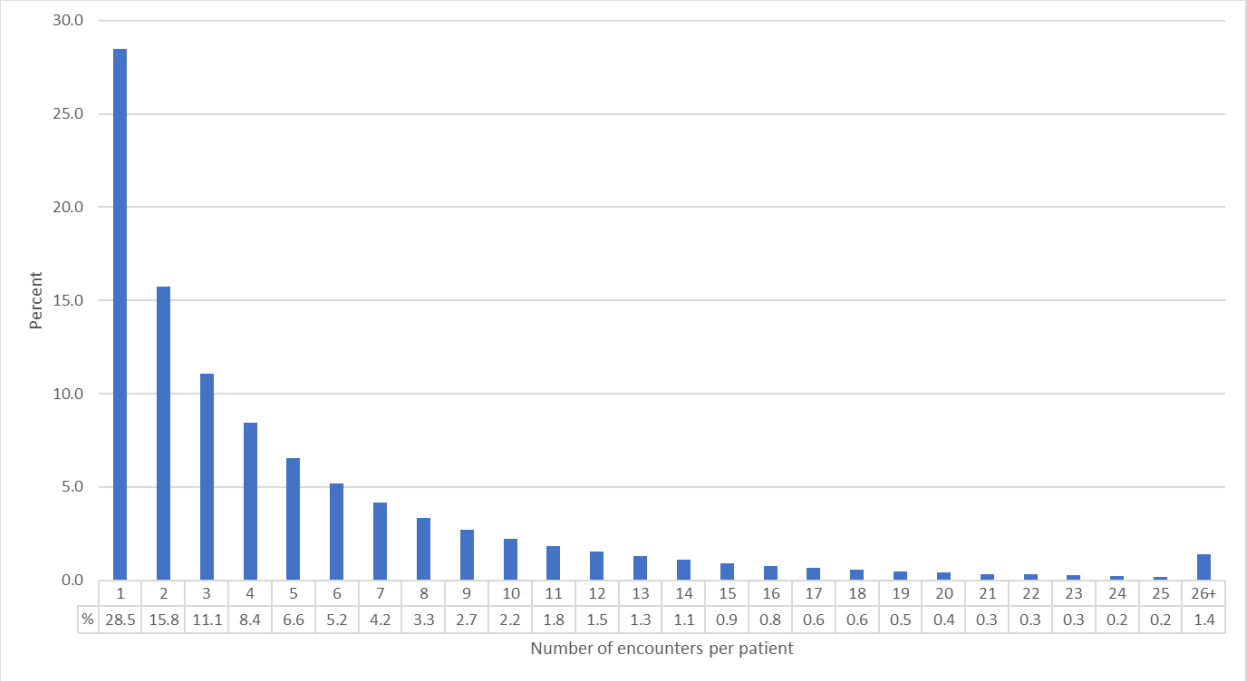


Figure 4.1 Frequency distribution of the number of encounters per patient (unweighted), MedicineInsight 2017–18

Data from MedicineInsight slightly underestimates the national average encounter rate per patient in Australia (5.0 vs 6.9, Table 4.1). This may be due partly to differences in the way that encounters are defined in MBS data compared to MedicineInsight. It can also be explained by the fact that many patients may regularly attend more than one general practice, and patient visits to practices that do not participate in MedicineInsight are not captured in MedicineInsight data. Patient loyalty data provided by the DoH[2]

demonstrates that 53% of patients attended a single practice in the 2016–17 financial year, and these patients had an average of 4.6 encounters per year.

Using patient loyalty data, in combination with the estimates of the proportion of practices in MedicineInsight, we can also model the likely number of duplicate patients in MedicineInsight. Assuming no change in patient behaviour, we estimate that 3% of patients in the MedicineInsight GPIR 2017–18 cohort are duplicate.

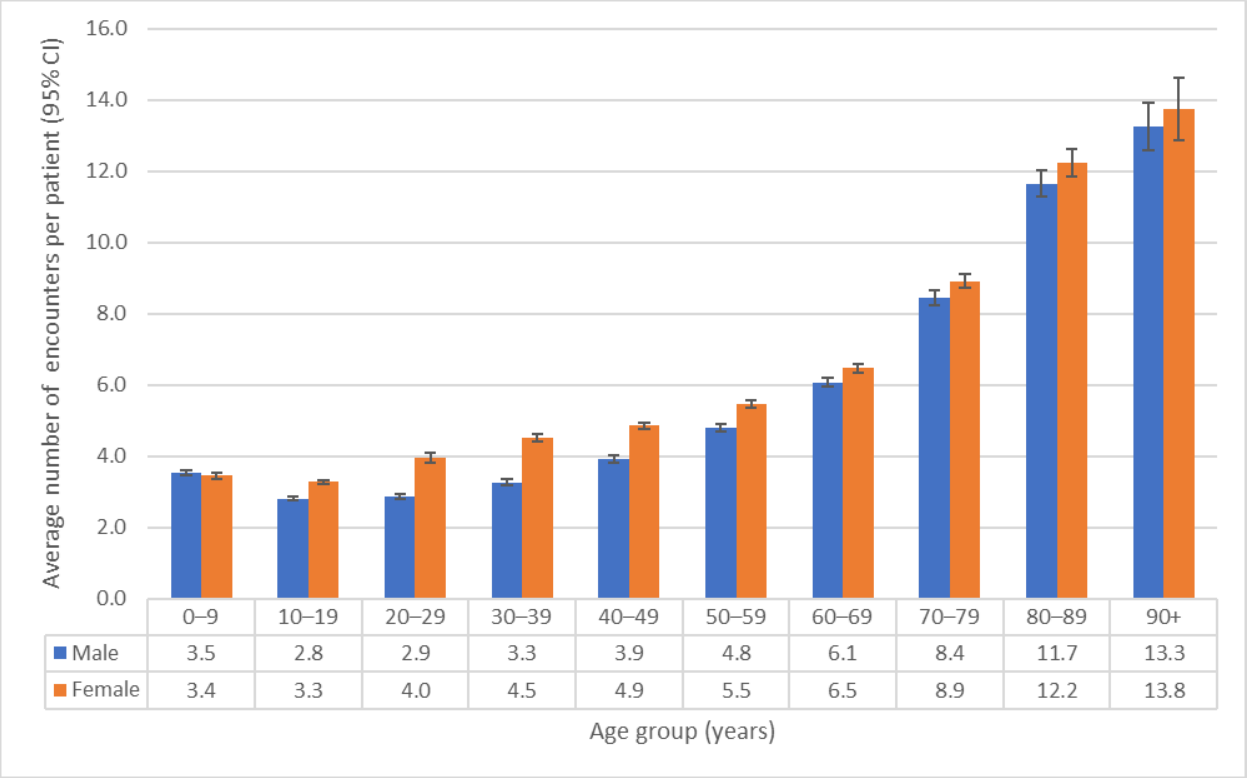
Table 4.1 Average number of encounters per patient by sociodemographic characteristic in MedicineInsight (unweighted data) compared to MBS national data, 2017–18

Patient characteristic	MedicineInsight average number of encounters per patient	95% CI	MBS average number of encounters per patient[a]
All patients	5.0	(4.9, 5.2)	6.9
Sex			
Male	4.6	(4.5, 4.8)	6.2
Female	5.4	(5.3, 5.5)	7.5
Age group (years)			
0–9	3.5	(3.4, 3.6)	5.6
10–19	3.1	(3.0, 3.1)	4.1
20–29	3.5	(3.4, 3.6)	5.7
30–39	4.0	(3.9, 4.1)	6.0
40–49	4.4	(4.4, 4.5)	6.2
50–59	5.2	(5.1, 5.3)	6.8
60–69	6.3	(6.2, 6.4)	8.1
70–79	8.7	(8.5, 8.9)	10.8
80–89	12.0	(11.7, 12.5)	14.4
90+	13.6	(13.1, 14.1)	16.3
State/Territory			
ACT	5.0	(4.7, 5.4)	5.6
NSW	5.1	(4.9, 5.2)	7.1
NT	3.6	(3.0, 4.3)	5.7
QLD	5.0	(4.8, 5.2)	7.0
SA	5.1	(4.6, 5.5)	6.9
TAS	5.8	(5.3, 6.2)	6.3
VIC	5.0	(4.7, 5.3)	7.0
WA	4.9	(4.6, 5.2)	6.3
Rurality			
Major city	4.9	(4.7, 5.0)	7.0
Inner regional	5.6	(5.4, 5.8)	6.6
Outer regional	5.0	(4.7, 5.3)	6.9
Remote/very remote	4.0	(3.7, 4.4)	5.9
Socio-economic status (SEIFA IRSAD quintile)			
1 (most disadvantaged)	5.6	(5.4, 5.8)	7.5
2	5.3	(5.1, 5.5)	7.2
3	5.3	(5.1, 5.5)	7.1
4	4.8	(4.6, 4.9)	6.9
5 (most advantaged)	4.5	(4.4, 4.7)	6.3

a MBS data from Australian Government Department of Health Total GP Non-Referred Attendances excluding Practice Nurse Items 2017–18[1]

As illustrated in Table 4.1, female patients had a slightly higher average number of GP encounters than male patients, at 5.4 (95% CI 5.3 to 5.5) compared to 4.7 (95% CI 4.5 to 4.8) encounters per patient per year. This difference was most significant in the 20–39-year age group, and was apparent in all age groups, except for patients aged 0–9 years (Figure 4.2). The average number of encounters per year increased significantly

with age from 3.5 encounters per patient aged 0–9 years to 13.6 encounters per patient aged 90+ years (Table 4.1 and Figure 4.2). Comparable trends were seen in the national data (Table 4.1).



	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90+
Male	3.5	2.8	2.9	3.3	3.9	4.8	6.1	8.4	11.7	13.3
Female	3.4	3.3	4.0	4.5	4.9	5.5	6.5	8.9	12.2	13.8

Figure 4.2 Average number of encounters per patient by sex and age group (unweighted data), MedicineInsight 2017–18

MedicineInsight patients in the Northern Territory had the least number of encounters on average (3.6), and Tasmanian patients had the highest (5.8). However, this was not seen in the comparative national data and may reflect disparate levels of general practice site coverage by MedicineInsight in these areas (see Chapter 3, section 3.1).

Inner regional patients had more encounters on average than patients residing in major cities, and patients in remote and very remote areas had the fewest number of encounters. This is also in contrast to the national data and may partly be explained by patients in major cities being more likely to visit several different practices, as there is a higher geographical density of general practices in urban areas compared to inner regional locations. Patients in remote areas are likely to have less access to general practices, and therefore have fewer encounters. Patients living in more disadvantaged socio-economic areas had more encounters per patient than those living in more advantaged areas, and this was apparent even when stratified by sex (Figure 4.3).

We investigated the proportion of all clinical GP encounters by age group (Figure 4.4) and saw an initial peak for patients aged under 10, and a steady increase in the proportion of encounters from 20 until 69 years of age, where the proportion levelled off, and was followed by a sharp drop in the proportion of encounters for patients aged 80 and over. This figure shows the disproportionate distribution of clinical encounters in different age groups. For example, while patients aged 60–69 years make up only 10% of the MedicineInsight patient cohort, they count for over 14% of all clinical encounters.

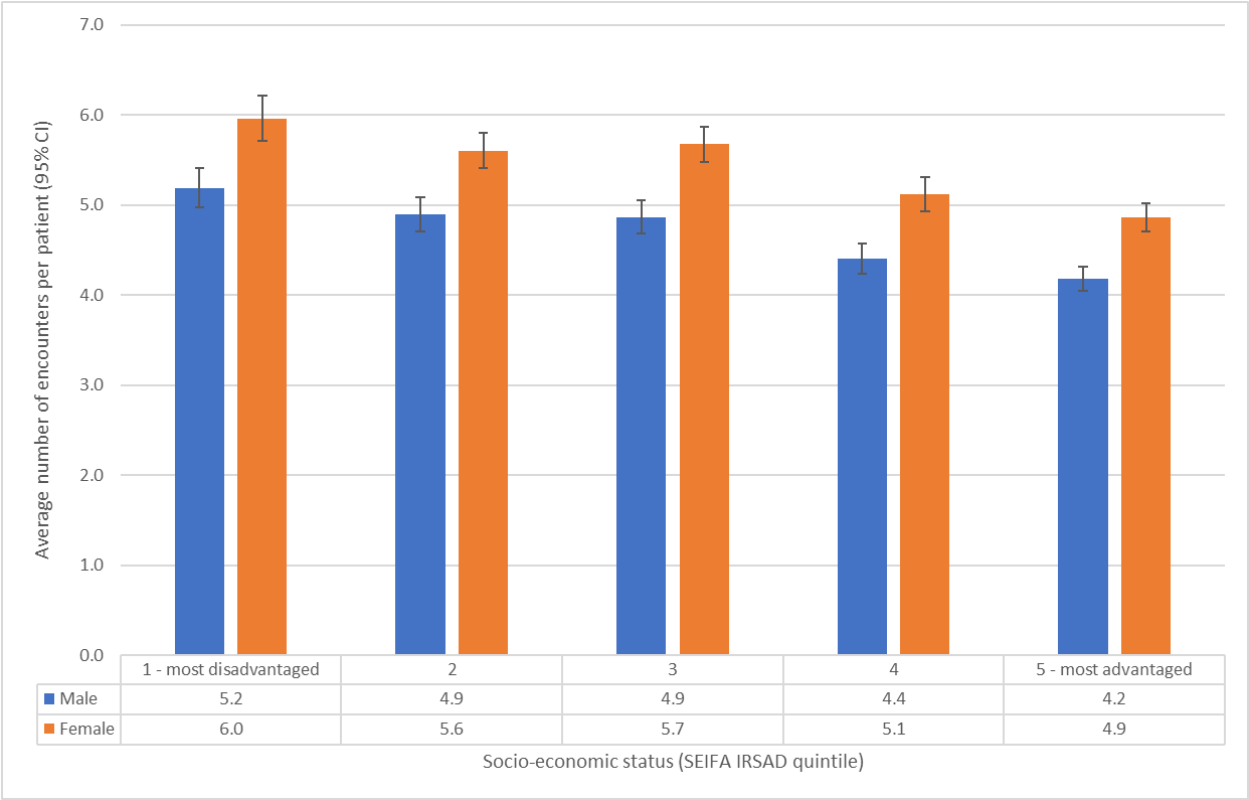


Figure 4.3 Average number of encounters per patient by SEIFA quintile and sex (unweighted data), MedicineInsight 2017–18

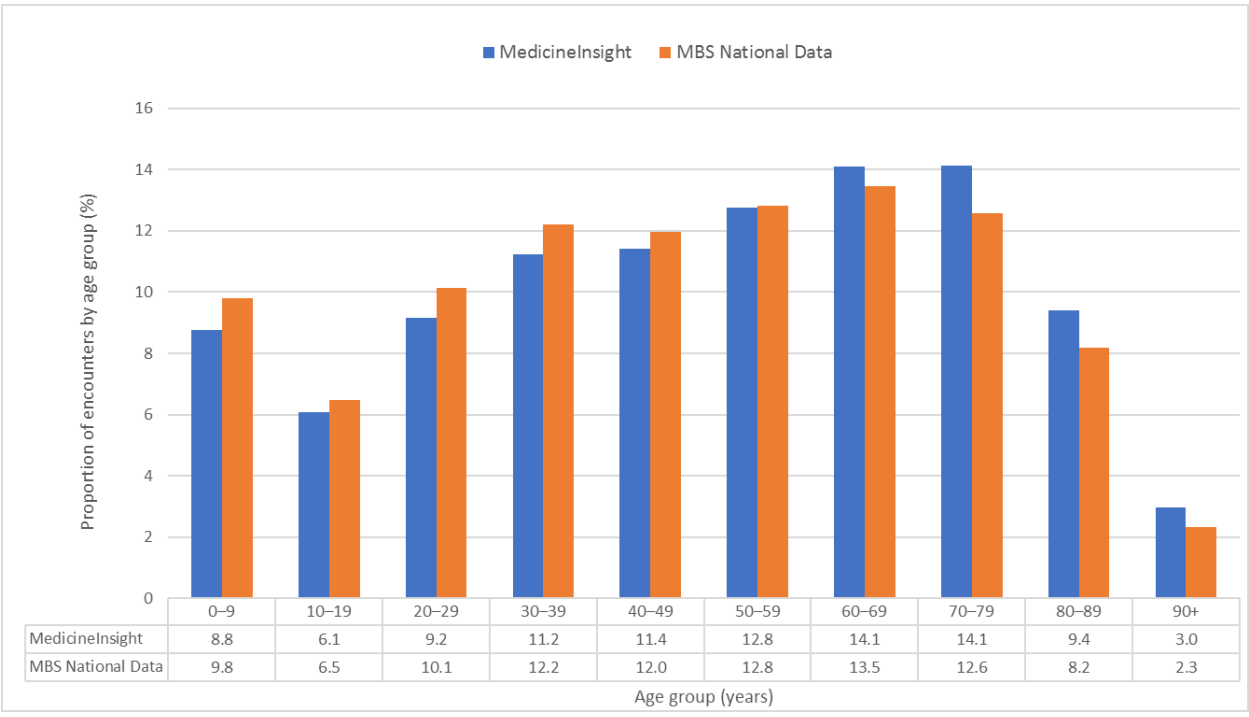


Figure 4.4 Distribution of encounters by patient age group in MedicineInsight (unweighted data) compared to MBS national data, 2017–18

5 NON-COMMUNICABLE CONDITIONS

In summary

- During 2017–18, hypertension was the most common selected condition recorded for patients seen by GPs in MedicineInsight practices (5.1% of patients). This was followed by depression (4.6% of patients) and anxiety (4.2% of patients).
- Patient prevalence in 2017–18 was further explored by identifying patients who were recorded as having a particular condition at any time in their medical record (ie, before or during 2017–18). Once again, hypertension was the most commonly reported of the selected non-communicable conditions (14.6% of patients), followed by depression (14.0%) and dyslipidaemia (12.7%).
- The patient prevalence estimates for most of the conditions (arthritis, anxiety, asthma, cardiovascular disease, COPD, osteoporosis, atrial fibrillation and CKD) align with the 2017–18 Australian Bureau of Statistics National Health Survey, or are slightly higher (depression, type 2 diabetes and heart failure).
- In line with national data, the proportion of patients with hypertension and arthritis increased with age.
- 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.
- While type 2 diabetes was rare in children and adolescents, it rose sharply in patients aged 40–49 years and over. It was more common in men of all age groups.

This chapter describes:

- the proportion of patients with selected conditions reported at encounters in 2017–18
- 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.

5.1 Identifying non-communicable conditions

Non-communicable conditions were selected for inclusion based upon burden of disease, or on whether the condition was a National Health Priority Area and likely to be treated in primary care, under advice from the Advisory Group (see section 1.2).

MedicineInsight condition flags – developed by clinical coders and reviewed by medical advisors – 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 one or more of the 'Diagnosis', 'Reason for visit' or 'Reason for prescription' fields. Records of medicines and tests can also be used to identify patients with a particular condition in MedicineInsight, however, this strategy was not utilised in this report. The condition flags are defined in Appendix 4.

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.

For this chapter, data on **conditions by patient** are presented in two ways:

i. the proportion of patients with the condition recorded at any time in their medical record (referred to as 'ever recorded'). We refer to this as patient prevalence.

ii. the proportion of patients with the condition recorded at least once during the 2017–18 study period.

Data on **conditions by encounter** are similarly presented in two ways:

i. the rate of patients with the condition ever recorded per 100 clinical GP encounters

ii. the rate of patients with the condition recorded at least once during the 2017–18 study period per 100 clinical GP encounters.

5.2 Patient prevalence

Hypertension was the most commonly recorded condition, when analysed according to whether a condition had been recorded ever (at any time in the medical record), with 14.6% of patients ever having a record of hypertension (Table 5.1). The next four most prevalent conditions were depression (14.0%), dyslipidaemia (12.7%), asthma (12.4%) and arthritis (any type, including gout; 12.1%).

The patient prevalence of most of the conditions were very similar in both the MedicineInsight cohort during 2017–18 and the 2017–18 Australian Bureau of Statistics National Health Survey (ABS NHS), including arthritis, anxiety, asthma, cardiovascular disease, COPD, osteoporosis, atrial fibrillation and CKD.[11] Arthritis was recorded for 12.1% of MedicineInsight patients and 15.0% of ABS NHS participants. Similarly, asthma was recorded for 12.4% of MedicineInsight patients and 11.2% of ABS NHS participants (Table 5.1).

Patient prevalence estimates were slightly higher for a number of conditions in MedicineInsight than in the 2017–18 ABS NHS (Table 5.1), including depression, type 2 diabetes and heart failure. Interestingly, the difference between the two data sets was greatest for the cardiovascular risk factors, hypertension and dyslipidaemia. In the MedicineInsight cohort, the proportion of people with hypertension was 14.6%, compared with 10.6% among ABS NHS participants. The proportion of MedicineInsight patients with dyslipidaemia was 12.7%, compared with 6.1% of ABS NHS participants reporting high cholesterol. This is partly a reflection of the different populations from which the data are drawn, the different collection methods (self-reported data compared with secondary use of electronic health records) and partly a result of the method of defining a 'current condition'. There is also the possibility that patients taking medicines that adequately control their hypertension and lipid levels are being missed, or that they may no longer self-report having these conditions when asked as part of the NHS survey.

MedicineInsight data includes people visiting their GPs, while the ABS NHS data were collected via self-report from people randomly selected from the general population. Therefore, as a group, patients from the MedicineInsight population will differ from those in the ABS NHS. Additionally, the ABS NHS asked respondents 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 type 2 diabetes.

The weighted results tend to be lower than for raw data, particularly for conditions that are primarily seen in older people. Weighting has adjusted for the over-representation of MedicineInsight patients in Tasmania (due to active recruitment in that state) which has an older population. While overall the age distribution of MedicineInsight patients is similar to the national MBS data (Table 3.4), 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 5.1 Proportion of MedicineInsight patients (unweighted and weighted) with selected chronic conditions ever recorded and ABS NHS participants with current conditions

	MedicineInsight unweighted (condition ever recorded) (n = 2,736,098)		MedicineInsight weighted (condition ever recorded)		ABS National Health Survey 2017–18 (current condition[a])
	% patients	95% CI	% patients	95% CI	% persons
Hypertension	16.9	(16.1, 17.6)	14.6	(13.9, 15.4)	10.6[b]
Depression	14.9	(14.3, 15.5)	14.0	(13.2, 14.8)	10.4
Dyslipidaemia	13.6	(13.0, 14.2)	12.7	(11.8, 13.5)	6.1[c]
Asthma	12.2	(11.8,12.6)	12.4	(11.6, 13.1)	11.2
Arthritis (any including gout)	14.1	(13.4, 14.8)	12.1	(11.3, 13.0)	15.0
Anxiety	12.4	(11.8, 12.9)	11.8	(11.1, 12.6)	13.1
GORD[d]	12.1	(11.6, 12.7)	11.3	(10.4, 12.1)	n/a
Type 2 diabetes	5.3	(5.1, 5.6)	4.9	(4.6, 5.1)	4.1
Cardiovascular disease[e]	5.0	(4.7, 5.3)	4.1	(3.8, 4.4)	4.8
Osteoporosis	4.6	(4.3, 4.9)	3.7	(3.4, 4.0)	3.8
COPD	2.7	(2.5, 2.9)	2.2	(2.0, 2.4)	2.5
Atrial fibrillation	2.3	(2.1, 2.4)	1.8	(1.6, 1.9)	1.9[f]
CKD	1.2	(1.0, 1.3)	0.9	(0.8, 1.0)	1.0
Heart failure	1.2	(1.1, 1.2)	0.9	(0.8, 0.9)	0.5

a Defined as a current medical condition which has lasted, or is expected to last, for 6 months or more, unless otherwise stated. Non-age standardised rate provided.
b Self-reported hypertension only. Excludes measured high blood pressure.
c Self-reported high cholesterol only.
d Gastro-oesophageal reflux disease
e Includes coronary artery disease, peripheral vascular disease stroke and TIA
f Rapid or irregular heartbeat, tachycardia or palpitations

5.3 Conditions recorded for patients in 2017–18

The most commonly recorded conditions in 2017–18 were similar to conditions recorded at any time in the medical record. Once again, hypertension was the most commonly recorded condition during the 2017–18 study period, affecting 5.1% of patients (Table 5.2). Depression (4.6%) and anxiety (4.2%) were also commonly recorded, followed by asthma (3.4%) and arthritis (3.3%).

The most common conditions seen here are consistent with data presented by the Royal Australian College of General Practitioners (RACGP) in the 2018 Health of the Nation report. In this online survey, GPs identified psychological, respiratory and musculoskeletal conditions as those they most commonly managed while circulatory issues were number five.[12]

Table 5.2 Proportion of MedicineInsight patients with selected non-communicable conditions recorded (unweighted and weighted), 2017–18

	MedicineInsight 2017–18, unweighted (n = 2,736,098)		MedicineInsight 2017–18, weighted	
	% patients	(95% CI)	% patients	(95% CI)
Hypertension	5.7	(5.4, 6.0)	5.1	(4.7, 5.5)
Depression	4.8	(4.6, 5.1)	4.6	(4.3, 4.9)
Anxiety	4.4	(4.2, 4.7)	4.2	(4.0, 4.5)
Asthma	3.2	(3.1, 3.4)	3.4	(3.1, 3.6)
Arthritis (any including gout)	3.8	(3.6, 4.0)	3.3	(3.1, 3.6)
Dyslipidaemia	3.2	(3.0, 3.3)	3.1	(2.8, 3.4)
GORD	2.7	(2.6, 2.9)	2.7	(2.4, 2.9)
Type 2 diabetes	2.4	(2.2, 2.5)	2.2	(2.0, 2.4)
Osteoporosis	1.3	(1.2, 1.4)	1.1	(1.0, 1.2)
Cardiovascular disease	1.2	(1.1, 1.2)	1.0	(0.8, 1.1)
COPD	1.0	(0.9. 1.0)	0.8	(0.7, 0.9)
Atrial fibrillation	0.7	(0.7, 0.8)	0.6	(0.5, 0.6)
Heart failure	0.4	(0.3, 0.4)	0.3	(0.3, 0.3)
CKD	0.3	(0.3, 0.4)	0.3	(0.2, 0.3)

Figures 5.1 to 5.6 show the age- and sex-specific rates for the six most common chronic conditions recorded during 2017–18.

As expected, recorded diagnoses of hypertension in 2017–18 increased with age in both men and women until age 70–79 in men and 80–89 in women (Figure 5.1). Hypertension was more commonly recorded in men until age 60–69 after which it was more commonly reported in women. This pattern was also seen in the 2017–18 ABS NHS.[11]

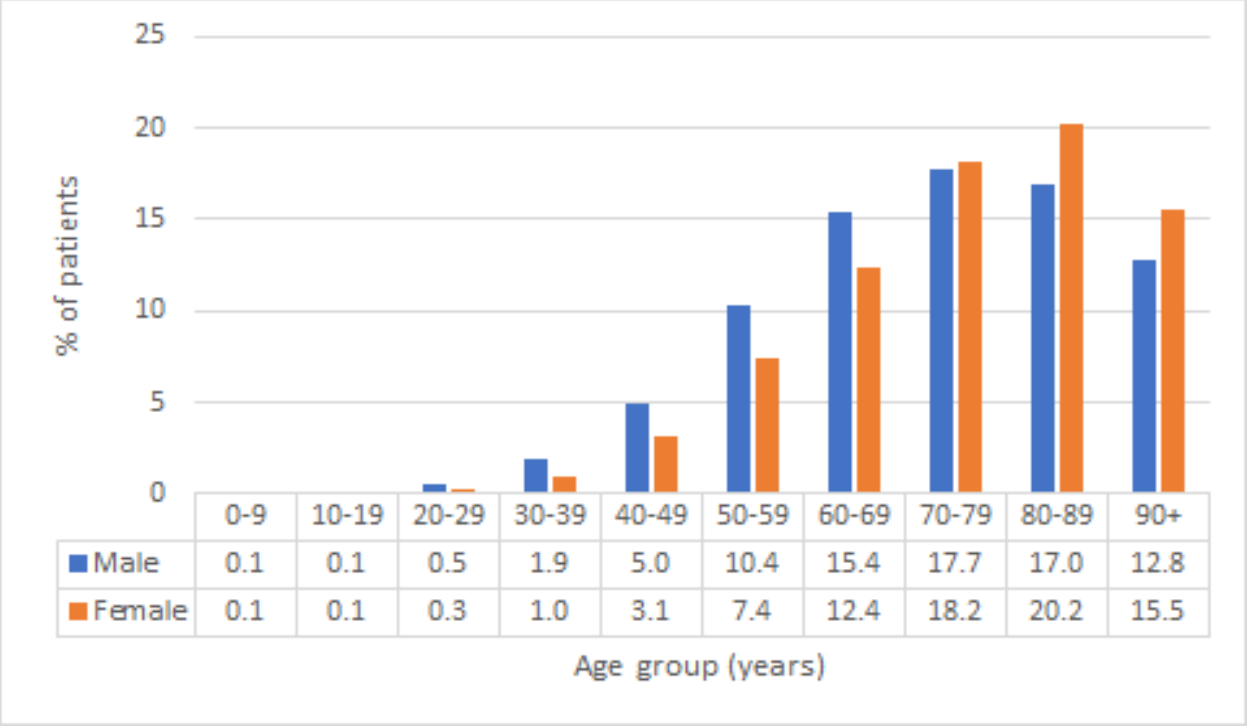
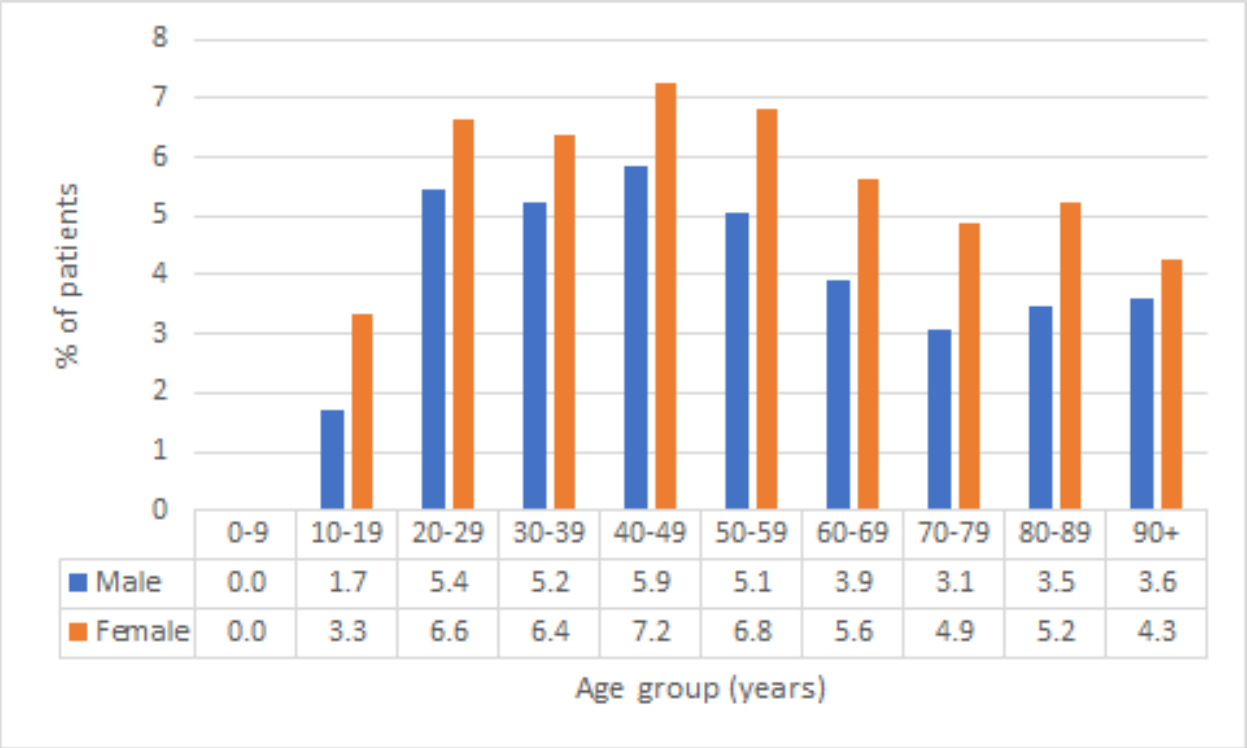


Figure 5.1 Age- and sex-specific rates for patients with hypertension recorded (weighted data), MedicineInsight 2017–18

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 5.2). Among patients with a recorded diagnosis of depression in 2017–18, the highest rate was recorded in women aged 40–49 (7.2%). 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 (3.3% vs 1.7%, respectively).



	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+
Male	0.0	1.7	5.4	5.2	5.9	5.1	3.9	3.1	3.5	3.6
Female	0.0	3.3	6.6	6.4	7.2	6.8	5.6	4.9	5.2	4.3

Figure 5.2 Age- and sex-specific rates for patients with depression recorded (weighted data), MedicineInsight 2017–18

As with depression, females of all ages were more likely to have a record of anxiety than males (Figure 5.3). Unlike depression, the highest rates of anxiety were recorded in people aged 20–29: 7.2% of women and 5.2% of men in this age group had a record of anxiety.

As expected, the patient prevalence of arthritis (including gout) increases with age (Figure 5.4).

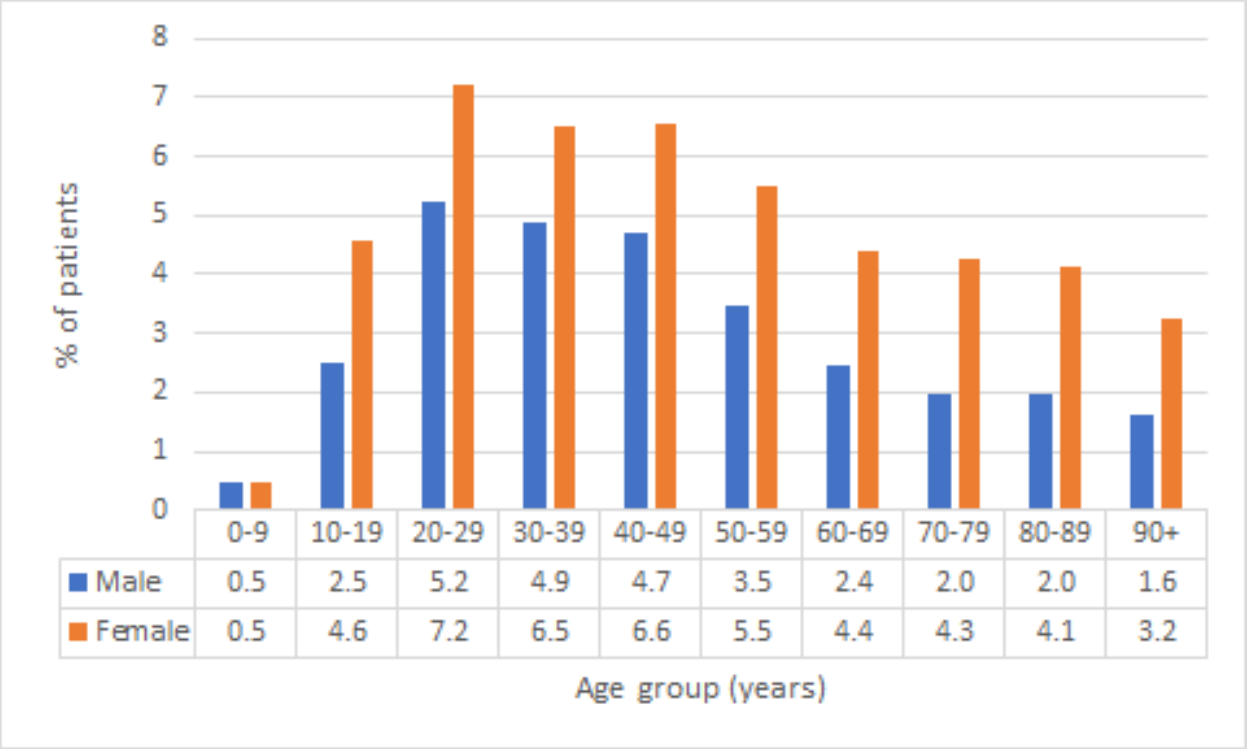


Figure 5.3 Age- and sex-specific rates for patients with anxiety recorded (weighted data), MedicineInsight 2017–18

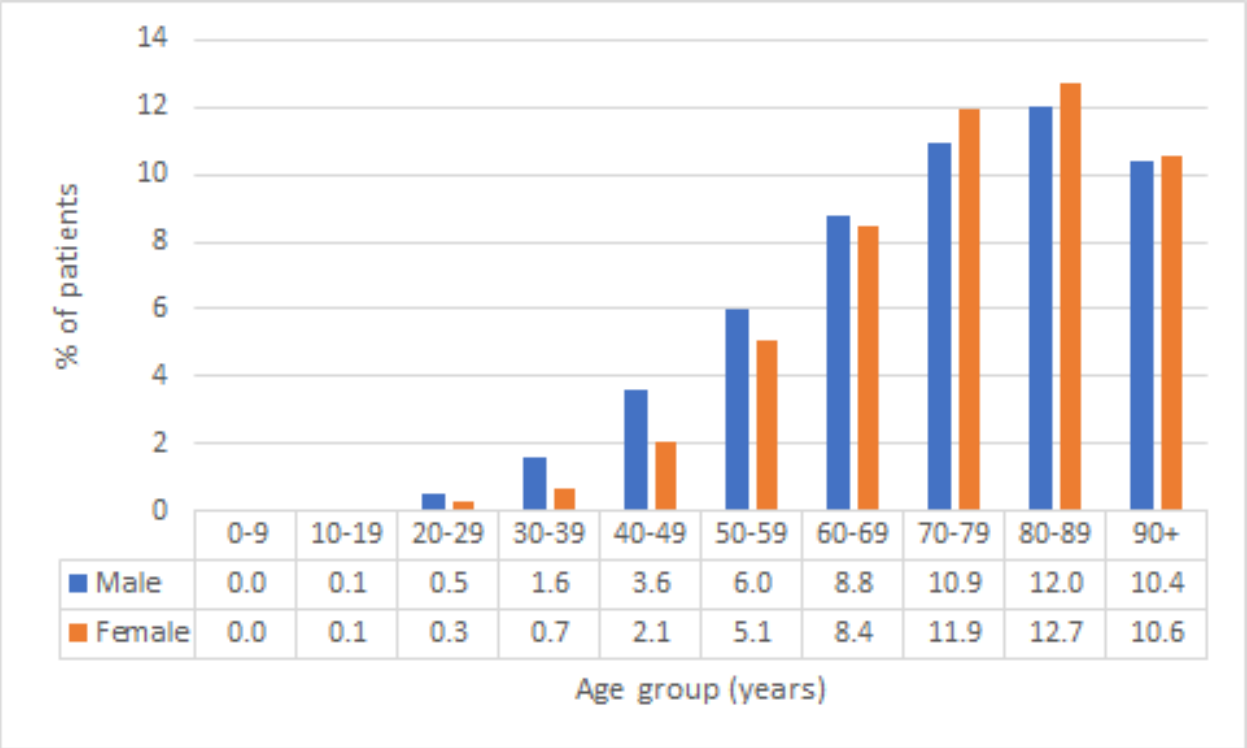


Figure 5.4 Age- and sex-specific rates for patients with arthritis recorded (weighted data), MedicineInsight 2017–18

During childhood and adolescence, boys were more likely to have a record of asthma than girls (Figure 5.5) although asthma was more common in women than in men, consistent with data reported in the 2017–18 ABS NHS.

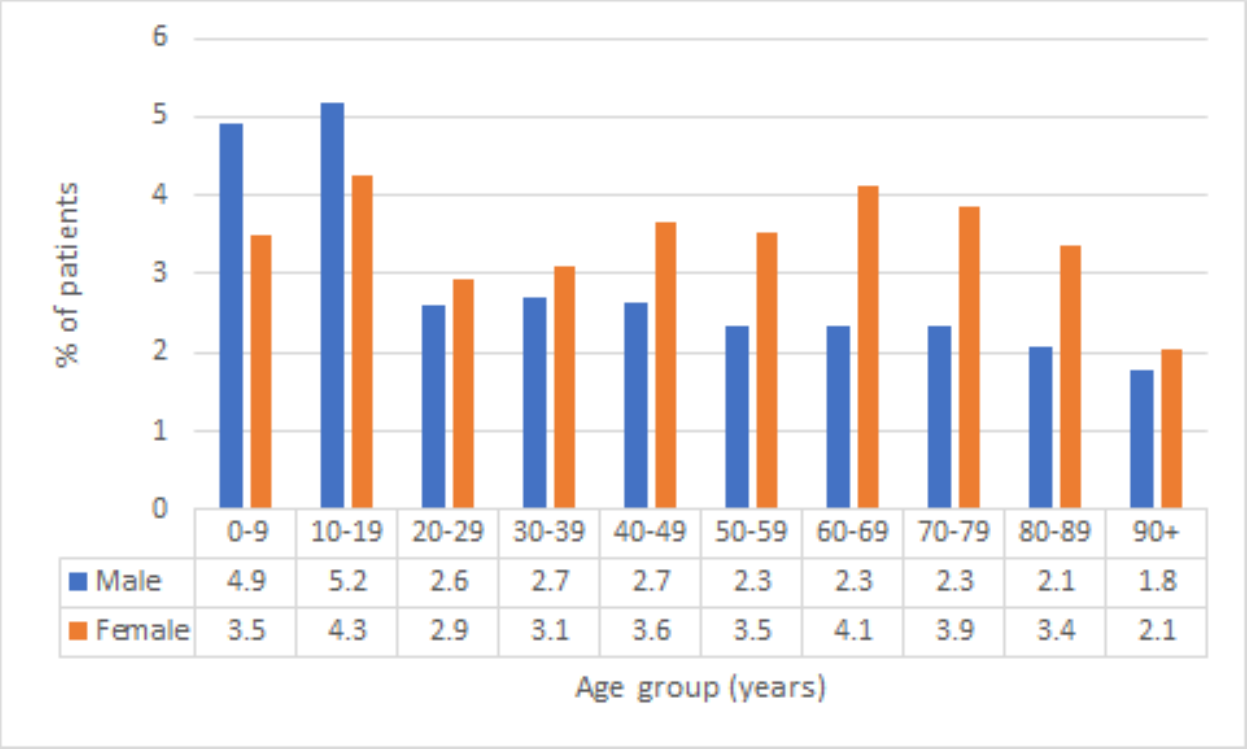


Figure 5.5 Age- and sex-specific rates for patients with asthma recorded (weighted data), MedicineInsight 2017–18

A record of type 2 diabetes was more common in males than females across all age groups (Figure 5.6). Type 2 diabetes was rare in children and adolescents, but rose sharply in patients aged 40–49 years and over.

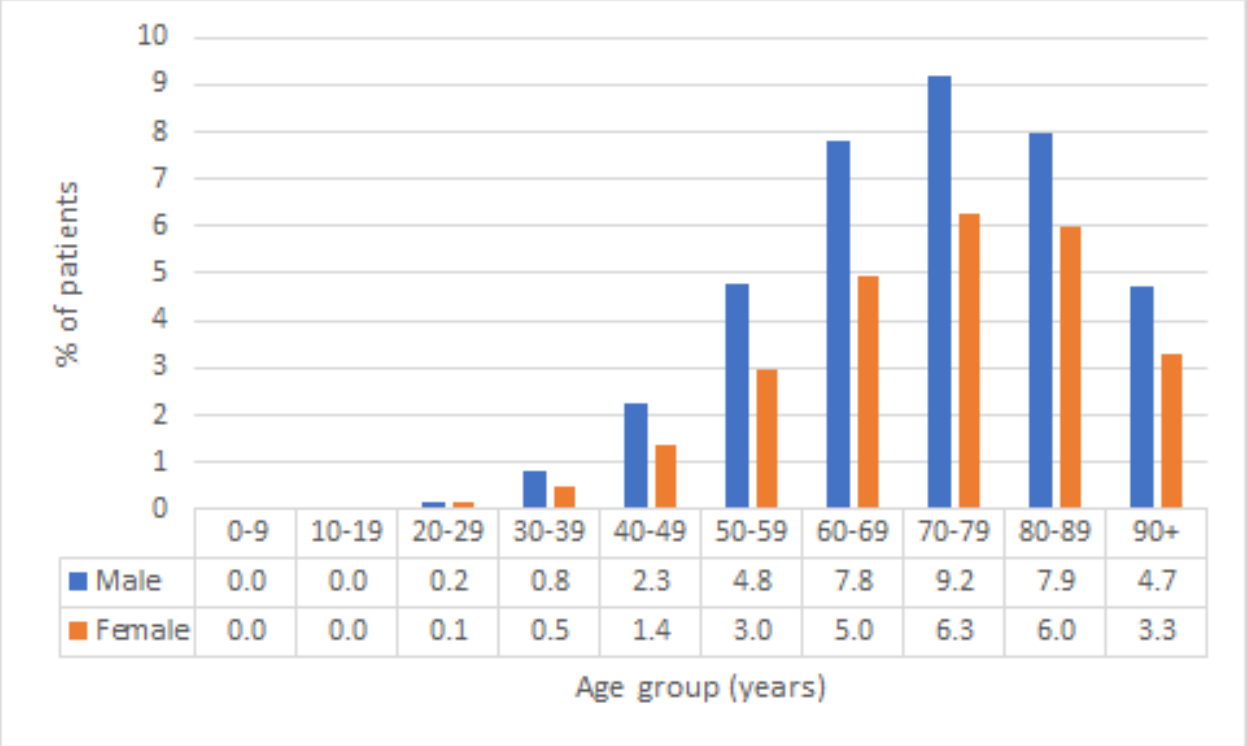


Figure 5.6 Age- and sex-specific rates for patients with type 2 diabetes recorded (weighted data), MedicineInsight 2017–18

5.4 Conditions by encounter

The left columns of Table 5.3 describe the rate at which patients with selected conditions recorded in 2017–18 were managed per 100 encounters, calculated by dividing the number of patients with the condition recorded in 2017–18 by the total number of encounters for all patients multiplied by 100. Consistent with the data shown above, patients with a recent record of hypertension, depression, anxiety and arthritis were among the most frequently seen in 2017–18 per 100 encounters. These results help illustrate GP workload in a novel way: for every 100 GP encounters during 2017–18, on average, 9.5 encounters were with a patient with a recent record of hypertension, 8.7 encounters were with a patient with a recent record of depression and 7.8 encounters were with a patient with a recent record of anxiety.

The right columns of Table 5.3 describe 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 patients with the condition ever recorded in the CIS by the total number of encounters for all patients multiplied by 100. For every 100 GP encounters, on average, 27 encounters were with a patient with a history of hypertension, 24 encounters were with a patient with a history of arthritis, and 24 encounters were with a patient with a history of depression.

Table 5.3 Patients with a record of selected conditions per 100 encounters (weighted)

	Condition recorded in 2017–18		Condition ever recorded in CIS	
	Patients with condition recorded in 2017–18 per 100 encounters[a]	95% CI	Patients with condition ever recorded per 100 encounters[a]	95% CI
Hypertension	9.5	(8.7, 10.2)	27.0	(25.7, 28.3)
Depression	8.7	(8.2, 9.3)	23.7	(22.6, 24.7)
Arthritis	7.5	(6.9, 8.1)	24.4	(23.0, 26.0)
Anxiety	7.8	(7.4, 8.3)	19.2	(18.2, 20.2)
GORD	5.5	(4.9, 6.0)	21.2	(19.9, 22.6)
Type 2 diabetes	5.0	(4.6, 5.3)	10.4	(10.0, 10.9)
Dyslipidaemia	5.2	(4.7, 5.7)	22.3	(21.1, 23.6)
Asthma	5.3	(4.8, 5.7)	17.0	(16.1, 17.8)
Osteoporosis	2.8	(2.5, 3.0)	8.9	(8.3, 9.6)
Cardiovascular disease	2.6	(2.3, 2.8)	10.0	(9.2, 10.7)
COPD	2.4	(2.1, 2.6)	5.7	(5.2, 6.2)
Atrial fibrillation	1.7	(1.5, 1.8)	4.7	(4.4, 5.1)
Heart failure	1.1	(1.0, 1.2)	2.8	(2.6, 3.1)
CKD	0.8	(0.7, 1.0)	2.4	(2.2, 2.6)

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.

Using MedicineInsight to inform a quality improvement activity on anxiety

To help GPs continue to provide quality care, NPS MedicineWise provides MedicineInsight quality improvement (QI) reports to participating GPs on their patterns of prescribing and patient care.

MedicineInsight QI activities allow staff working in a practice to meet as a group and compare their practice data with aggregated national data from all MedicineInsight practice sites. The meeting is facilitated by NPS MedicineWise staff who use the MedicineInsight QI report as a springboard for the practice staff to discuss how they are currently caring for patients and, if required, how they can improve the delivery of care. MedicineInsight QI reports are usually provided as part of a much larger educational program delivered to GPs by NPS MedicineWise.

One of the most recent QI reports delivered to MedicineInsight GPs covered anxiety and symptoms of anxiety and the medicines used to manage anxiety among regularly attending patients aged 16 or older.

Examples of the type of data presented and discussed during these visits are shown below, using the aggregated national MedicineInsight data and dummy data from a hypothetical sample practice. While the national aggregated data are real practice data, the sample practice data are not.

Please note that the definitions used to identify patients in the QI report differ slightly from those used to define patients with anxiety in the main GPIR.[ii] Because it was used to facilitate practice discussion, the QI report used a broader definition of anxiety which included patients with symptoms of anxiety. The GPIR restricted analyses to diagnosed anxiety only. For this reason, the aggregated data presented in this vignette are not directly comparable to information about anxiety contained in the report.

What is involved in a facilitated discussion?

At the beginning of the discussion, practice staff are provided with demographic information on how their patient population with anxiety compares with the national patient population with anxiety. An example, using national aggregated data and dummy practice data, is provided below (Figure v1.1). It shows the age and sex profile of the patients identified as having anxiety or symptoms of anxiety in the last 24 months. Practice staff are encouraged to discuss how the profile of their own patients differs from national data and the effect this may have on the care they provide. This provides a baseline for later discussions about treatment.

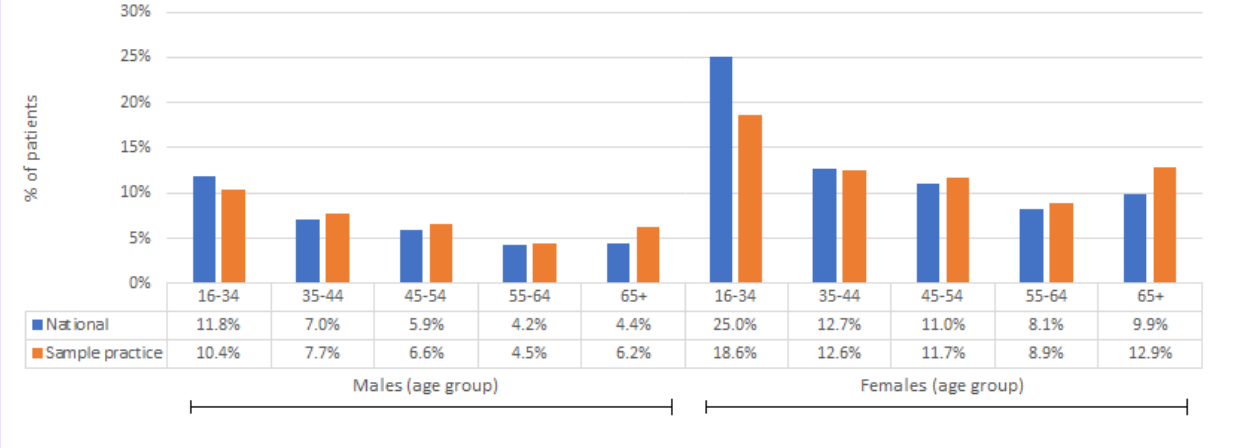
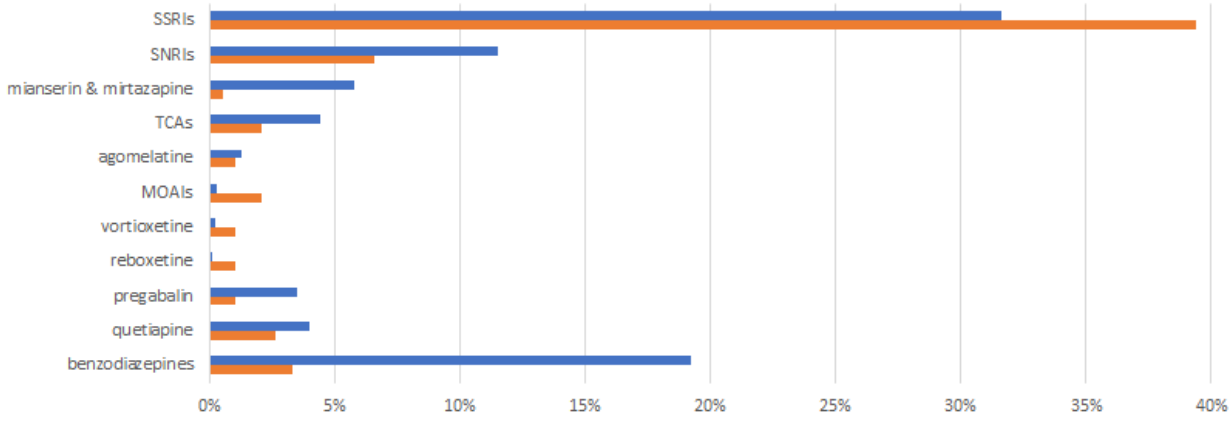


Figure v1.1 Profile of patients with anxiety or symptoms of anxiety recorded in the 24 months prior to October 2018 (example from MedicineInsight QI reports)

[ii] For the purpose of the practice report a 'regular patient' was a patient aged 16 years or older who had attended the practice at least three times in the last 2 years and who was not deceased or inactive; a 'patient with anxiety' had a coded or free text entry related to anxiety disorders or symptoms of anxiety recorded in in any diagnosis, reason for visit/encounter or reason for prescription field over the previous 24 months and eligible practices were those with uninterrupted practice data for at least 3 years prior to October 2018 (the end of the analysis period), and that issued an average of at least 30 prescriptions per week.

Another example of the type of data provided as part of the QI report is shown in Figure v1.2. This graph shows the antidepressants and other relevant medicines that patients with anxiety are currently using and once again compares the (dummy) practice data with national data. Practice staff are encouraged to reflect upon whether the treatment provided is appropriate and, if necessary, identify any changes to patient management that could be implemented in the practice in the light of these results.



	benzodiazepines	quetiapine	pregabalin	reboxetine	vortioxetine	MOAIs	agomelatine	TCAs	mianserin & mirtazapine	SNRIs	SSRIs
National	19.2%	4.0%	3.5%	0.1%	0.2%	0.3%	1.3%	4.4%	5.8%	11.5%	31.6%
Sample practice	3.3%	2.6%	1.0%	1.0%	1.0%	2.1%	1.0%	2.1%	0.5%	6.6%	39.4%

% of patients with anxiety in the last 24 months

Figure v1.2 Relevant medicines currently prescribed to patients with anxiety in the last 24 months (example from MedicineInsight QI reports)[a]

[a] Practice data are demonstration data only – not real practice data. The national data are actual practice data that has been aggregated at the national level.

Additional discussion

National aggregated data seen in figures v1.1 and v1.2 needs to be seen in the light of some of the key quality use of medicines issues that NPS MedicineWise addressed in its educational program on anxiety.

One of the main messages of the NPS MedicineWise program was that guidelines recommend non-pharmacological treatments, such as cognitive behavioural therapy, as the first treatment option for people with mild to moderate anxiety.[13,14] Nationally, 41% of patients had a record of a mental health treatment plan and 48% of patients had no record of using an antidepressant. This suggested that while non-pharmacological treatments were being used, there was still some potential for improvement and practice staff were encouraged to discuss this during the facilitated discussions.

An additional message was that selective serotonin reuptake inhibitors (SSRIs) are the preferred option if an antidepressant is required.[13,14] Consistent with this message, the most commonly used antidepressants were SSRIs (31.6%).

The educational program also included messages to limit the use of benzodiazepines and antipsychotics such as quetiapine in line with guidelines.[13,14] Only a small number of patients with anxiety (4.0%) had been prescribed quetiapine. However, nationally, almost one in five patients had a record of being prescribed a benzodiazepine.

6 COMMUNICABLE DISEASES

In summary

- Influenza and ILI, pertussis and chlamydia were selected for analysis, based on their relevance in general practice and to investigate the utility of MedicineInsight data for sentinel disease surveillance. We have compared rates of diagnosis of these diseases to the National Notifiable Disease Surveillance System (NNDSS) data.
- The definition of influenza and ILI used on this report includes all patients with a diagnosis of the disease, regardless of whether the patient has a record of a pathology test result confirming influenza. As the NNDSS reports on laboratory-confirmed cases of influenza only, MedicineInsight rates of influenza per 100,000 patients are higher than nationally reported rates from the NNDSS.
- MedicineInsight had a similar rate and pattern of influenza and ILI diagnosis per 1000 clinical encounters as previously described in published reports using MedicineInsight and other national influenza surveillance data sources.[4]
- In adults, MedicineInsight is a reliable source of data for estimating rates of pertussis, with comparable rates to those provided by the NNDSS.
- However, in children, MedicineInsight underestimates rates of pertussis when compared to NNDSS data. This is likely, in part, a reflection of the management of the disease in hospital settings rather than general practice, as it is often more severe in children.
- In contrast to pertussis and influenza, chlamydia rates were much lower in MedicineInsight than those reported by the NNDSS, possibly because patients seek care from specialist sexual health clinics, which are not included in MedicineInsight, although trends by age and sex were comparable.
- MedicineInsight is a valuable source of information on the burden and management of communicable diseases in general practice.
- In addition to estimating disease prevalence, MedicineInsight can also provide information on patient characteristics, risk factors, management and quality use of antibiotics, along with outcomes and sequelae for patients, provided this information is recorded in primary care.

This chapter describes:

- the rate per 100,000 and number of patients with the following notifiable communicable diseases reported in FY 2017–18:
    - influenza and ILI
    - pertussis
    - chlamydia (sexually transmitted)
- the age- and sex-specific proportion of patients with selected communicable diseases reported at encounters in FY 2017–18 compared with national notification data from 2018
- the state-specific proportion of patients with selected communicable diseases reported at encounters in FY 2017–18 compared with national notification data from 2018.

6.1 Identifying communicable diseases

Influenza and ILI, pertussis (or whooping cough), and chlamydia were selected for analysis, based on advice from the Advisory Committee (described in Chapter 1) about which diseases are most important, and commonly managed in general practice, and might illustrate the utility of MedicineInsight data for disease surveillance. The communicable disease flags are defined in Appendix 4 and, like the non-communicable condition flags, were based on both coded and non-coded conditions recorded in one or more of the

'Diagnosis', 'Reason for visit' or 'Reason for prescription' fields, and were not based on records of medicines or test results. As such, these communicable diseases were not ‘laboratory confirmed’, which is a limitation of the data. The 2018 data from NNDSS were selected as the source of comparator data as this was the most recent complete year, and NNDSS data is reported by calendar year, rather than financial year.[15]

6.2 Influenza and influenza-like illness

In order to capture the burden of influenza and ILI in general practice, for both patients and clinical management, MedicineInsight has developed a relatively inclusive definition for this disease (see Appendix 4). The NNDSS uses a much more restrictive definition of laboratory-confirmed cases of influenza, and for this reason, MedicineInsight rates of influenza and ILI are not are not directly comparable with NNDSS rates. GPs are unlikely to perform testing on every patient who presents with an ILI, and so the MedicineInsight definition is more sensitive to cases of influenza that are diagnosed symptomatically. Additionally, there is a lack of available data in MedicineInsight on respiratory swab results.

There were 36,547 records of influenza and ILI in MedicineInsight in FY 2017–18, giving a corresponding rate of 1401 records of influenza and ILI per 100,000 patients (Table 6.1). Over the 12-month period, there were an average of 2.65 diagnoses of influenza and ILI per 1000 clinical encounters. When examined on a month-by-month basis, there was a considerable spike in diagnoses per 1000 encounters in August and September 2017 (Figure 6.1). This is in keeping with previously published reports investigating MedicineInsight data, and consistent with data from the Australian Sentinel Practices Research Network, and the NNDSS.[4] MedicineInsight had a significantly higher rate of influenza and ILI than the NNDSS,[15] which reported a rate of 239 cases per 100,000 people of laboratory-confirmed influenza. MedicineInsight rates of influenza and ILI were similar in males and females, and there was no significant difference in the rate per 100,000 patients between age groups. This was in contrast to the NNDSS, which showed much higher rates per 100,000 population in children aged 0–9 years of age compared to other age groups. However, age- and sex-specific rates of influenza and ILI records show a marked increase in records in both males and females aged 80 years and over (Figure 6.2).

There was substantial variation in the rates of influenza and ILI between different states, with SA showing the highest rate per 100,000 patients in MedicineInsight (1970 per 100,000 patients, weighted), whereas NT had the highest rates in the NNDSS (483 per 100,000 population).

Table 6.1 The number and rate per 100,000 of influenza and ILI records for MedicineInsight patients 2017–18 (unweighted and weighted) compared with national notification rates of laboratory-confirmed influenza in 2018[15]

Patient characteristics	MedicineInsight records of influenza and ILI, FY 2017–18, unweighted			MedicineInsight records of influenza and ILI, FY 2017–18 weighted		NNDSS records of laboratory-confirmed influenza, 2018[a]	
	Number	Rate per 100,000 patients	(95% CI)	Rate per 100,000 patients	(95% CI)	Number	Rate per 100,000 population
All patients	36,547	1,336	(1240, 1432)	1,401	(1298, 1504)	58,822	239
Sex							
Male	16,329	1,319	(1219, 1419)	1,404	(1298, 1509)	27,699	227
Female	20,218	1,350	(1254, 1446)	1,399	(1294, 1504)	31,072	251
Age group (years)							
0–9	4,430	1,282	(1154, 1411)	1,350	(1187, 1512)	13,713	868
10–19	4,152	1,513	(1367, 1658)	1,625	(1469, 1782)	5,024	340
20–29	4,023	1,120	(1018, 1221)	1,158	(1054, 1262)	5,415	303
30–39	5,251	1,351	(1244, 1459)	1,389	(1279, 1498)	7,578	437
40–49	5,661	1,598	(1472, 1725)	1,672	(1536, 1809)	7,394	455
50–59	5,100	1,493	(1381, 1606)	1,561	(1431, 1690)	6,781	446
60–69	3,758	1,213	(1116, 1311)	1,298	(1187, 1410)	5,770	456
70–79	2,429	1,083	(991, 1176)	1,127	(1013, 1240)	3,941	487
80+	1,743	1,377	(1238, 2967)	1,257	(958, 1556)	3,205	665
State/Territory							
ACT	763	1,203	(802, 1603)	1,168	(720, 1615)	476	116
NSW	16,387	1,663	(1523, 1803)	1,634	(1404, 1863)	17,516	223
NT	230	553	(166, 940)	542	(0, 1098)	1,195	483
QLD	7,239	1,492	(1248, 1736)	1,499	(1263, 1735)	15,687	318
SA	953	2,061	(1481, 2640)	1,970	(1327, 2612)	5,862	340
TAS	1, 797	1, 000	(733, 1268)	1, 057	(725, 1388)	452	87
VIC	6, 855	1, 180	(978, 1383)	1, 205	(972, 1437)	11, 758	186
WA	2, 323	657	(515, 799)	701	(555, 847)	5, 876	228

a Australian Government Department of Health. National Notifiable Diseases Surveillance System Summary tables Canberra: Department of Health; 2019[15]

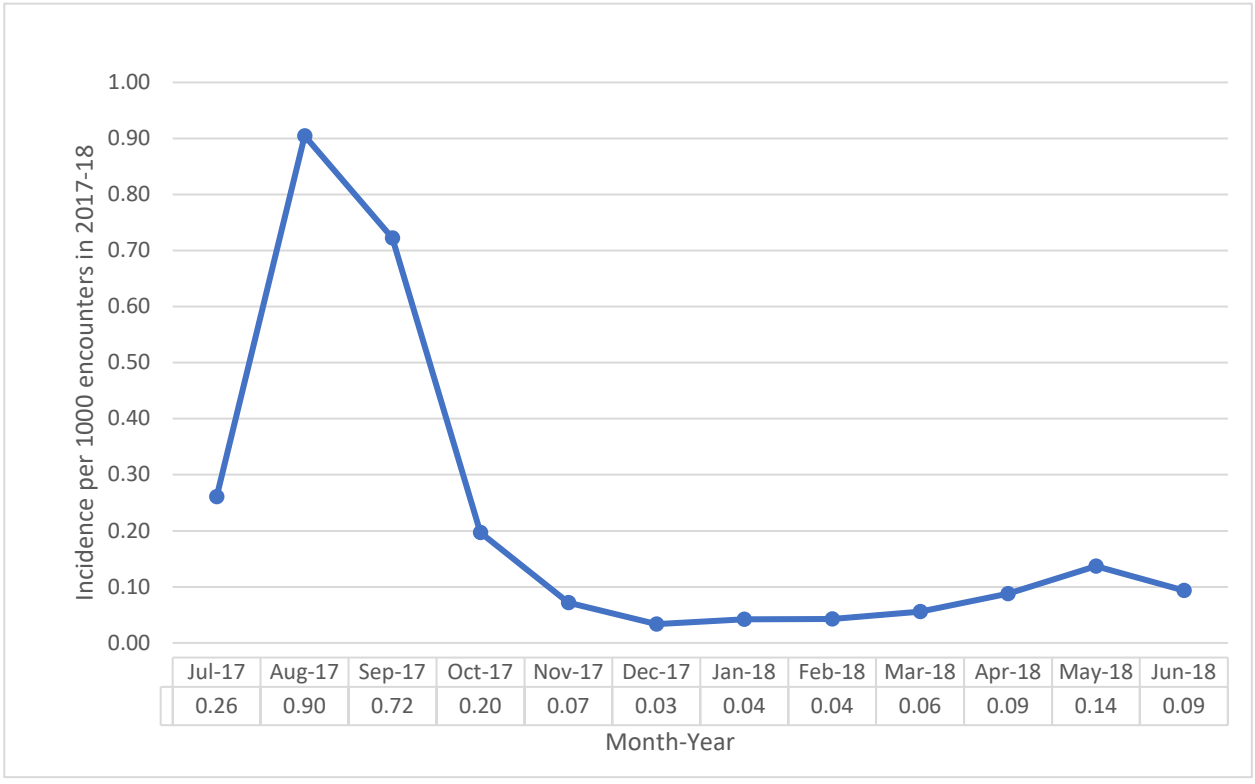


Figure 6.1 Diagnoses of influenza or influenza-like illness per patient per 1000 clinical encounters (unweighted data), 2017–18

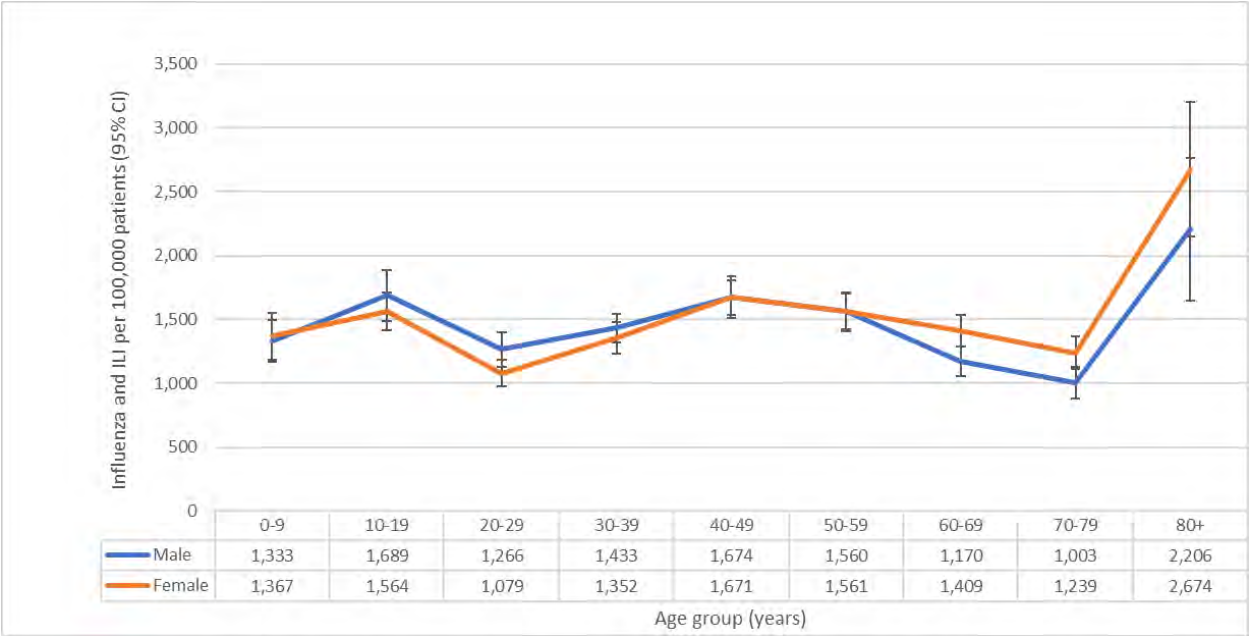


Figure 6.2 Age and sex-specific rates of records of influenza or influenza-like illness per 100,000 MedicineInsight patients (weighted data), 2017–18

6.3 Pertussis (whooping cough)

There were 2,266 records of pertussis in MedicineInsight in FY 2017–18, or a rate of 84 records per 100,000 patients (weighted) over the 12-month period (Table 6.2). This is in contrast to national data from the NNDSS for the period January–December 2018,[15] which reported 12,557 notifications of pertussis, or a rate of 51 cases per 100,000 people. Female patients have higher rates of pertussis than males, and the highest rates are seen in children and young adults under 20 years of age (Figure 6.3). Rates are otherwise quite consistent across age groups in both MedicineInsight and the NNDSS.

While overall pertussis recording is proportionally higher among MedicineInsight patients compared to NNDSS data, the rate of pertussis recording for children aged 0–9 years in MedicineInsight was less than half that reported to NNDSS (140 per 100,000 patients vs 293 per 100,000 people, respectively). MedicineInsight rates were also considerably lower, although less so, for patients aged 10–19 years (123 per 100,000 patients vs 190 per 100,000 people). This is most likely a reflection of the management of paediatric disease in hospitals rather than general practice, as pertussis is more severe in children. Additionally, when coding conditions in MedicineInsight, information recorded in progress notes, test results, or other fields was not used.

Pertussis recording is proportionally higher among adult MedicineInsight patients than in the NNDSS. There are a number of potential explanations for this finding. While our condition coding process eliminates 'suspected' and 'query' records of pertussis (see Appendix 4), GPs may make a provisional diagnosis without necessarily requesting confirmation by follow-up testing, or patients may decline testing. Notifications of confirmed pertussis to the NNDSS require either laboratory-confirmation; or laboratory-suggestive evidence AND clinical evidence of infection.[16] Additionally, NNDSS rates are calculated based on the entire Australian population, whereas MedicineInsight rates are based on the number of patients in the MedicineInsight cohort. However, the overall trends seen in both datasets, of higher rates in females and declining rates with age, are very similar. Distribution by state and territory is also quite comparable between

the NNDSS and MedicineInsight, with NSW having the highest rate of pertussis, and the Northern Territory among the lowest.

Table 6.2 The number and rate per 100,000 of pertussis records for MedicineInsight patients FY 2017–18 (unweighted and weighted) compared with national notification rates of confirmed pertussis in 2018[15]

Patient characteristics	MedicineInsight records of pertussis, FY 2017–18, unweighted			MedicineInsight records of pertussis, FY 2017–18, weighted		NNDSS records of confirmed pertussis, 2018	
	Number	Rate per 100,000 patients	(95% CI)	Rate per 100,000 patients	(95% CI)	Number	Rate per 100,000 population
All patients	2,266	83	(71, 94)	84	(67, 101)	12,557	51
Sex							
Male	930	75	(64, 87)	76	(59, 92)	5830	48
Female	1, 336	89	(77, 102)	92	(73, 100)	6714	54
Age group (years)							
0–9	498	144	(112, 176)	140	(88, 192)	4, 643	293
10–19	352	128	(102, 154)	123	(96, 149)	2, 795	190
20–29	199	55	(42, 69)	63	(38, 88)	792	44
30–39	314	81	(56, 106)	76	(45, 107)	949	55
40–49	249	70	(59, 82)	68	(55, 80)	1, 166	72
50–59	221	65	(53, 77)	64	(44, 85)	924	61
60–69	236	76	(65, 87)	78	(61, 94)	691	55
70–79	143	64	(50, 78)	73	(36, 110)	436	53
80+	54	59	(30, 89)	82	(23, 154)	159	33
State/Territory							
ACT	31	49	(26, 71)	49	(22, 77)	273	66
NSW	1, 081	110	(85, 135)	114	(69, 159)	6, 352	81
NT	10	24	(11, 37)	20	(9, 31)	67	27
QLD	436	90	(67, 112)	95	(63, 127)	1, 759	36
SA	30	65	(27, 102)	80	(21, 140)	697	40
TAS	74	41	(29, 54)	41	(30, 52)	407	78
VIC	280	48	(38, 59)	43	(32, 55)	1, 687	27
WA	324	92	(57, 126)	91	(59, 123)	1, 315	51

MedicineInsight can provide information on the characteristics, risk factors (such as vaccine history) and management of patients with pertussis (and other communicable diseases) in general practice.

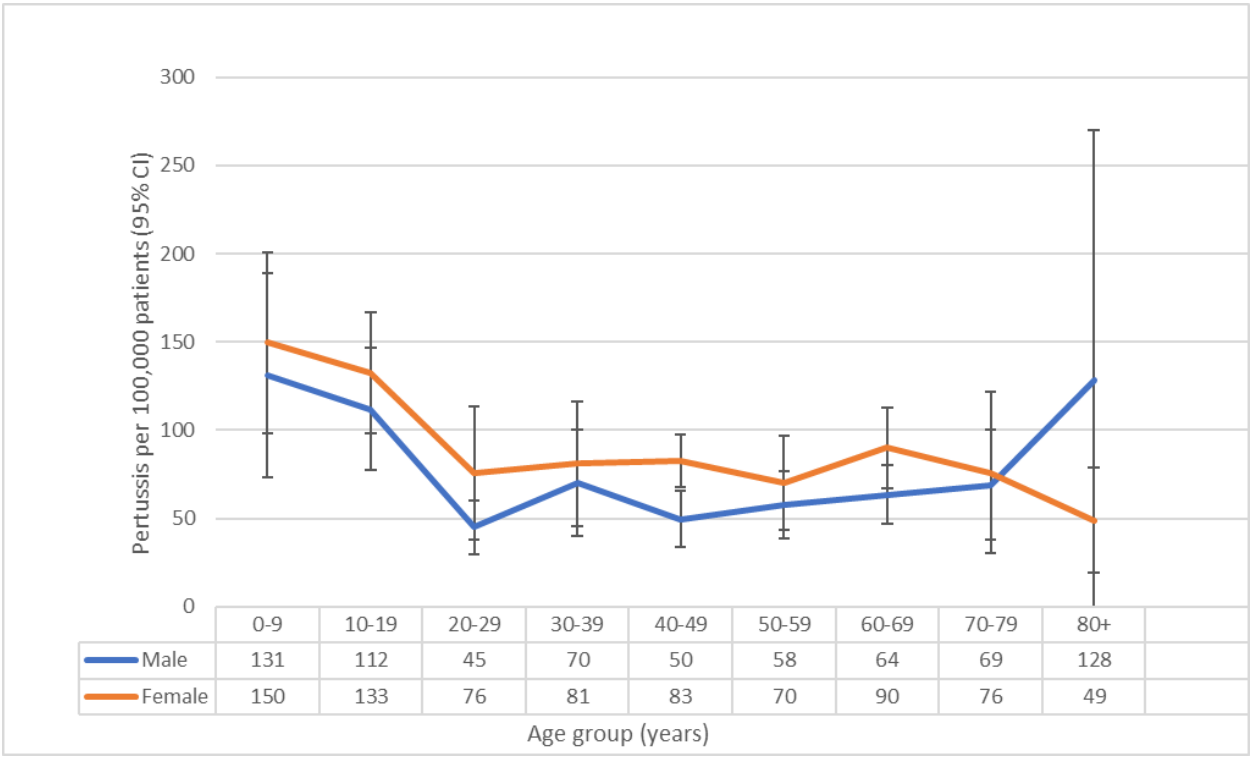


Figure 6.3 Age and sex-specific rates of records of pertussis per 100,000 MedicineInsight patients (weighted data), 2017–18

6.4 Sexually transmitted chlamydia (*Chlamydia trachomatis*)

In 2017–18, there were 4,856 records of sexually transmitted chlamydia in MedicineInsight, with a rate of 178 records per 100,000 patients, or 194 per 100,000 patients using weighted data (Table 6.3). In terms of cases managed in general practice, rates of chlamydia were significantly higher in the 20–29-year age group (Figure 6.4), but there was no significant difference between male and female patients. This was consistent with age- and sex-specific trends seen in NNDSS data. However, in contrast to adult pertussis and influenza, rates of chlamydia were much lower in MedicineInsight than those reported by the NNDSS. This is possibly due to patients preferentially seeking diagnosis and treatment for chlamydia in specialist sexual health clinics, which are not included in MedicineInsight.

Table 6.3 The number and rate per 100,000 of chlamydia records for MedicineInsight patients FY 2017–18 (unweighted and weighted) compared with national notification rates of confirmed chlamydia in 2018[15]

Patient characteristics	MedicineInsight records of chlamydia, FY 2017–18, unweighted			MedicineInsight records of chlamydia, FY 2017–18, weighted		NNDSS records of confirmed chlamydia, 2018	
	Number	Rate per 100,000 patients	(95% CI)	Rate per 100,000 patients	(95% CI)	Number	Rate per 100,000 population
All patients	4, 856	178	(157, 198)	194	(157, 231)	97, 474	396
Sex							
Male	2, 069	167	(127, 208)	198	(124, 271)	47, 096	386
Female	2, 787	186	(174, 199)	191	(173, 209)	50, 181	405
Age group (years)							
10–19	547	199	(176, 222)	175	(148, 202)	16, 765	1, 131
20–29	2, 751	766	(715, 816)	747	(670, 823)	53, 280	3, 012
30–39	940	242	(197, 287)	272	(191, 354)	17, 667	1, 000
40–49	354	100	(63, 137)	115	(57, 172)	6, 151	379
50–59	183	54	(26, 81)	64	(20, 108)	2, 640	173
60–69	52	17	(9, 25)	20	(5, 36)	750	59
70–79	20	9	(4, 14)	9	(2, 17)	135	15
80+	<5	<5	-	12	(0, 37)	23	5
State/Territory							
ACT	61	96	(59, 134)	122	(58, 186)	1, 578	383
NSW	1, 793	182	(145, 219)	198	(138, 258)	31, 100	396
NT	37	89	(15, 163)	96	(3, 188)	2, 772	1, 120
QLD	890	183	(160, 207)	194	(168, 219)	23, 718	481
SA	41	89	(59, 118)	107	(65, 149)	6, 239	362
TAS	275	153	(122, 184)	162	(126, 198)	1, 562	299
VIC	1, 144	197	(131, 263)	221	(109, 333)	18, 987	300
WA	615	174	(145, 203)	197	(167, 227)	11, 520	447

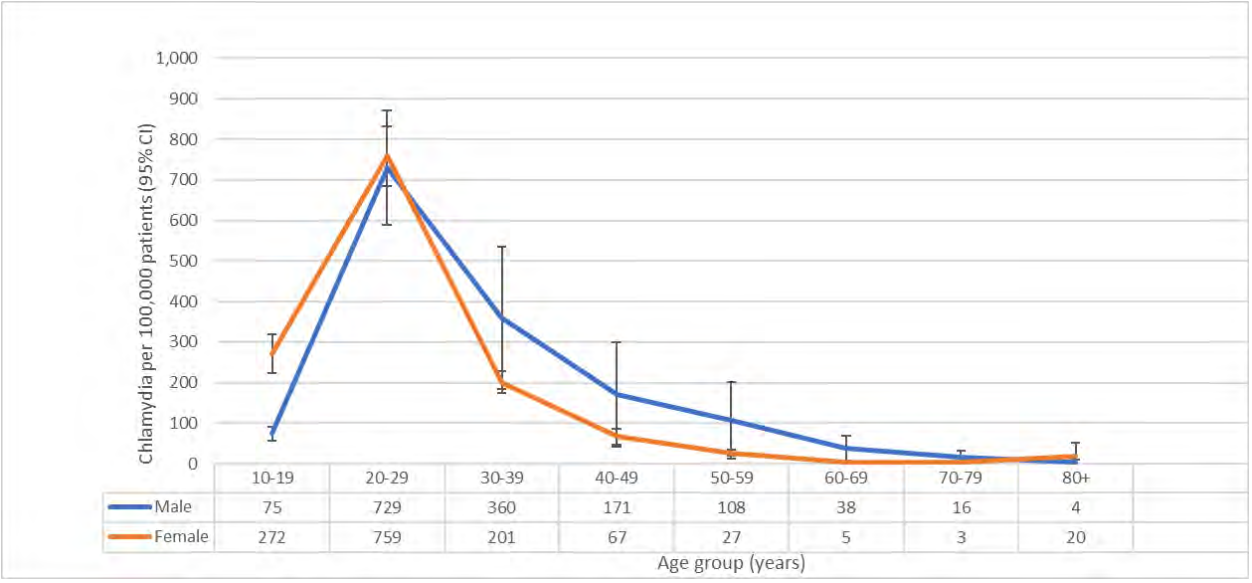


Figure 6.4 Age and sex-specific rates of records of sexually transmitted chlamydia per 100,000 MedicineInsight patients (weighted data), 2017–18

Using MedicineInsight data to inform and support vaccine policy

Background

Pneumococcal disease is a notifiable disease caused by the bacterium *Streptococcus pneumoniae*. It can cause serious illness, including pneumonia, otitis media and meningitis.[17] In 2017–18, there were 2,039 notifications of invasive pneumococcal disease in Australia, with over 41.1% of these cases seen in people aged from 20–64 years of age, and 39.2% of cases in people aged 65 and over (Figure v2.1).[18]

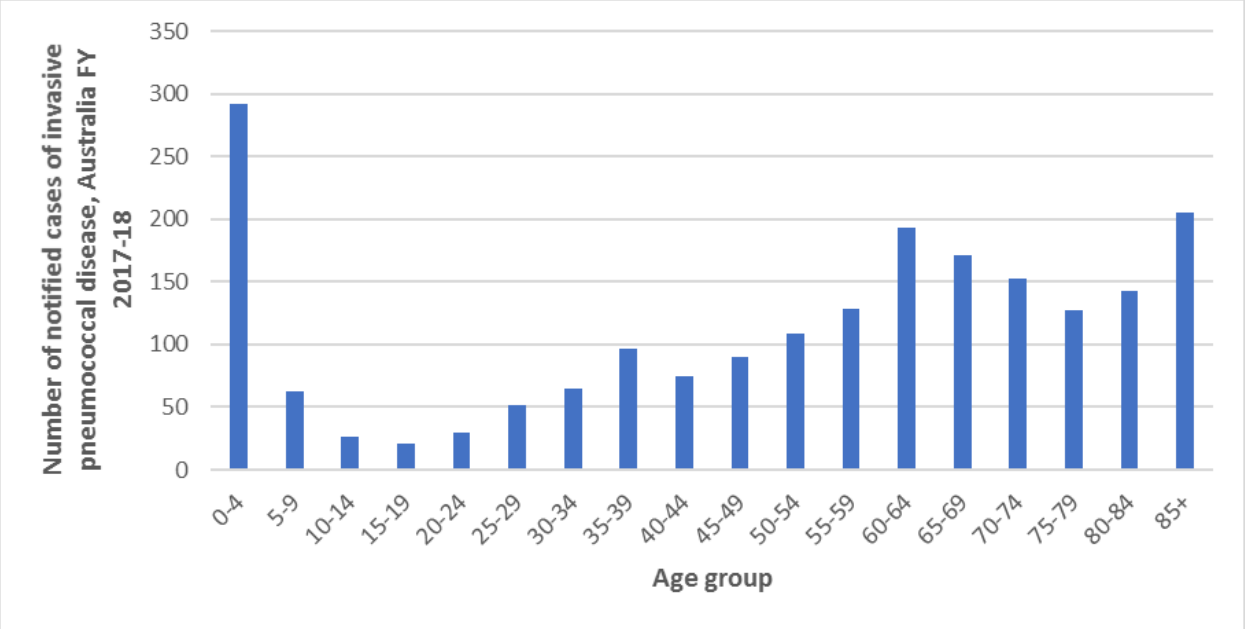


Figure v2.1 Invasive pneumococcal disease notifications, Australia 2017–18. Data from the Australian Department of Health Invasive Pneumococcal Disease Surveillance Quarterly Reports.[18]

The Australian Immunisation Handbook (AIH) recommends pneumococcal vaccination for all infants and children aged 5 and under, all adults aged 65 years and over, and Aboriginal and Torres Strait Islander adults.[19] The recommended vaccination schedule varies between these groups. Pneumococcal vaccines are provided free of charge through the National Immunisation Program (NIP) for infants ≤ 12 months, children aged 4 years with medical risk conditions, Aboriginal and Torres Strait Islander people aged 15 years and over with medical risk conditions, all Aboriginal and Torres Strait Islander people aged 50 years and over and all adults aged 65 years and over. The AIH also recommends vaccination for people of any age who have conditions associated with an increased risk of invasive pneumococcal disease, such as chronic renal disease and diabetes. However, if people in these categories do not receive fully subsidised vaccinations through the NIP or PBS, patient out-of-pocket costs can be more than $40 per vaccine.

MedicineInsight analysis

We have investigated the proportion of high-risk adult patients who are not able to access pneumococcal vaccines through the NIP schedule, compared to adult patients aged 65 and over, who are covered. We used a cohort of 2,142,042 MedicineInsight patients aged 18 years and over and analysed what proportion of patients have a record of ever having a pneumococcal vaccine; as the pneumococcal vaccine was listed for

children in 2005, this age group excludes patients who were immunised as children. We excluded Aboriginal and Torres Strait islander people from this analysis, as the NIP schedule differs for this group.[19]

The AIH lists several Category A (highest risk of pneumococcal disease) and Category B (increased risk of pneumococcal disease) conditions that are associated with an increased risk of invasive pneumococcal disease. We selected two representative conditions for this analysis; chronic renal failure (CRF) for Category A, and diabetes for Category B.

Table v2.1. Pneumococcal vaccination rates in MedicineInsight patients, 2017–18

Age group	Percentage of total patients (N = 2,142,042)	Proportion of all patients vaccinated (N = 2,142,042) % (95% CI)	Proportion of NIP-eligible patients vaccinated (N = 509,390) % (95% CI)	Proportion of patients with CRF vaccinated (N = 10,998) % (95% CI)	Proportion of patients with diabetes vaccinated (N = 180,401) % (95% CI)
18–29	19.1	0.6 (0.5, 0.7)	NA	14.3 (5.7, 22.8)	3.3 (2.6, 3.9)
30–44	25.7	0.7 (0.6, 0.8)	NA	14.6 (10.0, 19.2)	3.3 (2.9, 3.8)
45–64	31.4	3.5 (3.3, 3.8)	NA	23.8 (21.1, 26.6)	12.3 (11.3, 13.3)
65–79	17.3	44.9 (43.2, 46.6)	44.9 (43.2, 46.6)	67.1 (64.7, 69.4)	58.1 (56.5, 59.8)
80+	6.4	56.8 (54.7, 58.8)	56.8 (54.7, 58.8)	67.7 (65.4, 70.1)	65.8 (64.0, 67.5)
TOTAL	100	12.8 (12.0, 13.7)	48.1 (46.4, 49.8)	60.7 (58.7, 62.7)	35.4 (33.8, 36.9)

National data on pneumococcal immunisation rates in adults is limited. According to estimates from the NSW Population Health Survey, the percentage of people in NSW aged 65 years and over who reported having ever received a pneumococcal vaccination was 47.0% in 2016.[20] However, current estimates suggest that less than 10% of patients aged 10–64 years who are at increased risk of invasive pneumococcal disease according to AIH guidelines have been vaccinated with the pneumococcal vaccine.[21]

Overall pneumococcal vaccination rates in MedicineInsight adults aged 65 years and over are very similar to those reported for NSW, at 48.1% compared to 47.0% (Table v2.1). While vaccination rates were very low in the 18–64 age groups (1.8%), rates were significantly higher for patients with CRF and diabetes, at 23.8% and 12.3%, respectively, for patients aged from 45 and 64. However, the overall vaccination rate in these at-risk patients is 9.8% (data not shown), which is in keeping with previous estimates, and far below an optimal level. While further research is required, these results are suggestive of an issue of access and cost of vaccination for these high-risk groups who aren't covered by the NIP schedule, in combination with a potential clinical practice gap. This could be addressed through GP educational programs emphasising the value of preventative vaccination for at-risk groups, in conjunction with communication strategies to advise people at high risk that they may benefit from vaccination.

7 PRESCRIPTIONS

In summary

- MedicineInsight captures prescriptions that have been written – 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 million original prescriptions, and 34 million original plus repeat prescriptions with a unique ATC code were written by GPs in MedicineInsight practices during 2017–18.
- Almost 70% of MedicineInsight patients were prescribed a medicine at least once during 2017–18. While a third of patients only had one or two original prescriptions recorded, 6.4% of patients had 15 or more original prescriptions ordered during 2017–18.
- The average number of prescriptions increases as patients get older, and with socio-economic disadvantage, consistent with higher disease burdens in these populations.
- Over the year, the average number of original prescriptions prescribed to a patient was 3.6. In Tasmania, the average number of original prescriptions per patient (4.6) is significantly higher than the national average, possibly because of its older population.
- Medicines to treat the nervous system (ATC N; antidepressants, analgesics, antiepileptics) were the most commonly prescribed type of original prescriptions in 2017–18. However, cardiovascular medicines (ATC C; lipid-modifying medicines, antihypertensives) were the most commonly prescribed original plus repeat medicines.
- Opioids (N02A) accounted for 10.1% of all original prescriptions while antidepressants (N06A) accounted for 9.8% of total prescriptions (original plus repeats).
- Cardiovascular medicines featured heavily in the top 30 drug classes with lipid-modifying medicines accounting for 10.6% of total prescriptions and six different classes of antihypertensives accounting for a further 16.3% of total prescriptions.
- The overwhelming majority of medicines are subsidised by the Australian Government under the PBS or the RPBS (87.2%). However, private prescriptions are more common if the medicine is a topical dermatological medicine, a hormonal contraceptive, or an anti-infective for the eye or ear.
- Overall, on average, 100 MedicineInsight encounters result in 80 original prescriptions and 246 original and repeat prescriptions.
- Prescribing of anti-infectives and opioids increases with patient age. Prescribing of cardiovascular medicines increases before falling for people aged 90 years or older.
- A vignette on the impact of the upscheduling of codeine to a Prescription Only Medicine found a small increase in codeine prescriptions, mainly low dose, after 1 February 2018. This increase likely relates to people who previously bought low-dose codeine over the counter, wished to continue after the upscheduling, and are now doing so under the care of their GPs. However, these findings should be interpreted in light of an overall fall in national sales of codeine since the upscheduling, and a drop in reported codeine poisonings, suggesting that patients who saw their GP as a result of the codeine upscheduling may have been prescribed other analgesics or offered non-pharmacological pain management options.
- As MedicineInsight is able to collect patient level data on health conditions and prescriptions, it is uniquely placed to explore how conditions are managed in primary care and to describe indications for prescribing. These types of analyses will be explored in future reports.
- MedicineInsight data can also be used to describe prescribed daily dosage, with work currently underway in the MedicineInsight team to process both the structured and free-text dosage information in the CIS into a usable format for future projects.

This chapter describes:

- the distribution of number of prescriptions per patient in 2017–18

- the average number of original prescriptions according to patient demographics
- the number and proportion of prescriptions in 2017–18, original and total, by Anatomical Therapeutic Chemical (ATC) Level 1 (anatomical subgroup),[iii] compared to national PBS data
- the number and proportion of prescriptions in 2017–18 for the top 30 ATC Level 3 (pharmacological subgroup)[iv] categories, original and total
- the number and proportion of PBS/RPBS prescriptions and private prescriptions in 2017–18, by ATC Level 1 and ATC Level 3
- original and total prescriptions by ATC Level 1 per 100 encounters
- original 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.

This chapter reports on medicines prescribed in the general practice setting. All prescriptions ordered by practice staff in the clinical information software – private, PBS and RPBS – and which could be assigned to a unique ATC code have been included. There were an additional 1 million prescriptions recorded in the database which had an active ingredient listed but either did not have an ATC code 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 an ATC code could not be assigned is included in Table A7.1, Appendix 7. The single most commonly ordered medicine which could not be assigned a unique ATC code was mupirocin, a topical antibacterial cream (0.6% of all medicines).

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.

The data is reported by original 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 original prescription – that is the original prescription and the repeat prescriptions written for a patient to fill over the following months before returning to the GP for another original prescription.

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

There were approximately 11 million original prescriptions and 34.0 million total (original plus repeat) prescriptions with a valid ATC code recorded in MedicineInsight during 2017–18 for ~2.74 million patients.

[iii] The ATC classification system classifies the active ingredients of medicines according to the organ or system upon which they act. At Level 1, the ATC classification system divides medicines into one of the 14 main anatomical groups. For example, ATC C includes medicines that act upon the cardiovascular system.
[iv] 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.

Nearly 70% of MedicineInsight patients (n = ~1.9 million had at least one recorded prescription during 2017–18 and 30.4% (n = ~835,000) patients had no record of a prescription in this setting.

7.1 Prescription numbers

The average number of original prescriptions ordered per patient was 3.6 (95% CI 3.5 to 3.7) while the average number of total prescriptions (original plus repeats) per patient was 12.4 (95% CI 11.8 to 13.0) (Table 7.1).

Table 7.1 Average number of original prescriptions recorded by patient characteristic (unweighted and weighted data), MedicineInsight 2017–18

Characteristic	MedicineInsight unweighted data (n = 2,736,098)		MedicineInsight weighted data	
	Average[a]	(95% CI)	Average[a]	(95% CI)
All patients	4.0	(3.9, 4.2)	3.6	(3.5, 3.7)
Sex				
Male	3.7	(3.5, 3.8)	3.3	(3.2, 3.5)
Female	4.3	(4.1, 4.4)	3.8	(3.7, 4.0)
Age group (years)				
0–9	1.2	(1.1, 1.2)	1.2	(1.1, 1.2)
10–19	1.4	(1.3, 1.4)	1.3	(1.3, 1.4)
20–29	2.0	(1.9, 2.1)	1.9	(1.9, 2.0)
30–39	2.4	(2.3, 2.5)	2.3	(2.3, 2.4)
40–49	3.3	(3.2, 3.5)	3.3	(3.2, 3.3)
50–59	4.6	(4.5, 4.7)	4.5	(4.4, 4.7)
60–69	6.4	(6.2, 6.6)	6.3	(6.1, 6.5)
70–79	9.2	(8.9, 9.4)	9.1	(8.8, 9.3)
80–89	12.3	(12.0, 12.6)	12.0	(11.7, 12.3)
90+	13.4	(13.0, 13.9)	12.9	(12.4, 13.3)
Rurality				
Major city	3.6	(3.5, 3.8)	3.4	(3.2, 3.5)
Inner regional	4.8	(4.6, 5.1)	4.5	(4.2, 4.7)
Outer regional	4.4	(4.0, 4.8)	3.9	(3.5, 4.2)
Remote/very remote	3.6	(3.1, 4.2)	3.6	(2.8, 4.4)
State/Territory				
NSW	4.1	(3.8, 4.3)	3.5	(3.3, 3.8)
VIC	4.0	(3.6, 4.4)	3.8	(3.5, 4.1)
QLD	3.8	(3.5, 4.0)	3.5	(3.3, 3.8)
WA	3.7	(3.4, 4.0)	3.4	(3.1, 3.6)
TAS	5.1	(4.6, 5.6)	4.6	(4.1, 5.1)
SA	4.1	(3.3, 4.9)	3.8	(3.0, 4.6)
ACT	3.8	(3.3, 4.3)	3.4	(2.9, 4.0)
NT	2.5	(1.9, 3.1)	2.2	(1.5, 3.0)
Socio-economic status (SEIFA IRSAD quintile)				
1 (most disadvantaged)	5.1	(4.8, 5.4)	4.2	(3.9, 4.6)
2	4.4	(4.2, 4.7)	4.0	(3.7, 4.3)
3	4.3	(4.0, 4.5)	3.8	(3.5, 4.0)
4	3.5	(3.3, 3.7)	3.4	(3.2, 3.5)
5 (most advantaged)	3.2	(3.1, 3.4)	3.0	(2.9, 3.2)

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

Almost one in five MedicineInsight patients had six or more original prescriptions recorded during 2017–18 and 5.3% had 15 or more original prescriptions recorded (Figure 7.1).

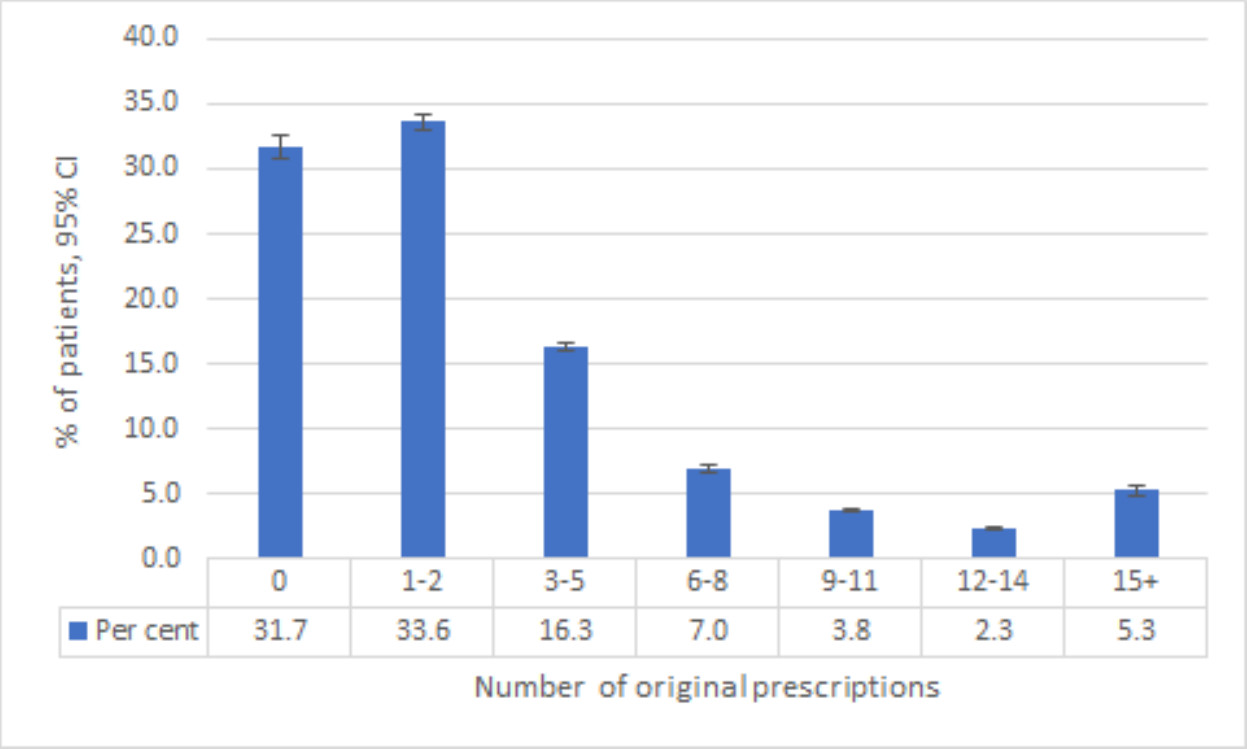


Figure 7.1 Number of original prescriptions recorded per patient (weighted data), MedicineInsight 2017–18

The average number of recorded prescriptions for an individual patient increases with age (Table 7.1, Figure 7.2), rising from 1.9 (95% CI 1.9 to 2.0) for patients aged 20–29 years to 9.1 (95% CI 8.8 to 9.3) in the 70–79 age group. This is likely to reflect the higher disease burden among older people, as discussed in Chapter 5. Increasing use of medicines with increasing age was also reported in the 2016 ABS Survey of Health Care.[22]

MedicineInsight patients from Tasmania had a significantly higher average number of recorded prescriptions (4.6, 95% CI 4.1 to 5.1) than the national average (Table 7.1). This may reflect the higher number of encounters per patient in Tasmania compared with the other states (see Chapter 4) and, given medicines use increases with age, its older population. The median age in Tasmania is 42 years compared with the national median age of 37 years.[11]

In contrast, patients from the NT had a significantly lower average number of prescriptions (2.2, 95% CI 1.5 to 3.0). There may be a number of reasons for this: the number of encounters per patient for Northern Territorians was the lowest seen in MedicineInsight practices, which may be due to the NT's lower median age (33 years).

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 3.0 (95% CI 2.9 to 3.2) compared with 4.2 (95% CI 3.9 to 4.6) for the most disadvantaged group. Again, this is likely to reflect higher disease burdens in more disadvantaged communities.[23]

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

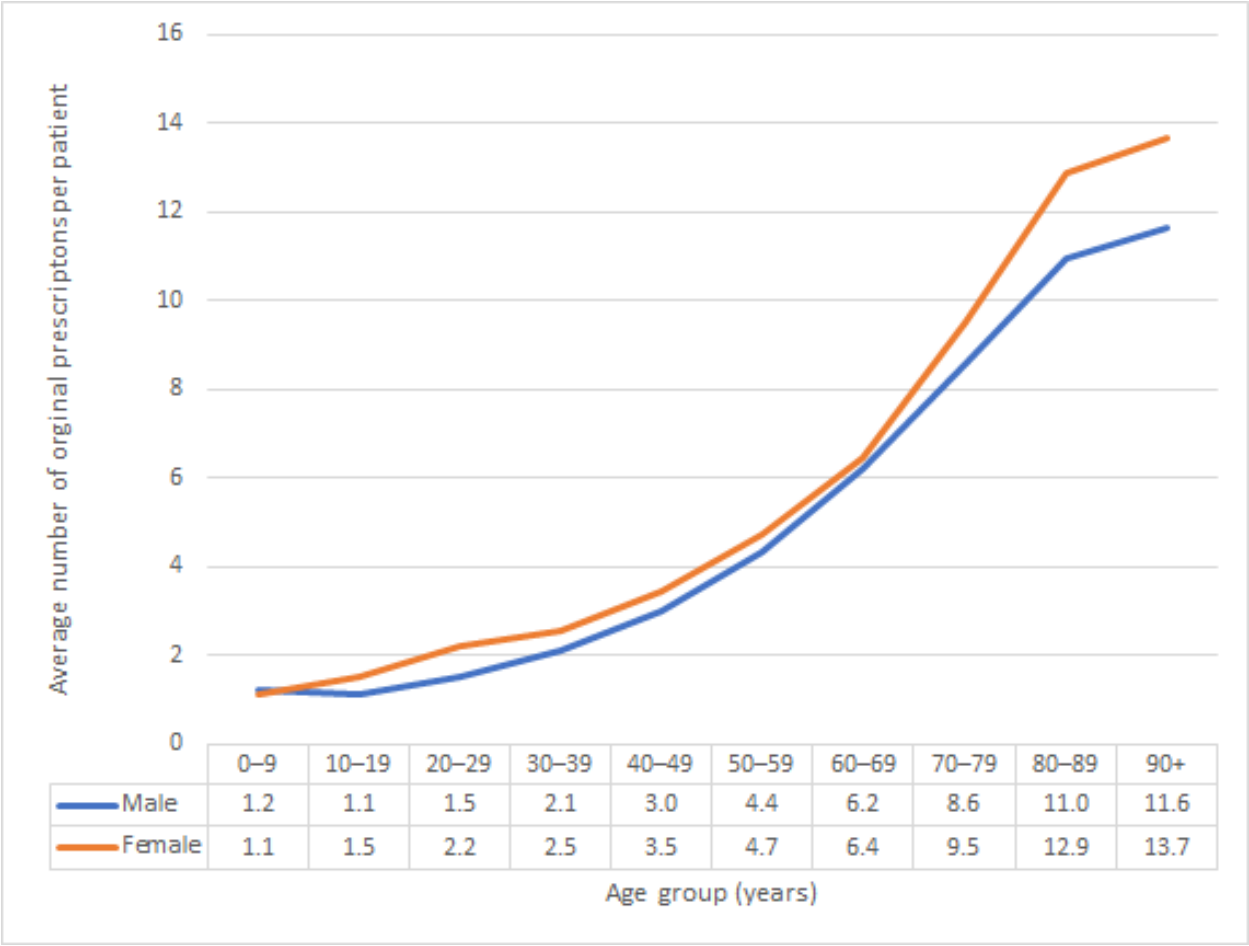


Figure 7.2 Average number of original prescriptions recorded per patient by age group and sex (weighted data), MedicineInsight 2017–18

7.2 Prescriptions per medicine type

Just under 11 million original prescriptions with a valid ATC code were prescribed to MedicineInsight patients in 2017–18 (Table 7.2). If total prescriptions – original and repeat prescriptions – are included, then there were just under 34 million prescriptions recorded for MedicineInsight patients. During the same period, there were 293 million prescriptions dispensed on the PBS (ATC Level 1 including under co-payment prescriptions). 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 87.2% of MedicineInsight prescriptions were PBS-subsidised (see Table 7.4), this suggests that GPs participating in MedicineInsight were responsible for ordering up to 10% of the prescriptions dispensed on the PBS in 2017–18 (assuming that all of the medicines prescribed were actually dispensed).[24]

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 ordered for MedicineInsight patients in terms of original prescriptions (27.9%). However, cardiovascular medicines accounted for largest proportion of medicines ordered for MedicineInsight patients in terms of total volume of prescriptions (30.3%; Table 7.2). The differences between the proportions of medicines seen when comparing original 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 conditions requiring 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 the Department of Human Services to prescribe repeats for many opioids and benzodiazepines, whereas PBS prescriptions for antidepressants may allow for three (one original prescription and two repeats) or six months (one original 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 almost a third of total prescriptions prescribed to MedicineInsight patients and almost a third of the prescriptions dispensed on the PBS. Medicines for the nervous system are the next most common prescriptions, accounting for 23.1% of total MedicineInsight prescriptions and 22.1% of PBS prescriptions, while medicines for the alimentary tract and metabolic system accounted for 14.2% and 15.5% of total prescriptions for MedicineInsight and the PBS, respectively.

There were some differences between the MedicineInsight prescription numbers and PBS figures (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 4.4% 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 and hormone replacement therapies which are much more likely to be prescribed by GPs than other prescribers. 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 (1.9%).

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

- MedicineInsight includes private prescriptions which are not captured by the PBS (see section 7.4)
- 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 original and total prescriptions for ATC level 1 (unweighted and weighted data) compared to number and proportion (%) of all PBS medicines dispensed, 2017–18

ATC level 1	Medicine class	Original prescriptions			Total prescriptions[a]			PBS 2017–18[b]	
		Unweighted data		Weighted data	Unweighted data		Weighted data		
		N	%	% (95% CI)	N	%	% (95% CI)	N	%
C	Cardiovascular system	1,976,643	18.0	16.8 (16.3, 17.3)	10,721,278	31.7	30.3 (29.7, 30.8)	64,197,518	31.5
N	Nervous system	3,140,323	28.7	27.9 (27.2, 28.7)	7,847,576	23.1	23.1 (22.4, 23.7)	45,097,240	22.1
A	Alimentary tract and metabolism	1,282,739	11.7	11.5 (11.3, 11.7)	4,871,963	14.4	14.2 (14.0, 14.3)	31,618,360	15.5
J	Anti-infectives for systemic use	1,701,900	15.5	17.1 (16.4, 17.7)	2,522,123	7.4	8.3 (8.0, 8.7)	12,829,125	6.3
R	Respiratory system	503,069	4.6	4.8 (4.6, 5.0)	2,123,647	6.3	6.6 (6.3, 6.9)	12,046,494	5.9
G	Genitourinary system and sex hormones	450,497	4.1	4.3 (4.1, 4.4)	1,390,899	4.1	4.4 (4.2, 4.5)	3,787,485	1.9
M	Musculoskeletal system	498,092	4.6	4.6 (4.4, 4.7)	1,239,421	3.7	3.7 (3.6, 3.8)	7,015,306	3.4
B	Blood and blood forming organs	320,443	2.9	2.6 (2.5, 2.7)	1,165,581	3.4	3.1 (3.0, 3.2)	9,481,968	4.6
D	Dermatologicals	463,957	4.2	4.6 (4.4, 4.8)	812,452	2.4	2.6 (2.5, 2.8)	2,848,227	1.4
H	Systemic hormonal preparations, excl. sex hormones and insulins	358,041	3.3	3.3 (3.2, 3.4)	689,664	2.0	2.1 (2.0, 2.1)	3,601,992	1.8
S	Sensory organs (eye/ear)	171,877	1.6	1.7 (1.6, 1.8)	354,514	1.0	1.1 (1.0, 1.1)	7,266,559	3.6
L	Antineoplastic and immunomodulating agents	44,645	0.4	0.4 (0.3, 0.4)	151,741	0.5	0.4 (0.4, 0.4)	3,853,043	1.9
P	Antiparasitic products, insecticides and repellents	45,584	0.4	0.5 (0.4,0.5)	64,136	0.2	0.2 (0.2, 0.2)	79,545	<0.1
V	Various	1066	0.01	0.01 (0.01, 0.01)	2946	0.01	0.01 (0.01, 0.01)	196,114	0.1
	Total	10,958,876	100	100	33,957,941	100	100	203,918,976[b]	

a Total prescriptions – original and repeat prescriptions.
b Excludes under co-payment prescriptions. These accounted for another 89,494,710 prescriptions, or 30% of all dispensed prescriptions (including those under co-payment and those over-co-payment). There were approximately 293 million prescriptions dispensed if under co-payment prescriptions are also counted.
c Includes 140,671 prescriptions that do not have an ATC code and are designated as 'unless otherwise classified'.

At ATC level 3,[v] opioids accounted for the largest proportion of medicines ordered for MedicineInsight patients in terms of original prescriptions (10.1%). The high proportion of original prescriptions to total prescriptions for opioids is due to PBS restrictions which largely limit opioids prescriptions to a single supply without any repeats.[vi] It may also be related to their use in the short-term management of acute pain. The

[v] 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.
[vi] Applications for increased quantities and/or repeats must be authorised by the Department of Human Services.

antidepressants 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 5), the lipid-modifying medicines (C10A and C10B) together accounted for 5.3% of the volume of original prescriptions and 10.6% 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 8.8% of the volume of original prescriptions and 16.3% of the volume of total prescriptions.

Table 7.3 only 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 original prescriptions but not by total prescriptions. These are largely used to treat acute or intermittent conditions and include two classes of antibiotics (macrolides [J01F; 1.8% of all original prescriptions] and sulfonamides [J01E; 0.8%]), vaccines for viral diseases (J07B; 0.8%), thyroid preparations (H03A; 1.1%) and propulsives used to control nausea and vomiting (A03F; 0.9%).

A breakdown of prescription numbers (original and total) for all ATC3 drug classes prescribed in MedicineInsight practices during 2017–18 is included in Appendix 8.

Table 7.3 Number and proportion (%) of original and total prescriptions for top 30 ATC level 3 classes recorded (unweighted and weighted data), MedicineInsight 2017–18

ATC level 3	Medicine class	Original prescriptions			Total prescriptions[b]			Average number of prescriptions[c] per original script
		Unweighted data[a]		Weighted data	Unweighted data[a]		Weighted data	
		N	%	% (95% CI)	N	%	% (95% CI)	
N06A	Antidepressants	718,209	6.65	6.4 (6.1, 6.7)	3,328,204	9.8	9.8 (9.4, 10.2)	4.6
C10A	Lipid-modifying agents, single agent	549,141	5.0	4.8 (4.7, 4.9)	3,300,452	9.7	9.6 (9.4, 9.7)	6.0
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	651,646	6.0	5.7 (5.6, 5.8)	2,790,759	8.2	7.9 (7., 8.0)	4.3
R03A	Adrenergics, inhalants	315,203	2.9	3.0 (2.9, 3.1)	1,543,606	4.6	4.8 (4.5, 5.0)	4.9
N02A	Opioids	1,169,391	10.7	10.1 (9.7, 10.5)	1,528,633	4.5	4.4 (4.2, 4.6)	1.3
C09C	Angiotensin-II antagonists, single agent	240,643	2.2	2.1 (2.0, 2.2)	1,373,077	4.0	3.9 (3.8, 4.0)	5.7
C09A	ACE inhibitors, single agent	232,111	2.1	1.9 (1.9, 2.0)	1,319,073	3.9	3.6 (3.5, 3.7)	5.7
A10B	Blood glucose-lowering drugs, excl. insulins	235,093	2.2	2.2 (2.1, 2.3)	1,280,884	3.8	3.9 (3.7, 4.1)	5.4
B01A	Antithrombotic agents	250,998	2.3	2.0 (1.9, 2.1)	1,072,706	3.2	2.9 (2.8, 2.9)	4.3
C07A	Beta-blocking agents	194,182	1.8	1.6 (1.5, 1.7)	1,030,948	3.0	2.8 (2.7, 2.9)	5.3
J01C	Beta-lactam antibacterials, penicillins	724,339	6.6	7.4 (7.0, 7.8)	946,099	2.8	3.2 (3.0, 3.4)	1.3
N03A	Antiepileptics	214,281	2.0	1.9 (1.9, 2.0)	942,826	2.8	2.8 (2.7, 2.9)	4.4

ATC level 3	Medicine class	Original prescriptions			Total prescriptions[b]			Average number of prescriptions[c] per original script
		Unweighted data[a]		Weighted data	Unweighted data[a]		Weighted data	
		N	%	% (95% CI)	N	%	% (95% CI)	
C09D	Angiotensin-II antagonists, combinations	148,763	1.4	1.3 (1.3, 1.4)	852,036	2.5	2.5 (2.4, 2.6)	5.7
M01A	Anti-inflammatory and anti-rheumatic products, non-steroids	326,647	3.0	3.1 (3.0, 3.3)	830,857	2.5	2.5 (2.4, 2.6)	2.5
C08C	Selective calcium channel blockers with mainly vascular effects	144,059	1.3	1.2 (1.1, 1.2)	814,313	2.4	2.2 (2.1, 2.3)	5.7
D07A	Corticosteroids, single agent	334,922	3.1	3.3 (3.2, 3.5)	598,246	1.8	2.0 (1.9, 2.1)	1.8
J01D	Other beta-lactam antibacterials	351,078	3.2	3.4 (3.3, 3.5)	494,302	1.5	1.6 (1.5, 1.6)	1.4
G03A	Hormonal contraceptives for systemic use	198,340	1.8	1.9 (1.8, 2.1)	484,249	1.4	1.6 (1.5, 1.7)	2.4
N05A	Antipsychotics	186,503	1.7	1.7 (1.6, 1.8)	462,194	1.4	1.4 (1.3, 1.5)	2.5
C09B	ACE inhibitors, combinations	77,398	0.7	0.7 (0.6, 0.7)	443,158	1.3	1.3 (1.2, 1.3)	5.7
H02A	Corticosteroids for systemic use, single agent	222,380	2.0	2.1 (2.0, 2.2)	425,761	1.3	1.3 (1.2, 1.3)	1.9
N05C	Hypnotics and sedatives	290,448	2.7	2.6 (2.5, 2.7)	410,747	1.2	1.2 (1.2, 1.3)	1.4
R03B	Other drugs for obstructive airways disease, inhalants	79,649	0.7	0.7 (0.7, 0.8)	382,726	1.1	1.2 (1.1, 1.2)	4.8
N05B	Anxiolytics	312,752	2.9	3.0 (2.8, 3.1)	340,833	1.0	1.1 (1.0, 1.1)	1.1
G04B	Urologicals	80,469	0.7	0.7 (0.7, 0.8)	336,194	1.0	1.0 (1.0, 1.1)	4.2
C10B	Lipid-modifying agents, combinations	55,665	0.5	0.5 (0.5, 0.6)	324,934	1.0	1.0 (0.9, 1.1)	5.8
J01A	Tetracyclines	134,986	1.2	1.3 (1.2, 1.3)	323,398	1.0	1.0 (1.0, 1.1)	2.4
G03C	Oestrogens	94,563	0.9	0.8 (0.8, 0.9)	305,388	0.9	0.9 (0.8, 1.0)	3.2
N02B	Other analgesics and antipyretics	81,538	0.7	0.7 (0.6, 0.7)	302,926	0.9	0.8 (0.7, 0.8)	3.7
M04A	Antigout preparations	84,193	0.8	0.7 (0.7, 0.8)	263,742	0.8	0.8 (0.7, 0.8)	3.1
	Subtotal[d]	86,699,590	79.4	78.8	28,853,271	85.0	86.5	3.3

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

7.3 Average number of repeats per original prescription

As would be expected, many of the medicines used to treat chronic conditions were prescribed with sufficient supply for six months treatment per original prescription (Table 7.3). The average number of total prescriptions per original prescription (original prescription plus repeat prescriptions) was 5.3–6.0 for the medicines used to treat diabetes (A10B) and the various cardiovascular medicines (lipid-lowering medicines [C10A], antihypertensives [C09A, C09C, C09D, C07A, C08C]).

The average number of total prescriptions per original prescription was much lower if the medicine is used to treat acute conditions (Table 7.3). The average number of prescriptions per original prescription was 1.3–1.4 for most of the antibiotics (J01C, J01D, J01E, J01F). The average number of prescriptions per original script was higher for the tetracyclines (J01A; 2.4) and may reflect extended use of doxycycline for the treatment of acne and malaria prophylaxis in people travelling overseas.

In accordance with guidelines and PBS restrictions which largely limit the prescribing of opioids and benzodiazepines to a single supply without repeats,[vii] the average number of prescriptions per original script for these classes was 1.3–1.4 (N02A, N05B, N05C).

7.4 Private and government-subsidised original prescriptions

Medicines prescribed by GPs may be subsidised by the PBS or RPBS or they may be private prescriptions (where the consumer pays full price). As can be seen in Table 7.4, the majority of original prescriptions for each ATC level 1 class are subsidised by the PBS or RPBS. However, approximately a third or more of original prescriptions for dermatological medicines (ATC D), medicines for the eye and ear (ATC S), genitourinary system and sex hormones (ATC G) are private prescriptions.

Table 7.4 Number and proportion (%) of PBS/RPBS and private original prescriptions for ATC level 1 (unweighted and weighted data), MedicineInsight 2017–18

ATC level 1	Medicine class	PBS/RPBS			Private		
		Unweighted data		Weighted data	Unweighted data		Weighted data
		N	% within class	% within class (95% CI)	N	% within class	% within class (95% CI)
N	Nervous system	2,724,041	86.7	86.2 (85.7, 86.7)	416,282	13.3	13.8 (13.3, 14.3)
C	Cardiovascular system	1,957,452	99.0	98.9 (98.8, 99.0)	19,191	1.0	1.1 (1.0, 1.2)
J	Anti-infectives for systemic use	1,494,742	87.8	87.1 (86.1, 88.2)	207,158	12.2	12.9 (11.8, 13.9)
A	Alimentary tract and metabolism	1,110,447	86.6	85.6 (84.5, 86.7)	172,292	13.4	14.4 (13.3, 15.5)
R	Respiratory system	419,655	83.4	82.9 (81.0, 84.7)	83,414	16.6	17.2 (15.3, 19.0)
M	Musculoskeletal system	463,834	93.1	92.5 (91.7, 93.3)	34,258	7.0	7.5 (6.7, 8.3)
D	Dermatologicals	301,399	65.0	65.3 (63.5, 67.1)	162,558	35.0	34.7 (32.9, 36.5)
G	Genitourinary system and sex hormones	274,174	60.9	59.8 (58.8, 60.9)	176,323	39.1	40.2 (39.1, 41.2)
H	Systemic hormonal preparations, excl. sex hormones and insulins	350,154	97.8	97.8 (97.5, 98.1)	7887	2.2	2.2 (1.9, 2.5)
B	Blood and blood forming organs	280,363	87.5	86.8 (85.8, 87.8)	40,080	12.5	13.2 (12.2, 14.2)
S	Sensory organs (eye/ear)	114,729	66.8	65.7 (63.5, 67.9)	57,148	33.3	34.3 (32.1, 36.5)
P	Antiparasitic products, insecticides and repellents	38,538	84.5	85.2 (83.8, 86.5)	7046	15.5	14.8 (13.5, 16.2)
L	Antineoplastic and immunomodulating agents	28,829	64.6	68.0 (64.9, 71.1)	15,816	35.4	32.0 (28.9, 35.1)
V	Various	1028	96.4	94.7 (90.4, 98.9)	38	3.6	5.4 (1.1, 9.6)
	Total all classes	9,559,385	87.2	-	1,399,491	12.8	-

[vii] Repeats may be authorised for some opioids if the patient is receiving palliative care, has cancer or has chronic severe disabling pain that has not responded to non-opioid analgesics. Applications for increased quantities and/or repeats must be authorised by the Department of Human Services.

Table 7.5 and Appendix 9 provide more detail about the private and PBS splits for original prescriptions within each ATC level 1 category. The hypnotics and sedatives (N05C) – which include benzodiazepines, barbiturates, and melatonin – were the most likely to be prescribed privately (40.3%). Other classes with higher levels of private prescribing were the dermatological topical corticosteroids (D07A; 22.9%) and systemic hormonal contraceptives (G03C; 19.2%). It is likely that some of these medicines are not PBS-listed while others are being used for indications that are not PBS-subsidised.

A breakdown of PBS/RPBS subsidised and private prescriptions (original only) for all ATC 3 drug classes prescribed in MedicineInsight practices during 2017–18 is included in Appendix 9.

Table 7.5 Number and proportion (%) of PBS/RPBS and private original prescriptions for top 30 ATC level 3 classes recorded (unweighted and weighted data), MedicineInsight 2017–18

ATC level 3	Medicine class	PBS/RPBS			Private		
		Unweighted data		Weighted data	Unweighted data		Weighted data
		N	% within class	% within class (95% CI)	N	% within class	% within class (95% CI)
N02A	Opioids	1,032,107	88.3	87.1 (86.4, 87.7)	137,284	11.7	13.0 (12.3, 13.6)
J01C	Beta lactams antibacterials and penicillins	715,228	98.7	98.8 (98.4, 99.1)	9111	1.3	1.2 (0.9, 1.6)
N06A	Antidepressants	697,939	97.2	97.0 (96.7, 97.2)	20,270	2.8	3.0 (2.8, 3.3)
A02B	Drugs for peptic ulcer and GORD	642,255	98.6	98.4 (98.2, 98.6)	9391	1.4	1.6 (1.4, 1.8)
C10A	Lipid modifying agents, plain	545,446	99.3	99.3 (99.2, 99.4)	3695	0.7	0.7 (0.6, 0.8)
J01D	Other beta lactam antibacterials	349,068	99.4	99.4 (99.1, 99.8)	2010	0.6	0.6 (0.2, 0.9)
D07A	Corticosteroids, plain (dermatological)	256,834	76.7	77.1 (75.3, 78.9)	78,088	23.3	22.9 (21.1, 24.7)
M01A	Anti-inflammatories and antirheumatic products, non-steroidal	297,259	91.0	90.6 (89.5, 91.7)	29,388	9.0	9.4 (8.3, 10.5)
R03A	Adrenergics, inhaled	310,723	98.6	98.5 (98.3, 98.7)	4480	1.4	1.5 (1.3, 1.7)
N05B	Anxiolytics	271,156	86.7	87.0 (86.2, 87.8)	41,596	13.3	13.0 (12.2, 13.8)
N05C	Hypnotics and sedatives	176,318	60.7	59.7 (58.1, 61.3)	114,130	39.3	40.3 (38.7, 41.9)
B01A	Antithrombotic agents	227,731	90.7	90.5 (89.8, 91.1)	23,267	9.3	9.5 (8.9, 10.2)
C09C	Angiotensin-II receptor blockers, plain	240,156	99.8	99.8 (99.7, 99.8)	487	0.2	0.3 (0.2, 0.3)
A10B	Blood glucose lowering drugs, excluding insulin	229,996	97.8	97.6 (97.2, 98.1)	5097	2.2	2.4 (1.9, 2.8)
C09A	ACE inhibitors, plain	231,276	99.6	99.6 (99.6, 99.7)	835	0.4	0.4 (0.3, 0.4)
H02A	Corticosteroids for systemic use, plain	220,032	98.9	99.0 (98.6, 99.3)	2348	1.1	1.0 (0.7, 1.4)
N03A	Antiepileptics	192,656	89.9	90.2 (89.6, 90.7)	21,625	10.1	9.9 (9.3, 10.4)
G03A	Hormonal contraceptives for systemic use	162,943	82.2	80.8 (79.9, 81.7)	35,397	17.6	19.2 (18.3, 20.1)
C07A	Beta blocker agents	193,429	99.6	99.6 (99.5, 99.7)	753	0.4	0.4 (0.3, 0.5)
N05A	Antipsychotics	165,306	88.6	89.1 (9.9, 12.0)	21,197	11.4	11.0 (88.0, 90.1)
J01F	Macrolides, lincosamides and streptogramins	155,209	89.7	88.3 (84.6, 92.0)	17,805	10.3	11.7 (8.0, 15.4)
C09D	Angiotensin-II receptor blockers, combinations	148,373	99.7	99.7 (99.6, 99.8)	390	0.3	0.3 (0.2, 0.4)
C08C	Selective calcium channel blockers with mainly vascular effects	143,822	99.8	99.8 (99.8, 99.9)	237	0.2	0.2 (0.1, 0.2)
J01A	Tetracyclines	118,174	87.6	87.2 (86.1, 88.4)	16,812	12.4	12.8 (11.6, 13.9)

ATC level 3	Medicine class	PBS/RPBS			Private		
		Unweighted data		Weighted data	Unweighted data		Weighted data
		N	% within class	% within class (95% CI)	N	% within class	% within class (95% CI)
H03A	Thyroid preparations	120,860	95.8	95.5 (94.8, 96.2)	5368	4.2	4.5 (3.8, 5.2)
A03F	Propulsives	92,735	90.9	91.1 (90.3, 91.9)	9270	9.1	8.9 (8.1, 9.7)
G03C	Oestrogens	76,814	81.2	81.6 (80.6, 82.5)	17,749	18.8	18.8 (17.5, 19.4)
C03C	High ceiling diuretics	89,604	97.2	97.2 (2.6, 3.1)	2623	2.8	2.8 (2.6, 3.1)
J01E	Sulfonamides and trimethoprim	90,681	99.4	99.3 (99.0, 99.6)	570	0.6	0.7 (0.4, 1.0)
M04A	Antigout preparations	83,378	99.0	99.0 (98.8, 99.1)	815	1.0	1.0 (0.9, 1.2)

7.4.1 Exploration of original prescription breakdown for dermatology (ATC D)

Just over a third of dermatological medicines prescribed for the eye and ear (ATC S) are private original prescriptions (Table 7.4). Table 7.6 indicates that this is driven by the high number of private prescriptions for topical antifungals (D01A) and moderate numbers of private prescriptions for ATC class D06B (which includes topical medicines for treatment of the herpes virus cold sores and warts) and topical corticosteroids (D07A and D07C). These include many over-the-counter and pharmacy-only medicines.

Table 7.6 PBS/RPBS and private prescribing of original prescriptions for ATC 3 medicine classes in ATC D, MedicineInsight 2017–18 (excludes ATC 3 classes with fewer than 10,000 prescriptions)

ATC3 code	Description	PBS/RPBS #	PBS/RPBS %	Private #	Private %
D01A	Antifungals for topical use	1,331	3.1	42,218	96.9
D05A	Antipsoriatics for topical use	12,848	91.7	1,160	8.3
D06B	Chemotherapeutics for topical use	4,995	30.4	11,434	69.6
D07A	Corticosteroids, plain	256,834	76.7	78,088	23.3
D07C	Corticosteroids, combinations with antibiotics	17,080	50.1	16,987	49.9

7.4.2 Exploration of original prescription breakdown for genitourinary system and sex hormones (ATC G)

As shown in Table 7.4, 40.2% of original prescriptions for genitourinary system and sex hormones (ATC G) are private. An exploration of the ATC 3 medicine classes that contribute to this higher rate of private prescribing (Table 7.7) suggests that it is due to high level of private prescribing for:

- the progestogens and oestrogens in combination (G03F) which include a number of combined oral contraceptive pills that are not PBS subsidised
- the anti-androgens (G03H)
- the urologicals (G04B) which includes medicines to treat erectile dysfunction which are only subsidised if the patient is a veteran (ie, RPBS only)
- drugs used to treat benign prostatic hypertrophy (G04C) which are only subsidised on the RPBS but not the PBS.

Table 7.7 PBS/RPBS and private prescribing of original prescriptions for ATC 3 medicine classes in ATC G, MedicineInsight 2017–18 (excludes ATC 3 classes with fewer than 10,000 prescriptions)

ATC3 code	Description	PBS/RPBS #	PBS/RPBS %	Private #	Private %
G03A	Hormonal contraceptives for systemic use	162,943	82.2	35,397	17.9
G03C	Oestrogens	76,814	81.2	17,749	18.8
G03D	Progestogens	12,401	82.7	2,598	17.3
G03F	Progestogens and oestrogens in combination	1,617	15.6	8,757	84.4
G03H	Antiandrogens	738	2.4	30,450	97.6
G04B	Urologicals	14,062	17.5	66,407	82.5
G04C	Drugs used in benign prostatic hypertrophy	1,660	15.7	8,896	84.3

7.4.3 Exploration of original prescription breakdown for sensory (eye or ear) organs (ATC S)

While 34.3% of prescriptions for medicines prescribed for the eye and ear (ATC S) are private prescriptions, this is driven almost completely by the high proportion of anti-infectives (topical antibacterials and antivirals) that are prescribed privately (Table 7.8). Medicines to treat glaucoma and inflammatory eye conditions are overwhelmingly subsidised by the PBS.

Table 7.8 PBS/RPBS and private prescribing of original prescriptions for ATC 3 medicine classes in ATC S, MedicineInsight 2017–18 (excludes ATC 3 classes with fewer than 10,000 prescriptions)

ATC3 code	Description	PBS/RPBS #	PBS/RPBS %	Private #	Private %
S01A	Anti-infectives	16,024	26.2	45,130	73.8
S01B	Anti-inflammatory agents	10,416	97.3	285	2.7
S01E	Antiglaucoma preparations and miotics	20,716	98.7	268	1.3
S02C	Corticosteroids and anti-infectives in combination	60,997	86	9,899	14

7.5 Prescriptions per 100 encounters

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 (original or total) recorded at any time during 2017–18, 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.

We have also ranked medicines according to how frequently they are prescribed during encounters. Because the number of repeat prescriptions varies among drug classes, medicines that may rank higher in terms of original prescriptions per 100 encounters can rank lower if the rate of total prescriptions per 100 encounters is used instead. For example, the most commonly prescribed class of medicines at ATC level 1 are medicines for the nervous system, if using original prescriptions per 100 encounters, but are cardiovascular medicines if using total prescriptions per 100 encounters.

On average, for every 100 encounters almost 80 original prescriptions are generated (Table 7.9). The prescriptions provided during these encounters are sufficient to generate 246 prescriptions per 100 encounters – ie, each GP-patient encounter results in 2.46 original and repeat prescriptions (Table 7.9).

As expected, the number of prescriptions per 100 encounters increases as patients become older (Table 7.9). Once patients are 60 years or older almost every encounter is associated with a prescription being written (~100 prescriptions per 100 encounters). In comparison, only a third of encounters involving children 0–9 years are associated with a prescription being written.

Table 7.9 Rate of original prescriptions per 100 encounters by patient characteristic (unweighted and weighted data), MedicineInsight 2017–18

Characteristic	Unweighted data		Weighted data	
		(95% CI)		(95% CI)
All patients	79.4	(58.5, 97.2)	79.4	(70.5, 89.5)
Sex				
Male	78.9	(69.8, 89.1)	75.4	(58.4, 97.3)
Female	79.8	(70.8, 90.0)	75.4	(58.5, 97.2)
Age group (years)				
0–9	33.0	(27.7, 39.3)	33.2	(25.0, 43.9)
10–19	44.5	(38.5, 51.5)	43.3	(33.3, 56.1)
20–29	56.3	(47.3, 67.0)	55.1	(42.1, 72.2)
30–39	60.3	(51.2, 71.1)	59.1	(45.0, 77.7)
40–49	75.4	(66.0, 86.2)	73.4	(56.8, 94.8)
50–59	89.4	(79.2, 101.0)	87.8	(67.9, 113.5)
60–69	101.6	(89.9, 114.8)	100.8	(77.3, 131.4)
70–79	105.6	(91.7, 121.7)	105.2	(79.1, 139.8)
80–89	103.0	(87.5, 121.2)	103.0	(77.0, 137.6)
90+	98.7	(81.2, 120.0)	98.5	(72.5, 133.7)
Rurality				
Major city	74.9	(61.4, 91.2)	71.8	(53.5, 96.2)
Inner regional	86.5	(59.3, 126.2)	84.2	(49.5, 142.2)
Outer regional	88.3	(47.9, 161.7)	85.6	(33.9, 216.3)
Remote/very remote	89.8	(30.5, 276.3)	88.8	(5.3, 1182.9)
State/Territory				
NSW	80.6	(59.6, 109.0)	74.6	(49.0, 113.4)
VIC	80.4	(50.2, 129.3)	77.6	(45.7, 131.9)
QLD	75.7	(49.4, 115.9)	74.4	(40.5, 135.7)
WA	75.3	(39.7, 142.9)	72.1	(27.2, 192.4)
TAS	88.6	(38.4, 206.5)	86.1	(32.9, 229.6)
SA	80.4	(13.9, 455.6)	77.0	(15.8, 365.9)
ACT	75.8	(12.2, 474.0)	72.8	(12.7, 433.5)
NT	69.4	(10.4, 472.3)	66.1	(2.9, 1088.2)
Socio-economic status (SEIFA IRSAD quintile)				
1 (most disadvantaged)	90.9	(60.3, 136.6)	83.0	(47.4, 145.2)
2	83.9	(60.3, 116.9)	79.5	(50.2, 125.4)
3	80.7	(58.7, 110.8)	76.3	(51.0, 114.1)
4	73.6	(55.4, 98.1)	72.1	(48.1, 108.3)
5 (most advantaged)	71.1	(51.9, 97.4)	69.3	(44.6, 107.2)

7.5.1 Prescriptions per 100 encounters by ATC codes

Table 7.10 shows the frequency of prescribing medicines per 100 encounters at the ATC 1 level. The three most frequently prescribed medicine classes for original prescriptions per 100 encounters were medicines for the nervous system (22.8 per 100 encounters), medicines for the cardiovascular system (14.3 prescriptions per 100 encounters) and anti-infective medicines for systemic use (12.3 per 100 encounters). The most frequently recorded medicine classes for total prescriptions were cardiovascular medicines

(77.7 prescriptions per 100 encounters), medicines for the nervous system (56.9 per 100 encounters) and medicines for the alimentary tract and metabolism (35.3 per 100 encounters).

Table 7.10 Original and total prescriptions recorded per 100 encounters, ATC level 1 (weighted), MedicineInsight 2017–18

ATC level 1	Medicine class	Original prescriptions			Total prescriptions[a]		
		Rate per 100 encounters	(95% CI)	Rank	Rate per 100 encounters	(95% CI)	Rank
C	Cardiovascular system	14.3	(13.4, 15.2)	2	77.7	(72.7, 82.6)	1
N	Nervous system	22.8	(21.3, 24.2)	1	56.9	(53.1, 60.6)	2
A	Alimentary tract and metabolism	9.3	(8.7, 9.9)	4	35.3	(33.0, 37.6)	3
J	Anti-infectives for systemic use	12.3	(11.5, 13.1)	3	18.2	(17.1, 19.4)	4
R	Respiratory system	3.6	(3.4, 3.9)	5	15.4	(14.4, 16.3)	5
G	Genitourinary system and sex hormones	3.3	(3.1, 3.5)	8	10.1	(9.4, 10.7)	6
M	Musculoskeletal system	3.6	(3.4, 3.8)	6	8.9	(8.4, 9.6)	7
B	Blood and blood forming organs	2.3	(2.2, 2.5)	11	8.4	(7.8, 9.0)	8
D	Dermatologicals	3.4	(3.1, 3.6)	7	5.9	(5.5, 6.3)	9
H	Systemic hormonal preparations, excl. sex hormones and insulins	2.6	(2.4, 2.8)	10	5.0	(4.7, 5.3)	10
S	Sensory organs	1.2	(1.2, 1.3)	9	2.6	(2.4, 2.7)	11
L	Antineoplastic and immunomodulating agents	0.3	(0.3, 0.4)	13	1.1	(1.0, 1.2)	12
P	Antiparasitic products, insecticides and repellents	0.3	(0.3, 0.4)	12	0.5	(0.4, 0.5)	13
V	Various	0.0	(0.0, 0.0)	14	0.0	(0.0, 0.0)	14
	Total	79.4	(74.7, 84.1)		246.1	(231.0, 261.1)	

a Total prescriptions – original and repeat prescriptions

Differences between the ranking of medicines according to whether they are ranked by original prescription rate or total prescription rate are more noticeable at ATC level 3 (Table 7.11). For example, the opioids (N02A) are the most frequently prescribed original prescription (8.5 original prescriptions per 100 encounters) but the fifth most commonly prescribed total prescription (11.1 total prescriptions per 100 encounters). In contrast, the inhaled adrenergics (R03A)[viii] are the ninth most frequently prescribed original prescription (2.3 original prescriptions per 100 encounters) but the fourth most commonly prescribed total prescription (11.2 total prescriptions per 100 encounters).

[viii] Please note that two of the inhaled adrenergics (salbutamol and terbutaline) are also available without prescription over the counter. MedicineInsight may underestimate the use of these medicines.

Table 7.11 Original and total prescriptions recorded per 100 encounters (weighted), ATC level 3, MedicineInsight 2017–18

ATC level 3	Medicine class	Original prescriptions			Total prescriptions[a]		
		Rate per 100 encounters	(95% CI)	Rank	Rate per 100 encounters	(95% CI)	Rank
N06A	Antidepressants	5.2	(4.9, 5.5)	3	24.1	(22.5, 25.79	1
C10A	Lipid-modifying agents, single agent	4.0	(3.7, 4.2)	5	23.9	(22.4, 25.4)	2
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	4.7	(4.4, 5.0)	4	20.2	(18.9, 21.5)	3
R03A	Adrenergics, inhalants	2.3	(2.1, 2.4)	9	11.2	(10.5, 11.9)	4
N02A	Opioids	8.5	(7.9, 9.1)	1	11.1	(10.3, 11.9)	5
C09C	Angiotensin-II antagonists, single agent	1.7	(1.6, 1.8)	13	9.9	(9.3, 10.6)	6
C09A	ACE inhibitors, single agent	1.7	(1.6, 1.8)	15	9.5	(8.9, 10.2)	7
A10B	Blood glucose-lowering drugs, excl. insulins	1.7	(1.6, 1.8)	14	9.3	(8.7, 9.9)	8
B01A	Antithrombotic agents	1.8	(1.7, 1.9)	12	7.8	(7.2, 8.3)	9
C07A	Beta-blocking agents	1.4	(1.3, 1.5)	19	7.5	(7.0, 8.0)	10
J01C	Beta-lactam antibacterials, penicillins	5.2	(4.9, 5.6)	2	6.9	(6.4, 7.3)	11
N03A	Antiepileptics	1.6	(1.4, 1.7)	17	6.8	(6.4, 7.3)	12
C09D	Angiotensin-II antagonists, combinations	1.1	(1.0, 1.1)	22	6.2	(5.8, 6.6)	13
M01A	Anti-inflammatory and anti-rheumatic products, non-steroids	2.4	(2.2, 2.6)	8	6.0	(5.6, 6.4)	14
C08C	Selective calcium channel blockers with mainly vascular effects	1.0	(1.0, 1.1)	23	5.9	(5.5, 6.3)	15
D07A	Corticosteroids, single agent	2.4	(2.3, 2.6)	7	4.3	(4.0, 4.6)	16
J01D	Other beta-lactam antibacterials	2.5	(2.4, 2.7)	6	3.6	(3.3, 3.8)	17
G03A	Hormonal contraceptives for systemic use	1.4	(1.3, 1.5)	18	3.5	(3.3, 3.7)	18
N05A	Antipsychotics	1.4	(1.3, 1.5)	20	3.3	(3.1, 3.6)	19
H02A	Corticosteroids for systemic use, single agent	1.6	(1.5, 1.7)	16	3.1	(2.9, 3.3)	20
N05C	Hypnotics and sedatives	2.1	(2.0, 2.2)	11	3.0	(2.8, 3.2)	21
N05B	Anxiolytics	2.3	(2.1, 2.4)	10	2.5	(2.3, 2.7)	22
J01A	Tetracyclines	1.0	(0.9, 1.0)	24	2.3	(2.2, 2.5)	23
G03C	Oestrogens	0.7	(0.6, 0.7)	27	2.2	(2.0, 2.4)	24
M04A	Antigout preparations	0.6	(0.6, 0.7)	30	1.9	(1.8, 2.0)	25
J01F	Macrolides, lincosamides and streptogramins	1.3	(1.2, 1.4)	21	1.8	(1.7, 2.0)	26
H03A	Thyroid preparations	0.9	(0.9, 1.0)	25	1.7	(1.6, 1.8)	27
C03C	High-ceiling diuretics	0.7	(0.6, 0.7)	28	1.3	(1.2, 1.4)	28
A03F	Propulsives	0.7	(0.7, 0.8)	26	1.0	(0.9, 1.0)	29
J01E	Sulfonamides and trimethoprim	0.7	(0.6, 0.7)	29	0.9	(0.8, 1.0)	30

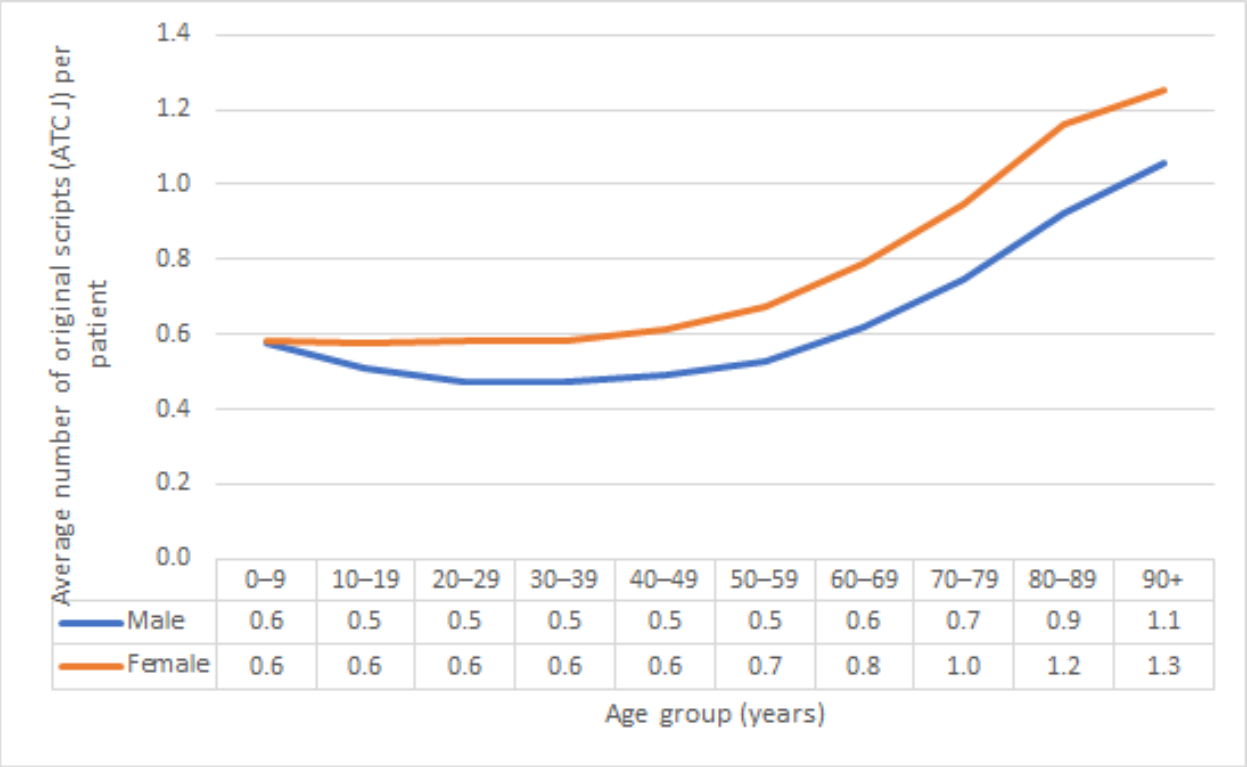
a Total prescriptions – original and repeat prescriptions

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:

- original prescriptions for anti-infectives for systemic use (ATC J)
- total prescriptions for cardiovascular medicines (ATC C)
- original 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 when rates began to rise for both genders. This could reflect increased rates of infections in the older age groups[23] and/or an increased readiness on the part of GPs to prescribe anti-infectives in older people due to underlying comorbidities.



	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90+
Male	0.6	0.5	0.5	0.5	0.5	0.5	0.6	0.7	0.9	1.1
Female	0.6	0.6	0.6	0.6	0.6	0.7	0.8	1.0	1.2	1.3

Figure 7.3 Average number of original prescriptions per patient for anti-infectives for systemic use (ATC level 1) by age group and sex (weighted data), MedicineInsight 2017–18

Use of cardiovascular medicines increased from ages 40–49 years for both sexes before falling in 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 – consistent with higher reported rates of cardiovascular disease in men.[23] The drop in the number of average prescriptions per patient seen in the oldest age group may be related to decisions to stop medicines due to an increased risk of adverse events in older frail people (eg, stopping antihypertensives because of increased risk of falls) or to reduce pill burden for those with a reduced life expectancy.[25,26]

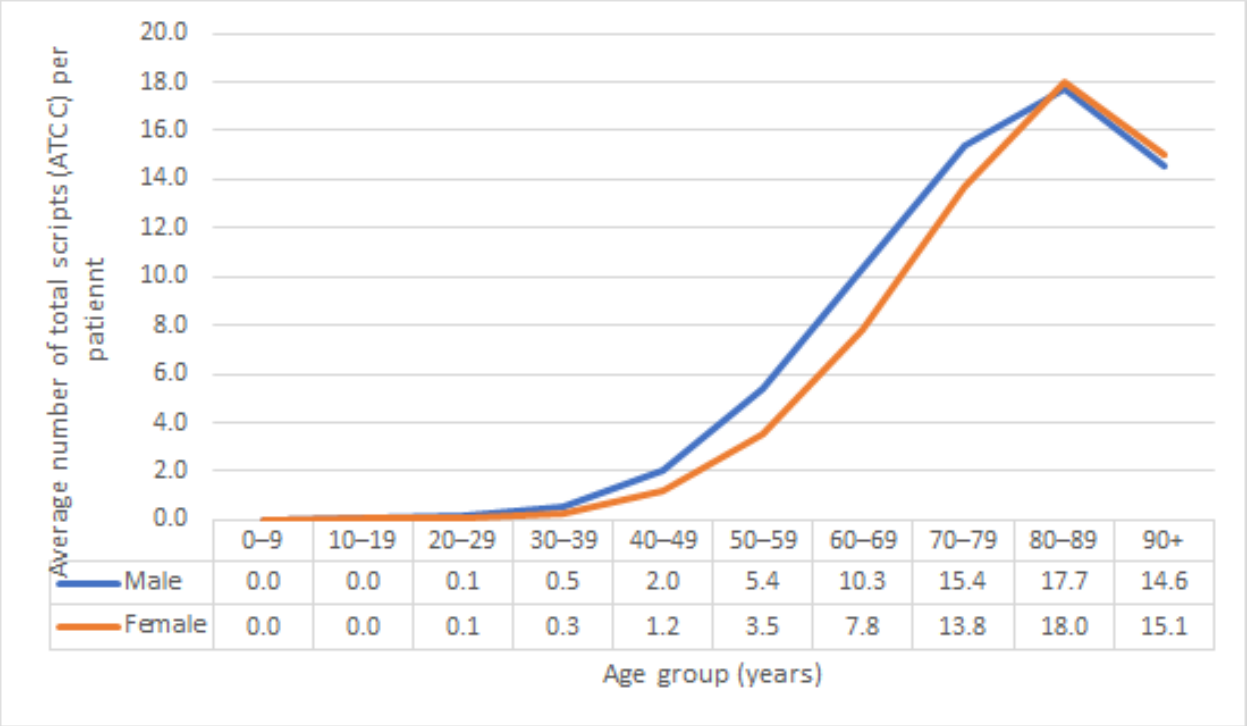


Figure 7.4 Average number of total prescriptions per patient for cardiovascular system (ATC level 1) by age group and sex (weighted data), MedicineInsight 2017–18

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 an opioid 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 chronic pain and conditions that may result in chronic pain among women than among men (eg, osteoporosis and minimal trauma fractures, arthritis).[11,27]

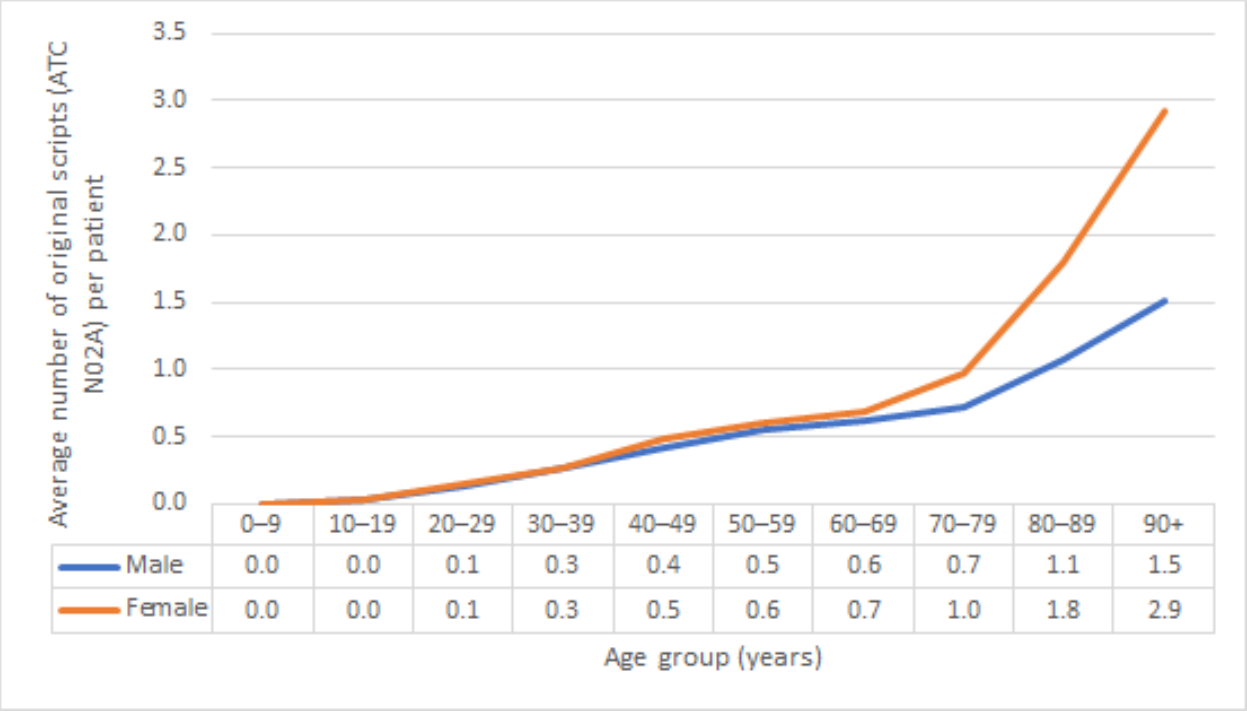
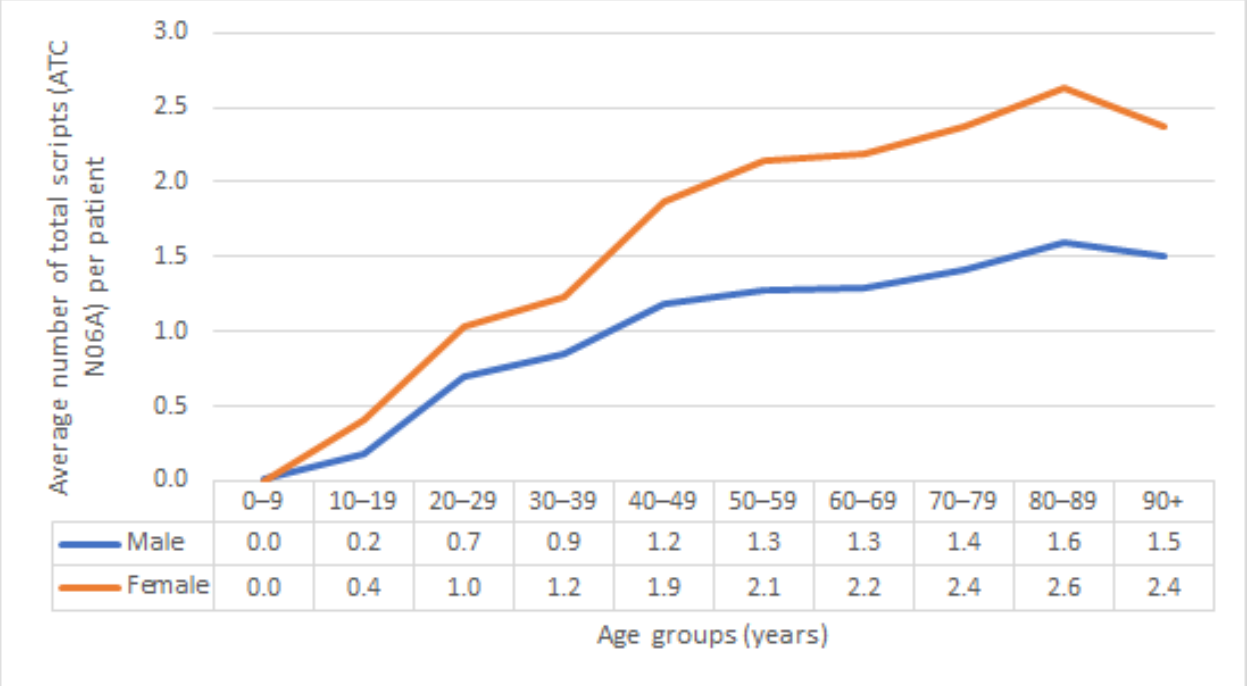


Figure 7.5 Average number of original prescriptions per patient for opioids [ATC level 3 – N02A] by age group and sex (weighted data), MedicineInsight 2017–18

Antidepressant prescriptions rose with age and were more frequently prescribed for females than in males (Figure 7.6). Use was highest among women aged 80–89 years. While this may reflect use for treating depression (which has been reported to be highly prevalent among residents of aged care facilities),[28] it may also reflect use of antidepressants for other conditions that tend to be more common in older people (ie, tricyclic antidepressants for neuropathic pain, insomnia or incontinence).



	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	80–89	90+
Male	0.0	0.2	0.7	0.9	1.2	1.3	1.3	1.4	1.6	1.5
Female	0.0	0.4	1.0	1.2	1.9	2.1	2.2	2.4	2.6	2.4

Figure 7.6 Average number of total prescriptions per patient for antidepressants [ATC level 3 – N06A] by age group and sex (weighted data), MedicineInsight 2017–18

Using MedicineInsight data to investigate the impact of regulatory changes – the increased restriction on low-dose codeine.

Low-dose codeine was changed from an over-the-counter medicine to a prescription-only medicine on 1 February 2018 (this is known as upscheduling). This decision was made by the TGA after a review of evidence which indicated that medicines containing low-dose codeine are generally no more effective than other non-codeine medicines (eg, paracetamol, non-steroidal anti-inflammatory drugs) but are associated with high health risks. While the question of whether there was a subsequent increase in scripts for stronger codeine preparations and other opioids can largely be answered with PBS data, understanding whether there was an increase in prescriptions for low-dose codeine (which are often private, and not PBS-rebated) can be best understood using MedicineInsight data.

Methods

De-identified patient data obtained from the MedicineInsight November 2018 download was analysed and included 428 Australian general practice sites that met the standard data quality criteria. Patients with at least one prescription recorded between 1 February 2016 and 31 October 2018 were included as the baseline population (N = 2,889,244) and original prescriptions for low-dose (< 30 mg) and high-dose (≥ 30 mg) codeine were analysed as a proportion of all prescriptions.

Results

MedicineInsight data showed a marked increase in the proportion of prescriptions for codeine after February 2018 (Figure 1). Before the upscheduling, codeine prescriptions (alone or in combination with other medicines) accounted for 2.4% of all original prescriptions. After upscheduling, this rose to 3.5%, representing slightly less than a 50% increase in prescriptions (Relative Risk: 1.49, 95% CI 1.45 to 1.53, p< 0.0001; comparing 1 February 2016 to 31 January 2018 and 1 February 2018 to 31 October 2018). There was a four-fold increase in low-dose prescribing, from 0.27% of all original scripts to 1.14%, and a 10% increase in high-dose prescribing from 2.1% to 2.4%.

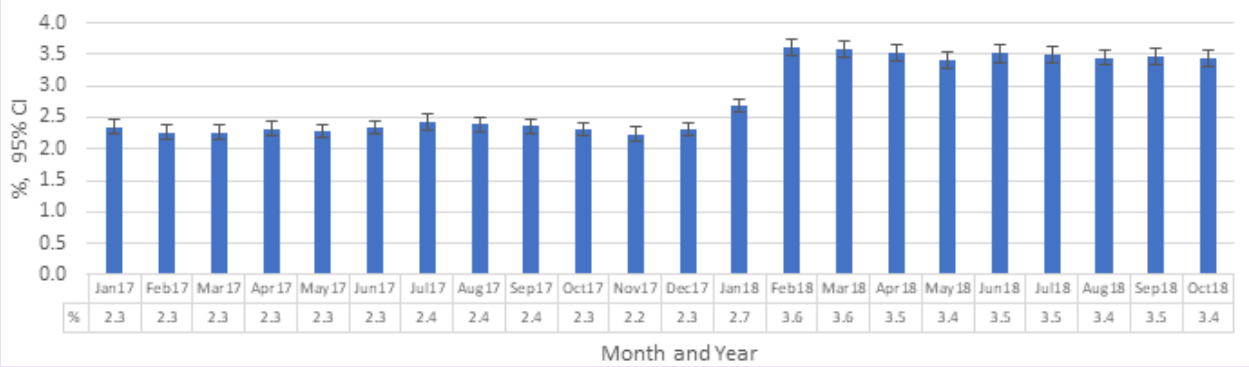


Figure v3.1 Trend in the proportion of all MedicineInsight original prescriptions for codeine (alone or in combination) by month and year

Discussion

While there was a small but clear increase in codeine prescriptions after 1 February 2018, most of this increase was due to low-dose codeine. This likely relates to people who previously bought low-dose codeine over the counter, wished to continue after the upscheduling, and are now doing so under the care of their GPs. There was a fear that people previously taking low-dose codeine may change to high-dose codeine after the upscheduling. However, the data from our analysis suggests that this has only occurred in a small proportion of people.

Data from the TGA[29] indicates that the national sales of codeine have fallen in response to the upscheduling. Reports of codeine poisoning have fallen rapidly in association with falling sales.[30] This this suggests that many patients who visited a GP once codeine was upscheduled may have been prescribed other analgesics or offered non-pharmacological pain management options. However, this was not investigated in this analysis. MedicineInsight could be used similarly, to shed further light on the implications of the regulatory changes on prescribing of other opioids and to consider other relevant factors such as indications for use.

8 PATHOLOGY TESTING

In summary

- More than 65 million pathology test results were recorded in MedicineInsight in 2017–18.
- There was an average of 24 test results per patient in 2017–18, although only 42.2% of patients had pathology test results in their medical records.
- Age- and sex-specific rates showed an increase in the number of test results with age, and a higher average number of tests for women compared to men. This was particularly apparent for women of reproductive age, and is likely to be due to testing related to pregnancy.
- Patients living in the most advantaged socio-economic areas (SEIFA quintiles) had fewer test results on average than patients from more disadvantaged areas, correlating with the higher burden of disease for these patients.
- Patients who had more than 70 pathology test results during 2017–18 were also more likely to have non-communicable conditions such as heart failure and CKD. These patients were also more likely to be older.
- MedicineInsight is not affected by episodic coning of pathology tests services requested. MedicineInsight can provide data on all pathology service results, not just the top three most expensive items performed in an episode of care.
- MedicineInsight can also provide data on patient conditions and sociodemographic characteristics in conjunction with pathology testing results, and is a potential source of data on appropriate use of pathology tests in general practice.
- Furthermore, MedicineInsight can provide longitudinal information on pathology testing, which can be used in future to investigate patient outcomes and to evaluate changes to GP clinical management practices.

This chapter reports on pathology test results recorded in MedicineInsight in 2017–18 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 pathology tests according to patient demographics
- age and sex-specific average number of pathology tests
- distribution of number of pathology tests per patient
- age and sex-specific distribution of patients with more than 70 pathology test results
- proportion and relative risk of selected conditions in patients with more than 70 pathology test results.

8.1 Pathology test results by patient

There were 65,775,795 separate pathology test results recorded in MedicineInsight for 2017–18, or an average of 22.5 atomised test results per patient using weighted data. However, only 42.2% of patients (1,153,517) had one or more atomised pathology test result recorded in 2017–18, and the remaining 57.8% of patients had no pathology tests recorded.

Pathology test results may come into the CIS from other sources, 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 2017–18

Pathology test result	MedicineInsight 2017–18 (unweighted)		MedicineInsight 2017–18 (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)
Haemoglobin (as a proxy for full blood count (FBC))	34.2	56.9 (54.6, 59.1)	31.7	51 (49, 53)
ALT (as a proxy for liver function tests (LFTs))	32.3	51.3 (49.2, 53.3)	30.5	47 (45, 49)
Sodium (as a proxy for urea, electrolytes and creatinine (UECs))	29.6	48.8 (46.0, 51.6)	26.9	43 (39, 46)
Total cholesterol (as a proxy for lipids)	26.7	36.5 (34.7, 38.4)	26.2	36 (34, 39)
TSH (as a proxy for thyroid function tests)	21.6	27.3 (26.1, 28.5)	19.8	25 (23, 27)
Ferritin	19.1	24.8 (23.9, 25.6)	18.2	23 (22, 25)
Vitamin B_{12}	11.1	12.4 (11.8, 13.0)	10.7	12 (11, 13)
Vitamin D	10.6	12.1 (11.5, 12.8)	10.2	12 (11, 12)

Figure 8.1 illustrates 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.

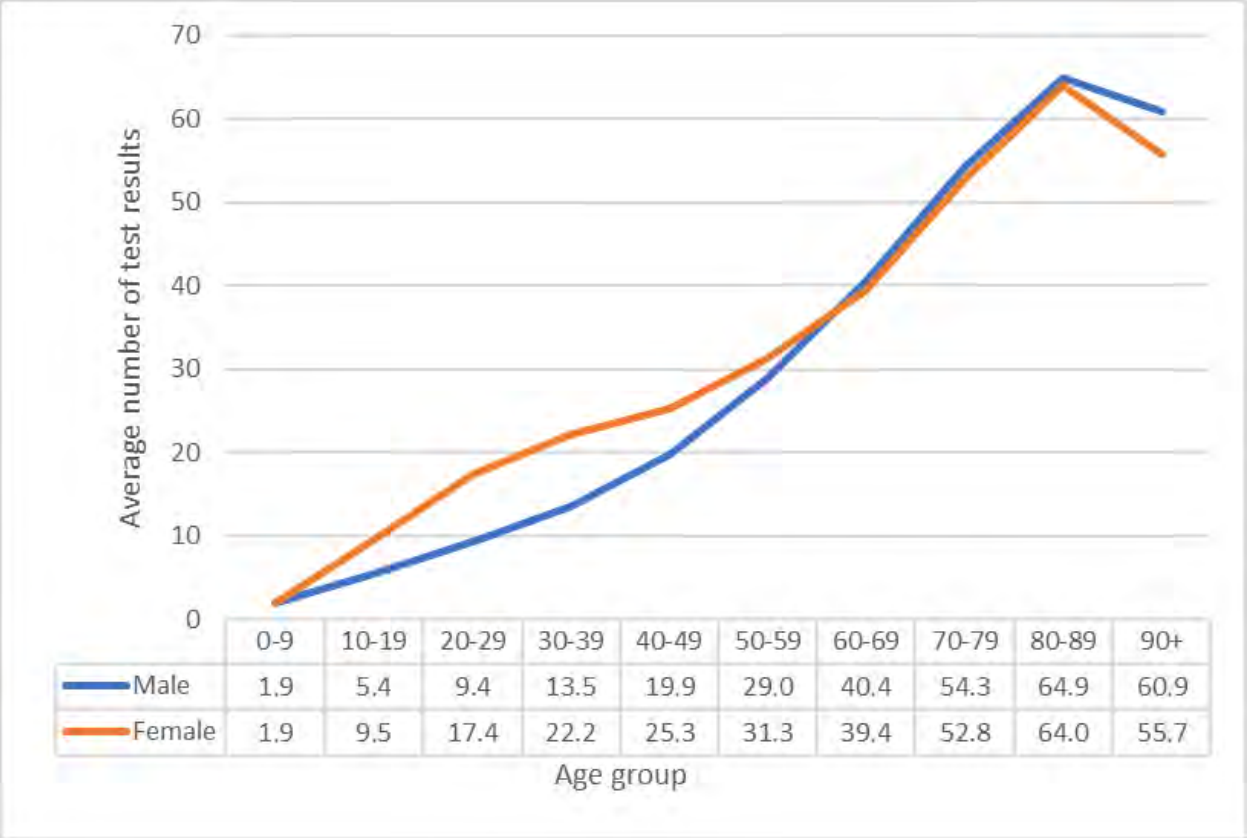


Figure 8.1 Average number of pathology test results per patient by age group and sex (weighted data), MedicineInsight 2017–18

On average, females had significantly more pathology test results than males (24.4 vs 20.2), although rates were similar between men and women in older age groups (from 50–89 years). Patients aged 60 years and over had more than five times as many pathology test results as patients aged under 20 (Table 8.2).

The highest rates of pathology tests per patient were seen in inner regional Australia (25.4), compared to major cities, or outer regional or remote areas. The number of tests per patient decreased by SEIFA quintile, with patients from more disadvantaged areas having more pathology test results per patient than patients from more advantaged areas. The Northern Territory had the fewest average number of pathology test results per patient (12.4), and SA and the ACT had the highest (28.2 and 27.3 respectively).

Table 8.2 Average number of pathology test results by patient demographics (unweighted and weighted data), MedicineInsight 2017–18

Patient characteristics	Average number of test results per patient, unweighted (95% CI)	Average number of test results per patient, weighted (95% CI)
All patients	24.0 (23.1, 24.9)	22.5 (21.4, 23.5)
Sex		
Male	21.8 (20.8, 22.7)	20.2 (19.2, 21.3)
Female	25.9 (25.0, 26.8)	24.4 (23.4, 25.4)
Age group (years)		
0–9	1.9 (1.8, 2.0)	1.9 (1.8, 2.1)
10–19	7.6 (7.3, 7.8)	7.5 (7.1, 7.8)
20–29	13.9 (13.2, 14.6)	14.0 (13.1, 14.9)
30–39	18.2 (17.4, 18.9)	18.3 (17.2, 19.4)
40–49	22.4 (21.7, 23.2)	22.8 (21.7, 23.9)
50–59	29.6 (28.6, 30.5)	30.3 (28.9, 31.7)
60–69	39.7 (38.5, 40.8)	39.9 (38.3, 41.5)
70–79	53.5 (51.8, 55.2)	53.5 (51.4, 55.5)
80–89	64.1 (62.0, 66.1)	64.4 (62.0, 66.8)
90+	56.9 (54.7, 59.1)	57.8 (55.0, 60.7)
Rurality		
Major cities	23.1 (22.0, 24.2)	21.8 (20.6, 22.9)
Inner regional	26.9 (25.3, 28.5)	25.4 (24.1, 26.8)
Outer regional	23.6 (21.7, 25.4)	22.4 (19.1, 25.7)
Remote/very remote	19.8 (16.7, 22.9)	21.7 (14.7, 28.8)
State/Territory		
ACT	30.4 (26.1, 34.7)	27.3 (23.9, 30.7)
NSW	25.6 (24.3, 26.9)	23.0 (21.5, 24.5)
NT	14.0 (10.8, 17.2)	12.4 (9.1, 15.7)
QLD	26.8 (24.8, 28.8)	25.3 (23.6, 27.0)
SA	28.8 (24.0, 33.6)	28.2 (22.8, 33.6)
TAS	22.7 (20.7, 24.6)	20.6 (19.0, 22.1)
VIC	20.6 (18.3, 22.9)	19.2 (17.3, 21.0)
WA	21.7 (20.2, 23.2)	20.1 (18.5, 21.7)
Socio-economic status (SEIFA IRSAD quintile)		
1 (most disadvantaged)	26.3 (24.5, 28.1)	23.4 (21.1, 25.6)
2	26.0 (24.4, 27.7)	24.1 (21.8, 26.3)
3	24.7 (23.5, 26.0)	22.5 (21.2, 23.8)
4	22.5 (21.2, 23.8)	22.1 (20.8, 23.4)
5 (most advantaged)	22.0 (20.7, 23.3)	21.3 (19.9, 22.7)

We investigated the relative distribution of the volume of pathology test results per patient, and while most patients had no test results, 7.5% of patients had 81 or more test results during 2017–18 (Figure 8.2).

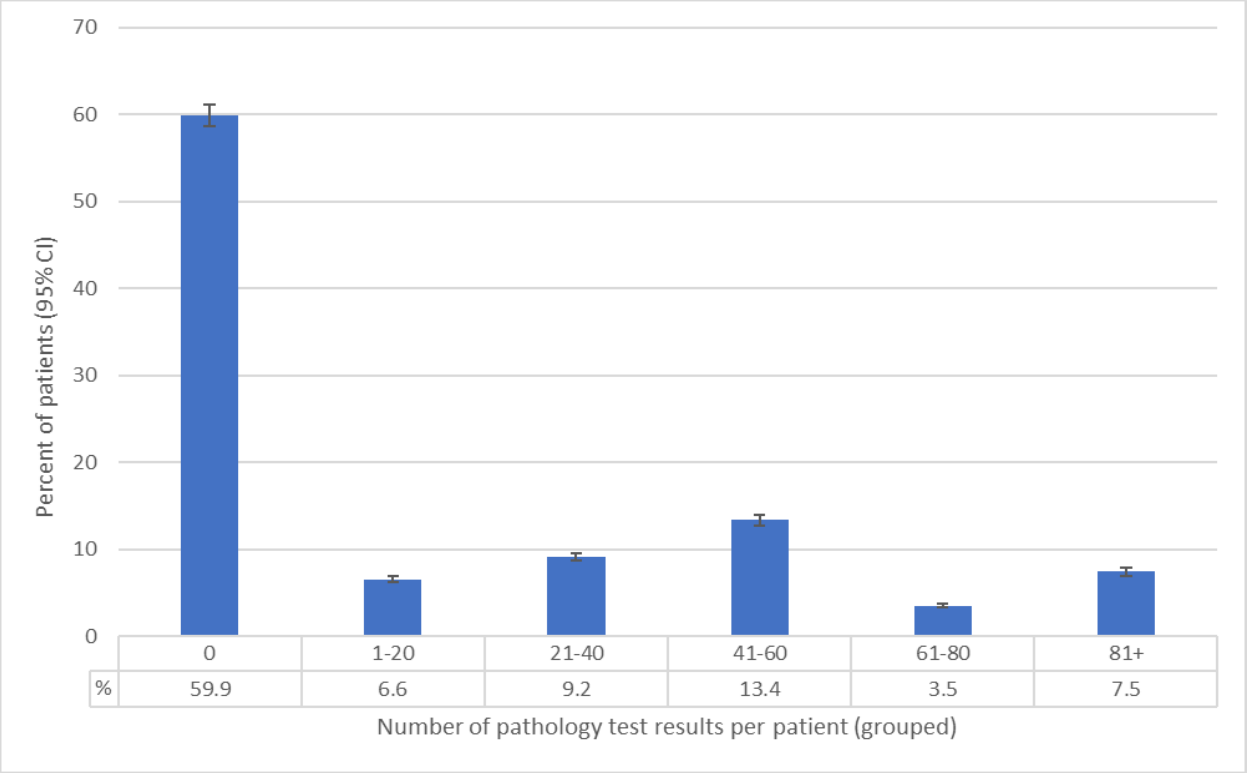


Figure 8.2 Frequency distribution by grouped number of test results per patient (weighted data), MedicineInsight 2017–18

8.2 Pathology testing in the top 10% of patients by pathology test volume

Analysis of the top 10% of patients, by the number of pathology tests received, showed that these patients had more than 70 test results, were more likely to be female (59.8% vs 40.2%), and were more likely to be aged 60–79 years. 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.

We investigated the rates of selected non-communicable conditions in patients with over 70 pathology test results compared to other patients (Table 8.3). There was a significantly higher rate of every condition investigated in patients with over 70 pathology test results. CKD and heart failure showed the greatest relative difference between the two groups, at 15.5 (95% CI 11.0 to 21.9) and 15.5 (95% CI 14.1 to 17.0) times more likely, respectively, in patients with over 70 test results. Interestingly, rates of anxiety and depression were also higher for patients with over 70 pathology test results, although these aren't conditions that are generally associated with increased pathology testing in the general practice setting. However, several studies have suggested that anxiety and depression can often be associated with other chronic comorbidities, particularly arthritis, CVD, hypertension and dyslipidaemia.[23,31]

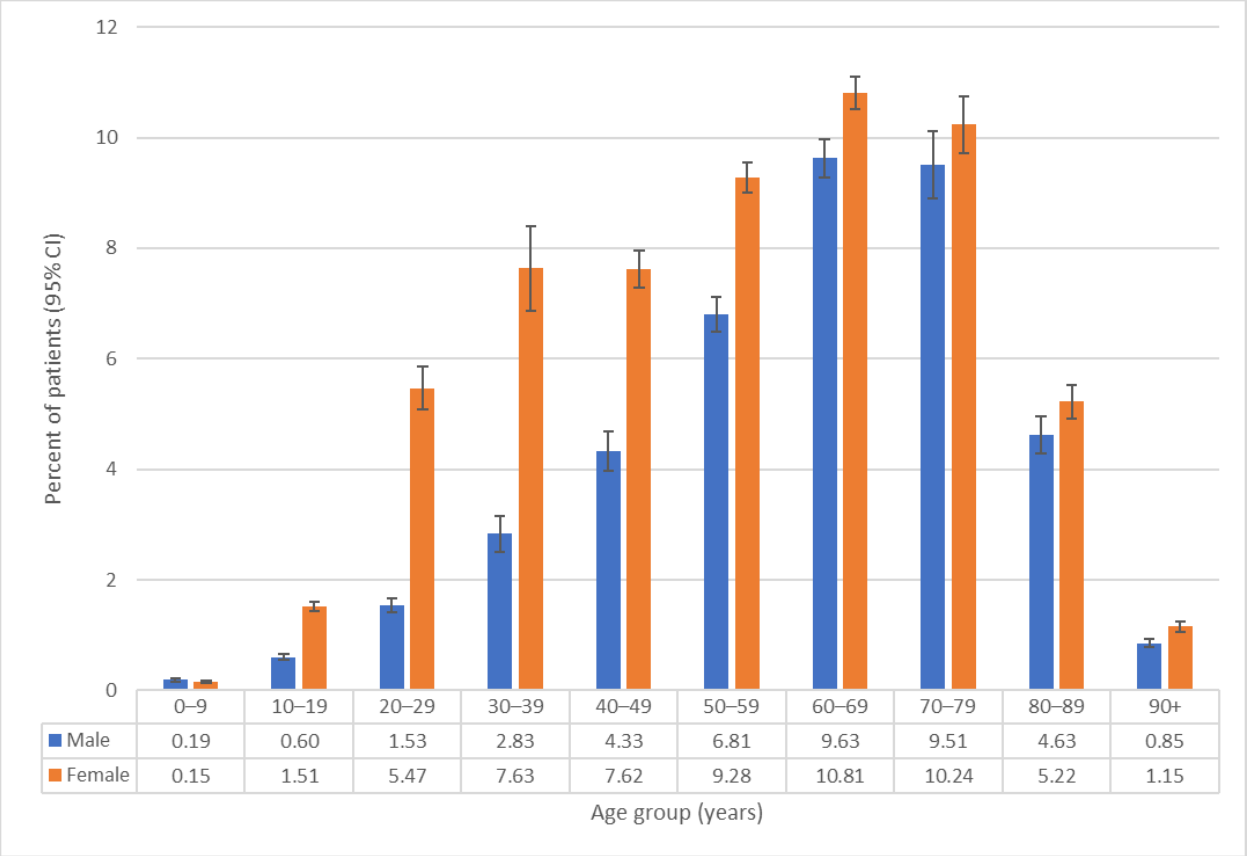


Figure 8.3 Age and sex distribution of patients with more than 70 pathology test results recorded (weighted data), MedicineInsight 2017–18

Table 8.3 Proportion and risk of selected chronic conditions in patients with over 70 pathology test results (weighted data), MedicineInsight 2017–18

Condition	≤ 70 pathology tests	> 70 pathology tests	Relative risk	
	% patients	% patients	RR	95% CI
Anxiety	3.9	7.9	2.0	1.9-2.1
Arthritis	2.5	11.7	4.7	4.5-4.9
Asthma	3.2	4.6	1.4	1.4-1.5
Atrial fibrillation	0.3	2.8	8.0	7.6-8.4
Cardiovascular disease	0.6	4.4	6.9	6.4-7.3
CKD	0.1	1.8	15.5	11.0-21.9
COPD	0.6	3.3	5.8	5.5-6.2
Depression	4.1	9.3	2.3	2.2-2.4
Diabetes mellitus type 2	1.3	10.8	8.1	7.5-8.7
Dyslipidaemia	2.5	9.9	4.0	3.6-4.5
Heart failure	0.1	1.9	15.5	14.1-17.0
Hypertension	4.1	15.0	3.6	3.4-3.8
GORD	2.2	7.5	3.4	3.2-3.7
Osteoporosis	0.7	4.6	6.3	5.8-6.8

Using MedicineInsight data for longitudinal analyses of pathology testing patterns: HbA_{1c} monitoring for patients with type 2 diabetes

Diabetes Australia and the RACGP recommend all patients with type 2 diabetes (T2D) should have HbA_{1c} measured every year, with a target for management of ≤ 53 mmol/mol. However, more than half of Australians with T2D have an HbA_{1c} result that is above target.[32] The AIHW's Australia's Health 2018 report states there is a need for national primary health care data for diabetes, particularly in relation to screening, self-care management, and appropriateness of care and health across the life course.[23] The Australian Bureau of Statistics (ABS) conducted this descriptive study in order to demonstrate the utility of MedicineInsight data to describe diabetes monitoring and control in patients who have had T2D for over 5 years.

Methods

This was an analysis of longitudinal general practice records of patients with T2D who visited the same MedicineInsight practice each year during the five-year period, 2012–2016. The flowchart for the inclusion of study participants is shown below (Figure v4.1). The study population included patients who had an encounter recorded each year, at the same practice, during the study period, and who were aged ≥ 20 years, were alive until the end of the study period, and had a diagnosis of T2D recorded before the study period.

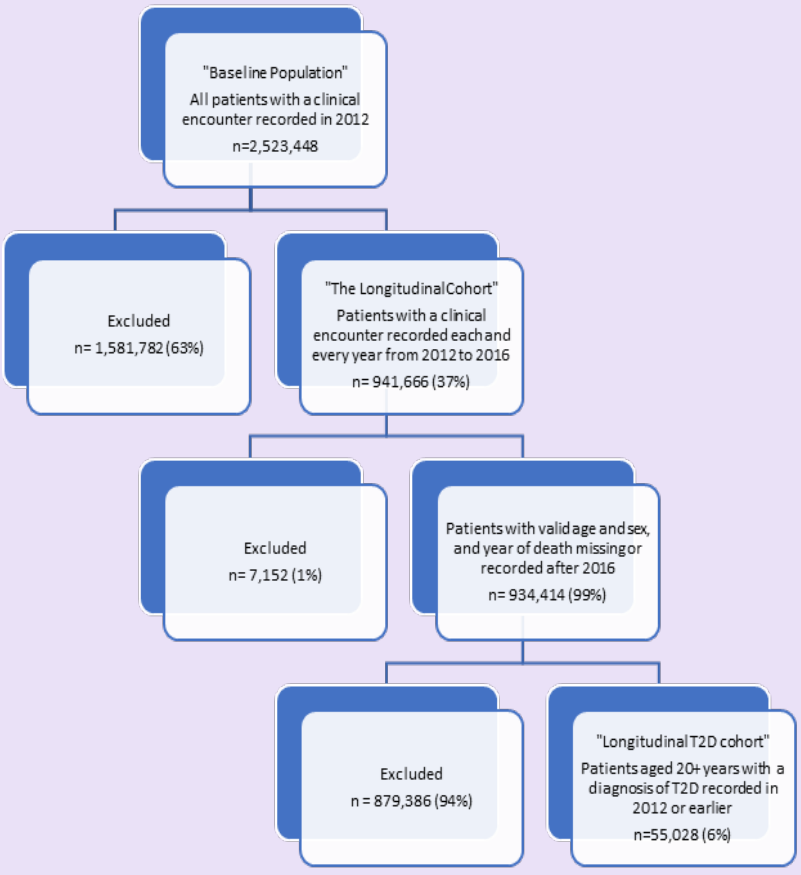


Figure v4.1 Inclusion of study participants

The following definitions of blood glucose control were used; below target: under 48 mmol/mol (< 6.5%); within target: 48–58 mmol/mol (6.5–7.5%); and above target: over 58 mmol/mol (> 7.5%).

Results

Of 2.5 million patients with a clinical encounter recorded in 2012 (the baseline population), 941,666 (37%) had a clinical encounter recorded each and every year from 2012 to 2016 (the longitudinal cohort). Compared to the baseline population, the longitudinal cohort was older, and more likely to be female. From the longitudinal cohort, 55,028 patients with T2D met the study inclusion criteria, representing 63.2% of all patients with T2D in the baseline population.

Recording of HbA_{1c}

Over 97% of patients had at least one HbA_{1c} measurement recorded over the 5-year period, with an average of 8.9 tests recorded overall, and 1.8 tests per year. However, while there were a number of patients who did

not have a test result recorded each and every year of the study period, 82% of patients with T2D had an HbA_{1c} test recorded in at least four of the five years, and 62% of patients had an HbA_{1c} test recorded in each of the five study years.

The likelihood of having an HbA_{1c} test recorded in each year of the study increased with age up to 60–79 years of age, and then decreased for the 80+ group. Patients aged 70–79 years were most likely to have an HbA_{1c} test recorded in each and every year (68%), and those aged 20–49 years least likely (47%) There was no difference in the recording of testing between men and women (Figure v4.2) or by socio-economic status (not shown). Patients in inner regional areas were the most likely to have annual HbA_{1c} records (66%) and patients in a remote region the least likely (58%).

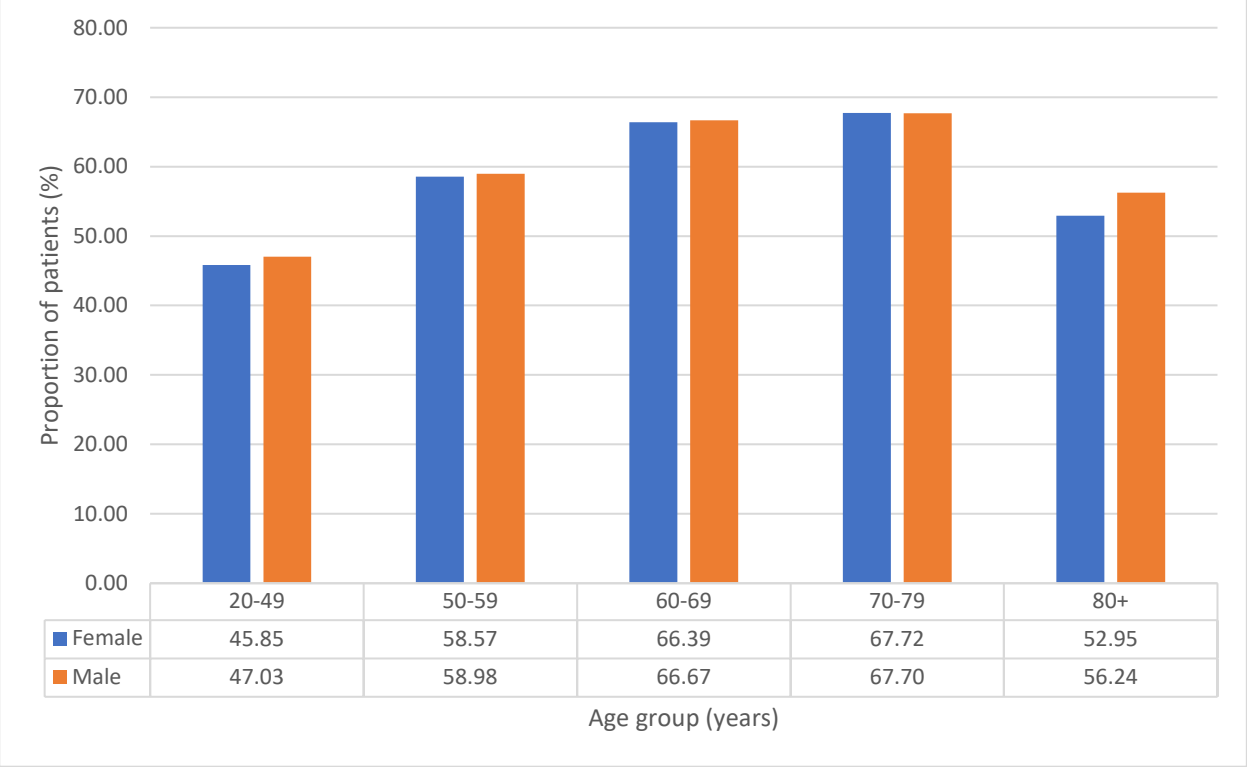


Figure v4.2 Proportion of T2D patients with HbA_{1c} measurements each year, by age and sex

Target HbA_{1c} levels

Among patients with HbA_{1c} measured each year, there was no change in the average HbA_{1c} level from 2012 (55 mmol/mol) compared with 2016 (54 mmol/mol). Figure v4.3 presents the flow of patients between levels of blood glucose control, based on their HbA_{1c} levels, in 2012, 2014, and 2016. The level of glucose control did not change for the majority of patients during the study period, with 58% remaining at the same level, 20% worsening, and 22% improving. There was no association between patient demographic characteristics, nor frequency of HbA_{1c} testing and change in HbA_{1c}.

Discussion

This study included a highly selected cohort of patients with T2D who were managed at the same general practice regularly over a 5-year period, enabling a longitudinal analysis of their diabetes management. Considering the progressive nature of T2D, the proportion of patients who maintained or improved glycaemic control over the five-year period is encouraging. For the majority of these 31,301 patients who had annual HbA_{1c} tests recorded across all five years, the level of blood glucose control either remained the same (58%)

or improved (22%), with only 20% worsening over time. Additionally, their average HbA_{1c} level remained the same from 2012 (55 mmol/mol) to 2016 (54 mmol/mol).

Just over 80% of T2D patients had an HbA_{1c} test recorded in at least 4 of the 5 study years and just over 60% had an HbA_{1c} test recorded in each year. If patients receive care from specialists and other general practices, this information may not be available in the MedicineInsight record, leading to an underestimate of the true level of testing.

Selecting an appropriate study cohort is a complex and important first step when designing studies using observational routinely collected data, impacting both the study questions that can be answered, and the generalisability of results. For example, to give the cohort the highest chance of having pathology data available for analysis, the study selection criteria excluded 36.8% of the T2D patients who visited the practice in the first year of the study but not all the other years.

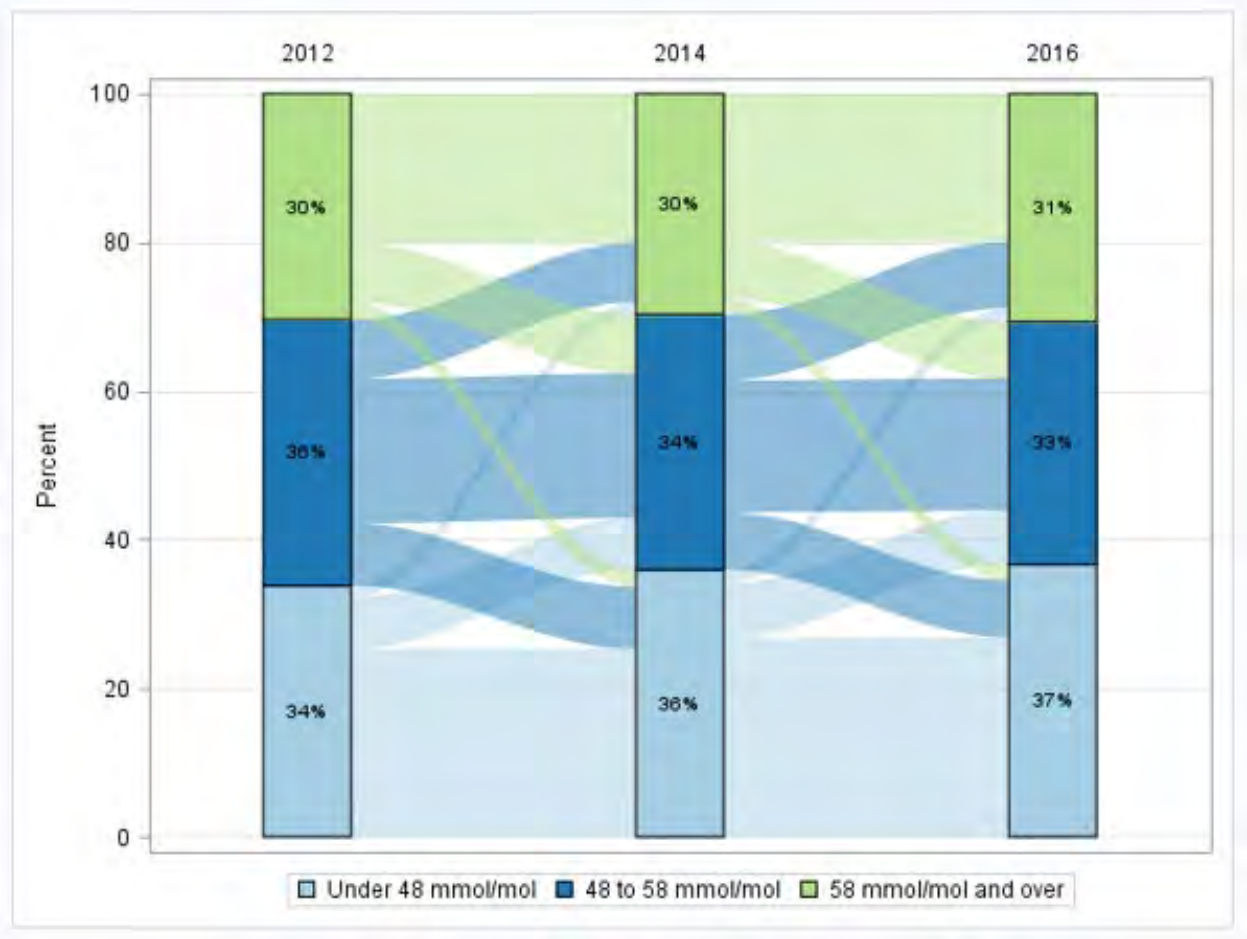


Figure v4.3 Transitions between levels of blood glucose control (HbA_{1c}) in 2012, 2014, and 2016

Vertical bars show the proportion of patients in each level of blood glucose control in 2012, 2014, and 2016. The segments joining the bar charts show the transitions from each level after two years. Thicker horizontal segments moving to the same levels across time periods indicate a lack of mobility between levels of control.

9 RISK FACTORS – COMPLETENESS OF MEDICINEINSIGHT DATA

In summary

- In order to better understand the characteristics of MedicineInsight data, we investigated the completeness of the MedicineInsight dataset on three important health risk factors; smoking, alcohol use, and body mass index (BMI).
- Some GPs may record information on BMI, smoking or alcohol use in different places within their CISs, for example in the progress notes (which are not available to MedicineInsight), and this can have a significant effect on completeness rates.
- BMI (or height and weight) was recorded for 35.2% of all patients in MedicineInsight in the 24-month period from 1 July 2016 to 30 June 2018. Females aged 20–39 years had higher rates of BMI recorded than males of the same age, and completeness rates increased with age for both males and females up to the age of 80–89 years.
- Smoking status was recorded for 82.9% of patients in MedicineInsight.
- Alcohol use was ever recorded for only 22.1% of patients over 18 years of age in MedicineInsight in 2017–18 and was more frequently recorded for females than males (23.8% vs 20.1%). Patients aged 80 years and over had significantly higher rates of recording of alcohol use compared to younger patients.

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 in the past 24 months (since 1 July 2016) in the MedicineInsight 'Observations' data table for patients of all ages

We found that smoking status was ever recorded for 82.9% of all patients aged 18 years and over. Rates of recording of smoking status were lowest in the younger age groups, and particularly in young males aged 18–19, at 61%. This is despite the fact that smoking rates are reported by the ABS as relatively high in this at-risk group, at around 17.5%[3] (Table 9.1). Completeness rates for recording of smoking status were very similar between males and females aged 40 years and over, at > 80% (Figure 9.1).

Table 9.1 Completeness rates of health risk factors by patient age and sex (unweighted data), MedicineInsight 2017–18 (N = 2,736,098)

	Age group	Percentage (%) of patients with		
		Smoking status recorded[a]	Alcohol use recorded[a]	BMI or equivalent recorded
Total patients		82.9	22.1	35.1
Females	0-9	NA	NA	37.8
	10-19	68.2	21.3	23.6
	20-29	79.2	22.4	28.4
	30-39	83.2	25.0	31.0
	40-49	85.4	22.3	33.3
	50-59	86.3	21.5	35.7
	60-69	86.0	21.7	39.5
	70-79	86.5	25.7	48.9
	80-89	85.9	36.1	55.5
	90+	79.1	34.2	38.7
Total females		83.7	23.8	35.0
Males	0-9	NA	NA	38.1
	10-19	60.8	17.6	22.1
	20-29	73.9	17.6	22.3
	30-39	79.8	19.3	27.8
	40-49	83.6	20.0	35.3
	50-59	85.9	19.8	39.5
	60-69	86.3	19.1	42.4
	70-79	86.3	21.7	49.3
	80-89	86.4	31.1	56.6
	90+	81.8	30.7	45.3
Total males		82.0	20.1	35.2

a Patients aged 18–19 only

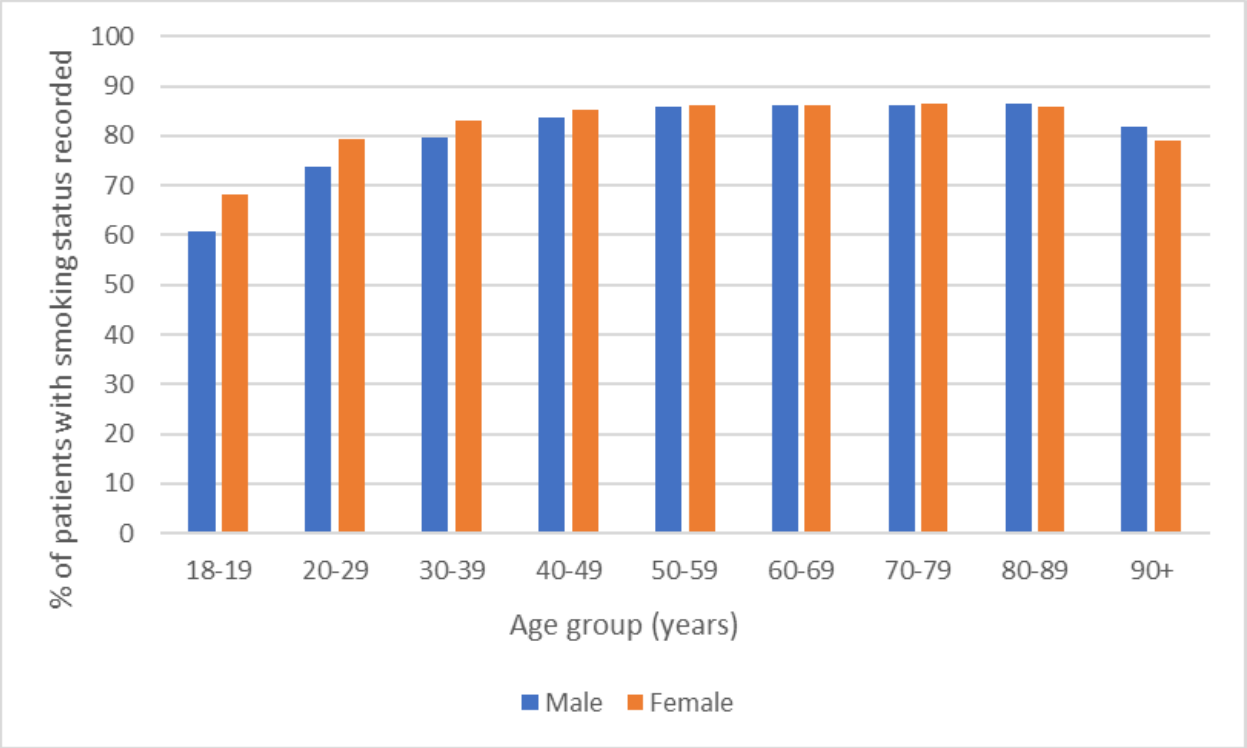


Figure 9.1 Completeness rates of smoking status recorded by patient age and sex (unweighted data), MedicineInsight 2017–18 (N = 2,736,098)

Alcohol use was ever recorded for 22.1% of patients over 18 years of age in MedicineInsight in 2017–18 (Table 9.1) and was more frequently recorded for females than males (23.8% vs 20.1%). Patients aged 80 years and over had significantly higher rates of recording of alcohol use (Figure 9.2). This may reflect higher rates of recording risk factors for patients with comorbidities such as CVD or COPD, who are also more likely to be older. It may also partly reflect opportunity, as people in younger age groups tend to visit their GPs less frequently than people in older age groups.

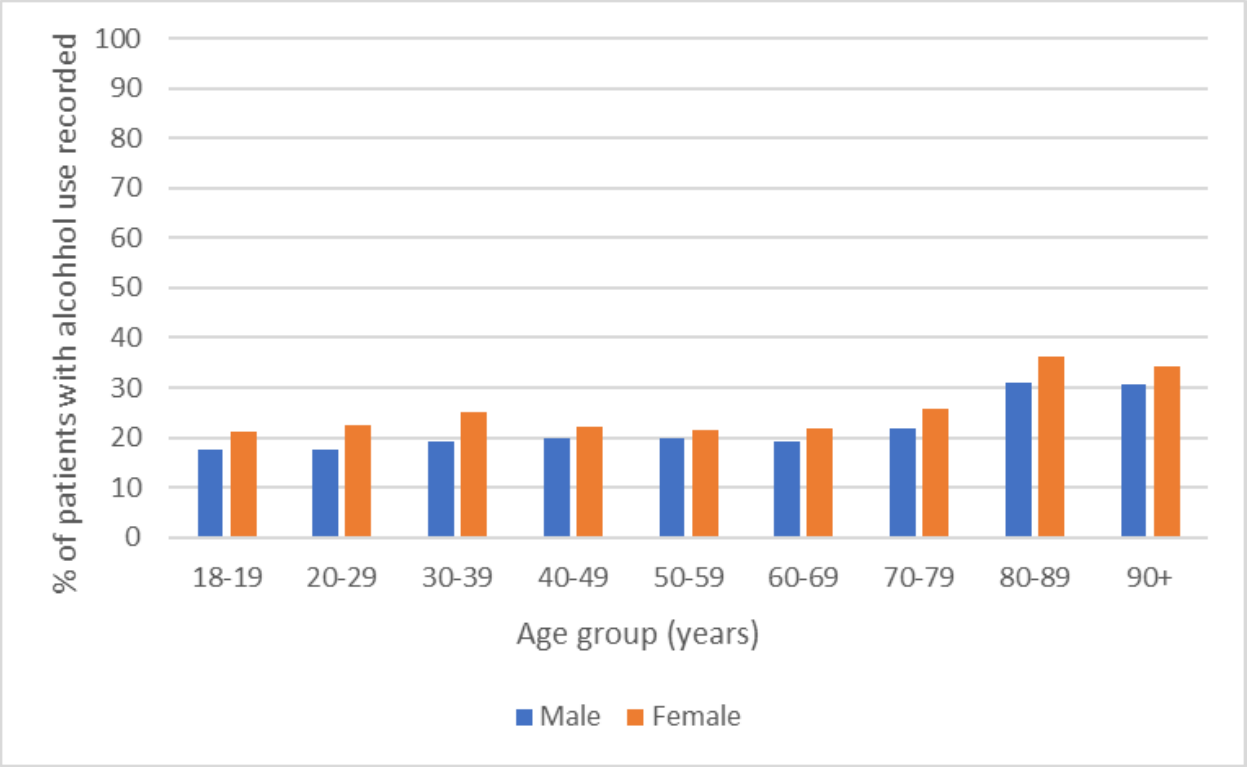


Figure 9.2 Completeness rates of alcohol use recorded by patient age and sex (unweighted data), MedicineInsight 2017–18 (N = 2,736,098)

BMI (or height and weight) was recorded for 35.2% of all patients in MedicineInsight in the 24-month period from 1 July 2016 to 30 June 2018 (Table 9.1). According to the RACGP Redbook clinical guidelines,[33] BMI should be measured in adults every two years, and in 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. Children under 10 years of age had higher rates of BMI completeness than patients aged between 10 and 49 (Figure 9.3). Women aged 20–39 years had higher rates of BMI recorded than men of the same age, and completeness rates increased with age for both men and women up to the age of 80–89 years.

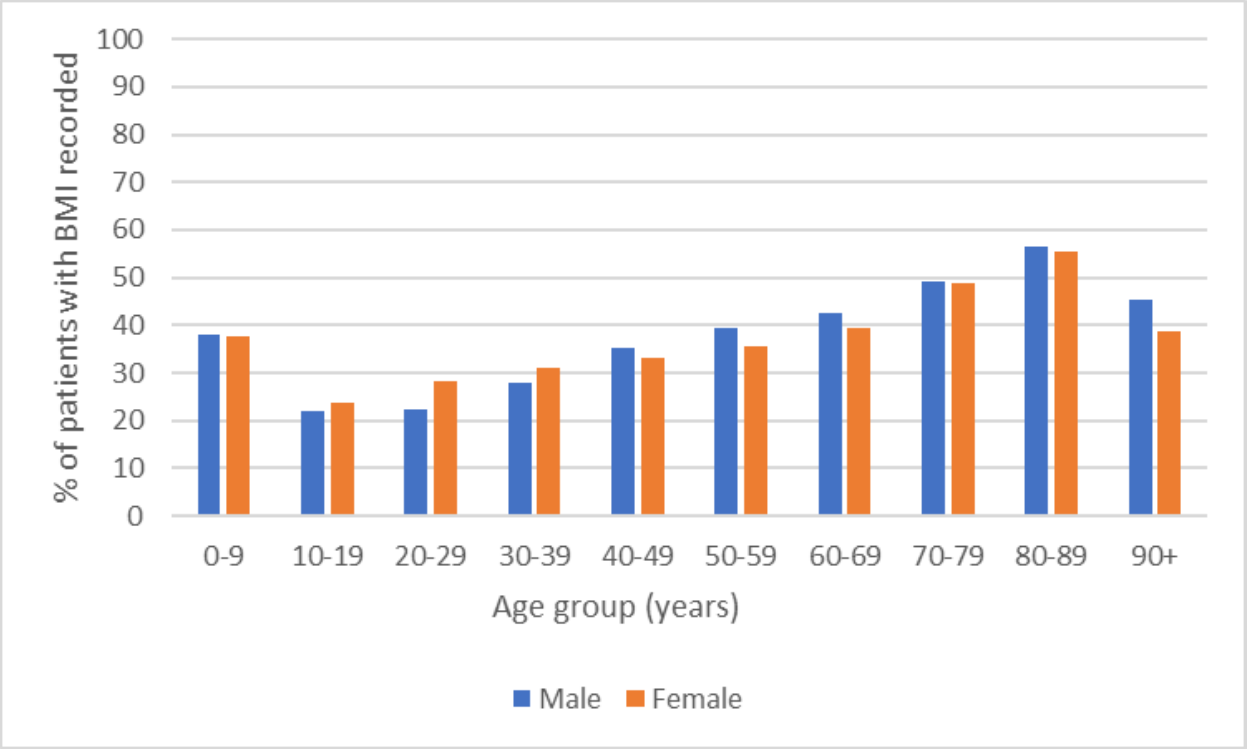


Figure 9.3 Completeness rates of BMI (or height and weight) recorded by patient age and sex (unweighted data), MedicineInsight 2017–18 (N = 2,736,098)

10 INTERPRETATION OF THE DATA

MedicineInsight provides an important source of national longitudinal general practice data. This 2017–18 report provides information on activities that occur in general practices, including details of encounters, the conditions patients present with and how they are managed.

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. Clinical information systems are not designed to capture data for research purposes, and data fields can require defining or refining to support robust analyses. Additionally, to protect patient privacy, data are not collected from patient progress notes.

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.

When interpreting the information presented in this report, the following limitations or caveats related to the MedicineInsight data should be noted.

- MedicineInsight data are dependent on the accuracy and completeness of data recorded in, and available for extraction from, general practice CISs.
- Identification of conditions is dependent on GPs recording these items in their CISs. Conditions may be under-reported in MedicineInsight data depending on GPs' 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 vs 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 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. Furthermore, comparisons between regions should be interpreted with caution, although we have weighted the data to improve national representability.
- Due to confidentiality issues 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.

APPENDIX 1. ADDITIONAL INFORMATION ABOUT MEDICINEINSIGHT

Recruitment and consent

General practice sites 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 all use one of two clinical information systems (CISs), 'Best Practice' (BP) or 'Medical Director 3' (MD), which together account for over 80% 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.

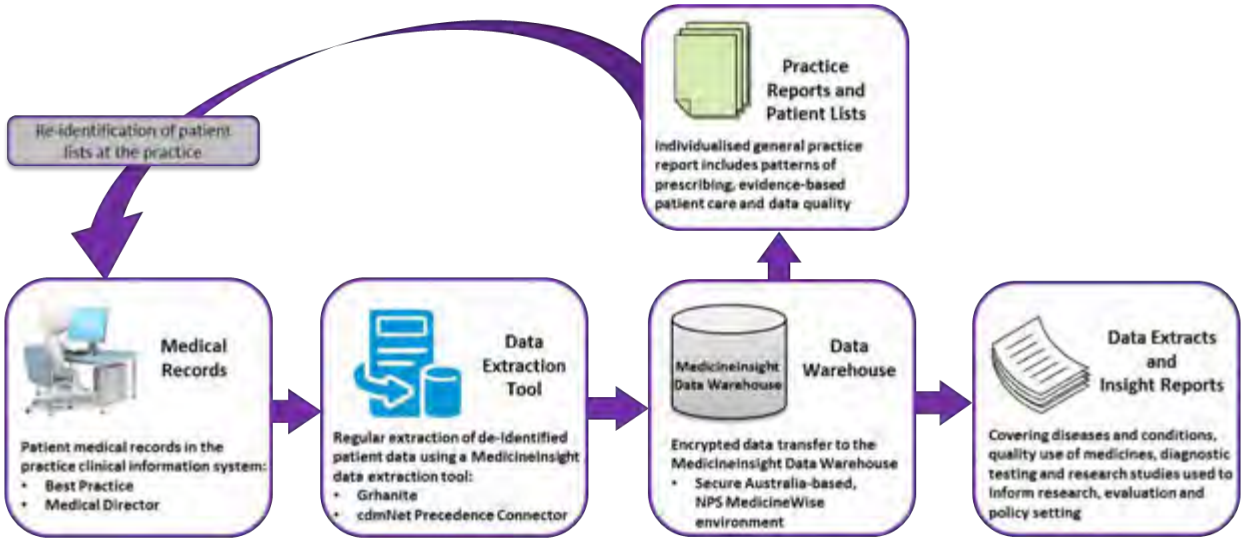


Figure A.1 MedicineInsight data collection and extraction procedure

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

Table A.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

Table *[TABLE NAME]*	Description	Data fields available (examples only)
		▪ IRSAD decile ▪ PHN
CLINICAL USER *[EMI_CLINICAL _USER]*		▪ Provider ID ▪ Provider type
ENCOUNTERS		
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 ▪ 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

Table *[TABLE NAME]*	Description	Data fields available (examples only)
		▪ 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.[34] 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.

ABS National Health Survey (NHS), First Results 2017–18

The most recent ABS NHS collected a range of information about the health of Australians, including the prevalence of long-term health conditions, risk factors, and demographic and socio-economic characteristics of participants. Trained ABS interviewers conducted interviews with selected residents in the sampled dwellings. The survey was conducted in all states and territories and across urban, rural and remote areas of Australia (excluding very remote areas) from July 2017 to June 2018. The survey included around 21,300 people in over 16,000 private dwellings.[3]

Further information about the NHS is accessible from https://www.abs.gov.au/ausstats/abs@.nsf/Lookup/by%20Subject/4364.0.55.001~2017-18~Main%20Features~Key%20Findings~1

RACGP General Practice: Health of the Nation 2018

This 2018 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 1537 RACGP Fellows on a broad range of questions, from experiences and challenges in clinical practice to opinions of government health policy.[12]

APPENDIX 2. DEFINITIONS OF VARIABLES USED IN THIS REPORT

Demographics

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.[35]

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.[36]

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'.[37]

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.[37] Both free-text and coded data extracted from the fields listed above are used to identify conditions. Please refer to Appendix 3 for more detailed definitions of conditions used in this report.

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 2017–18 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 'original' 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 'original' prescription. When reporting the volume of prescriptions, the number of original prescriptions and the total number of prescriptions, including both originals 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 original prescriptions and will be counted six times when the analysis is for the original-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.[38]

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 3. EXCLUSION TERMS FOR CLINICAL ENCOUNTERS

- Summary list of “Visit Types” excluded for the purposes of defining a clinical GP encounter

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

- 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 4. CONDITION CODING

Non-communicable and communicable conditions described in this report:

Anxiety

Arthritis

Asthma

Atrial fibrillation

Cardiovascular disease (CVD)

Chronic kidney disease (CKD)

Chronic obstructive pulmonary disease (COPD)

Depression

Dyslipidaemia

Gastro-oesophageal reflux disease (GORD)

Heart failure

Hypertension

Osteoporosis

Type 2 diabetes mellitus (T2DM)

Infectious diseases described in this report:

Chlamydia

Influenza and Influenza-like illness

Pertussis

Methodology for condition coding in MedicineInsight:

Condition flags have been developed by a team of clinical coders and medical advisors to indicate those records where the above conditions of interest (or their relevant synonyms) are reported in MedicineInsight. We search for both coded conditions (entered by the GP using a drop-down list in the CIS) and non-coded conditions (free text) in one or more of the 'Diagnosis', 'Reason for visit' or 'Reason for prescription' fields.

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 “query” or “?” condition were not flagged as the condition, unless otherwise specified.

Non-infectious or chronic conditions described in this report:

Anxiety

Note: this definition reflects 'anxiety broadly understood' and includes (but is not limited to) generalised anxiety disorder, social anxiety disorder, panic disorders, phobias, obsessive compulsive disorder and post-traumatic stress disorder.

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ADJUSTMENT DISORDER WITH ANXIETY
ADJUSTMENT DISORDER WITH MIXED ANXIETY AND DEPRESSED MOOD
AGORAPHOBIA
ANTIANXIETY AGENT PRESCRIPTION
ANXIETY
ANXIETY - GENERALISED
ANXIETY - PERFORMANCE
ANXIETY - PTSD
ANXIETY - SOCIAL
ANXIETY ATTACKS
ANXIETY DISORDER
ANXIETY DISORDER, SUBSTANCE INDUCED
ANXIETY NEUROSIS
ANXIETY PHOBIA
ANXIETY WITH PANIC ATTACKS
ANXIETY, SEPARATION
ANXIETY/DEPRESSION
DEPRESSION/ANXIETY
DEPRESSIVE ANXIETY DISORDER
FEAR, IRRATIONAL
GAD
GAD (GENERALISED ANXIETY DISORDER)
GENERALISED ANXIETY DISORDER
GENERALISED ANXIETY DISORDER (GAD)
INSOMNIA - ANXIETY-RELATED
IRRATIONAL FEAR
MIXED ANXIETY DEPRESSION
MIXED ANXIETY/DEPRESSIVE DISORDER
MIXED DEPRESSION ANXIETY
NERVOUS ANXIETY
NEUROTIC ANXIETY
NEUROTIC DEPRESSION
OBSESSIVE COMPULSIVE DISORDER
OBSESSIVE-COMPULSIVE PERSONALITY DISORDER
OCD
OCD (OBSESSIVE COMPULSIVE DISORDER)
PANIC ATTACKS
PANIC DISORDER
PERFORMANCE ANXIETY
PERSONALITY DISORDER - OBSESSIVE-COMPULSIVE
PERSONALITY DISORDER, OBSESSIVE-COMPULSIVE
PHOBIA
PHOBIA - AGORA
PHOBIC ANXIETY DISORDER
PHOBIC DISORDER
POST-TRAUMATIC STRESS DISORDER
PRESCRIPTION - ANTIANXIETY

PTSD (POST-TRAUMATIC STRESS DISORDER)
SEPARATION ANXIETY DISORDER
SOCIAL ANXIETY DISORDER
SOCIAL PHOBIA
STAGE FRIGHT
SUBSTANCE INDUCED ANXIETY DISORDER

The following text strings have been used to search for terms which may indicate records for inclusion:

ANX
AX
FEAR, IRRATIONAL
GAD
IRRATIONAL FEAR
NEUROTIC DEPRESSION
OBSESSIVE COMPULSIVE DISORDER
OBSESSIVE-COMPULSIVE PERSONALITY DISORDER
OCD
PANIC ATTACKS
PANIC DISORDER
PERSONALITY DISORDER - OBSESSIVE-COMPULSIVE
PERSONALITY DISORDER, OBSESSIVE-COMPULSIVE
PHOBIA
PHOBIC DISORDER
POST-TRAUMATIC STRESS DISORDER
STAGE FRIGHT
PTSD
P.T.S.D
O.C.D

Note: This list was approved by NPS MedicineWise medical advisors in January 2019.

Arthritis

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

- AC JOINT ARTHRITIS
- ACROMIOCLAVICULAR JOINT ARTHRITIS
- ANEURYSM-OSTEOARTHRITIS SYNDROME
- ANKLE OSTEOARTHRITIS
- ANKYLOSING SPONDYLITIS
- ARTHRITIS
- ARTHRITIS - GOUTY
- ARTHRITIS - JUVENILE RHEUMATOID
- ARTHRITIS - LISFRANC
- ARTHRITIS - LUPUS
- ARTHRITIS - OSTEO
- ARTHRITIS - PSORIATIC
- ARTHRITIS - RHEUMATOID
- ARTHRITIS - SEPTIC
- ARTHRITIS - SERONEGATIVE
- ARTHRITIS - VIRAL
- ARTHRITIS OF SPINE
- ARTHRITIS OF THE ACROMIOCLAVICULAR JOINT
- ARTHRITIS, INFLAMMATORY
- ARTHRITIS, JUVENILE RHEUMATOID
- ARTHRITIS, PSORIATIC
- ARTHRITIS, RHEUMATOID
- ARTHRITIS, SEPTIC

- ARTHRITIS, SERONEGATIVE
- ARTHRITIS, VIRAL
- CAPLAN SYNDROME
- CERVICAL - OSTEO ARTHRITIS
- CERVICAL SPINE OSTEOARTHRITIS
- ELBOW OSTEOARTHRITIS
- FACET JOINT ARTHRITIS
- GENERALISED OSTEOARTHRITIS
- GIANT CELL RETICULOHISTIOCYTOSIS
- GOUT
- GOUTY ARTHRITIS
- HALLUX RIGIDUS
- HIP OSTEOARTHRITIS
- HIP OSTEOARTHROSIS
- HYPERURICAEMIA
- HYPERURICEMIA
- INFLAMMATORY POLYARTHRITIS
- JOINT INFECTION
- JRA
- JRA (JUVENILE RHEUMATOID ARTHRITIS)
- JUVENILE IDIOPATHIC ARTHRITIS
- JUVENILE RHEUMATOID ARTHRITIS
- KNEE OSTEOARTHRITIS
- KNEE OSTEOARTHROSIS
- LIPOID DERMATOARTHRITIS
- LIPOID RHEUMATISM
- LISFRANC ARTHRITIS
- LOEYS-DIETZ SYNDROME TYPE 3
- LUMBAR - OSTEO ARTHRITIS
- LUMBAR SPINE OSTEOARTHRITIS
- LUPUS ARTHRITIS
- LYME ARTHRITIS
- MIDFOOT OSTEOARTHRITIS
- MONOARTHRITIS
- MULTICENTRIC RETICULOHISTIOCYTOSIS
- OA
- OA (OSTEOARTHRITIS)
- OLIGOARTHRITIS, INFLAMMATORY
- OSTEOARTHRITIS
- OSTEOARTHRITIS - ANKLE
- OSTEOARTHRITIS - ELBOW
- OSTEOARTHRITIS - FINGERS
- OSTEOARTHRITIS - GLENOHUMERAL JOINT
- OSTEOARTHRITIS - HANDS
- OSTEOARTHRITIS - HIP
- OSTEOARTHRITIS - KNEE
- OSTEOARTHRITIS - NECK
- OSTEOARTHRITIS - SHOULDER
- OSTEOARTHRITIS - SPINE
- OSTEOARTHRITIS OF 1ST CARPOMETACARPAL JOINT
- OSTEOARTHRITIS OF 1ST CARPO-METACARPAL JOINT
- OSTEOARTHRITIS OF 1ST METATARSOPHALANGEAL JOINT
- OSTEOARTHRITIS OF ANKLE
- OSTEOARTHRITIS OF CERVICAL SPINE
- OSTEOARTHRITIS OF ELBOW
- OSTEOARTHRITIS OF FINGERS
- OSTEOARTHRITIS OF FOOT
- OSTEOARTHRITIS OF HAND

- OSTEOARTHRITIS OF HIP
- OSTEOARTHRITIS OF KNEE
- OSTEOARTHRITIS OF LUMBAR SPINE
- OSTEOARTHRITIS OF NECK
- OSTEOARTHRITIS OF SACROILIAC JOINTS
- OSTEOARTHRITIS OF SHOULDER
- OSTEOARTHRITIS OF THE PATELLOFEMORAL JOINT
- OSTEOARTHRITIS OF THORACIC SPINE
- OSTEOARTHRITIS OF TMJ
- OSTEOARTHRITIS OF WRIST
- OSTEOARTHRITIS, GENERALISED
- OSTEOARTHROSIS
- PATELLOFEMORAL OSTEOARTHRITIS
- PODAGRA
- POLYARTHRITIS
- POLYARTHRITIS, INFLAMMATORY
- PSORIATIC ARTHRITIS
- PSORIATIC ARTHROPATHY
- RA
- RA (RHEUMATOID ARTHRITIS)
- REACTIVE ARTHRITIS
- REITER'S DISEASE
- REITER'S SYNDROME
- RHEUMATOID ARTHRITIS
- RHEUMATOID ARTHRITIS - JUVENILE
- RHEUMATOID ARTHRITIS - PNEUMOCONIOSIS
- RHEUMATOID ARTHRITIS, JUVENILE
- SACROILIAC JOINT ARTHRITIS
- SEPTIC ARTHRITIS
- SERONEGATIVE ARTHRITIS
- SERONEGATIVE RHEUMATOID ARTHRITIS
- SHOULDER OSTEOARTHRITIS
- SPONDYLOARTHRITIS
- SPONDYLOSIS
- STILLS DISEASE
- THORACIC - OSTEO ARTHRITIS
- URATE CRYSTAL DEPOSITION
- VENEREAL ARTHRITIS
- VIRAL ARTHRITIS
- WAELSCH'S SYNDROME
- WEAR AND TEAR ARTHRITIS
- WRIST OSTEOARTHRITIS (blank)

The following free text strings have been used to search for terms which may indicate records for inclusion:

- ANKYLOSING
- ARTHRI
- CAPLAN SYNDROME
- GIANT CELL RETICULOHISTIOCYTOSIS
- GOUT
- HALLUX RIGIDUS
- HYPERURICAEMIA
- HYPERURICEMIA
- JOINT INFECTION
- LIPOID RHEUMATISM
- LOEYS-DIETZ SYNDROME TYPE 3
- LYME DISEASE
- MULTICENTRIC RETICULOHISTIOCYTOSIS

- O.A
- O/A
- OA
- PSORIATIC ARTHROPATHY
- RA
- REITER'S DISEASE
- REITER'S SYNDROME
- SPONDYLOSIS
- STILLS DISEASE
- WAELSCH'S SYNDROME

Note: This group has not been broken down by type of arthritis eg, Seronegative, Osteoarthritis etc.

This list was approved by NPS MedicineWise medical advisors in January 2019.

Asthma

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ACUTE SEVERE ASTHMA
ALLERGIC ASTHMA
ALLERGY INDUCED ASTHMA
ASPIRIN SENSITIVE ASTHMA
ASTHMA
ASTHMA - ALLERGY INDUCED
ASTHMA - CHRONIC PERSISTENT
ASTHMA - EXERCISE INDUCED
ASTHMA - FREQUENT EPISODIC
ASTHMA - INFECTIVE EXACERBATION
ASTHMA - INFREQUENT EPISODIC
ASTHMA - PRECIPITATED BY BACTERIAL INFECTION
ASTHMA - PRECIPITATED BY VIRAL INFECTION
ASTHMA ACTION PLAN
ASTHMA ACTION PLAN PERFORMED
ASTHMA ACTION PLAN PRINTED
ASTHMA CARE PLAN
ASTHMA CARE PLAN REVIEW
ASTHMA CYCLE OF CARE
ASTHMA EXACERBATION
ASTHMA REVIEW
ASTHMA, ALLERGIC
ASTHMA, ALLERGY INDUCED
ASTHMA, CHILDHOOD
ASTHMA, EXERCISE INDUCED
ASTHMA, FREQUENT EPISODIC
ASTHMA, INFECTIVE EXACERBATION
ASTHMA, INFREQUENT EPISODIC
ASTHMA, OCCUPATIONAL
ASTHMA, THUNDERSTORM
BRONCHIAL ASTHMA
CARE PLAN, ASTHMA
CHECK UP, ASTHMA
EXERCISE INDUCED ASTHMA
EXERTIONAL ASTHMA
FREQUENT EPISODIC ASTHMA
INFECTIVE EXACERBATION OF ASTHMA
INFREQUENT EPISODIC ASTHMA
OCCUPATIONAL ASTHMA

REVIEW - ASTHMA
SAMTER'S TRIAD
STATUS ASTHMATICUS
THUNDERSTORM ASTHMA
WHEEZY BRONCHITIS

The following text strings have been used to search for terms which may indicate records for inclusion:

ASTH
ASTMA
SAMTER'S TRIAD
SAMTER

Note: Although 'Wheezy bronchitis' is not the most correct term at this time, it shares a code with Asthma and Bronchial Asthma and so has been included. It has not been included as a free text term.

This list was approved by NPS MedicineWise medical advisors in January 2019.

Atrial fibrillation

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

AF
AF (ATRIAL FIBRILLATION)
ARRHYTHMIA, ATRIAL FIBRILLATION
ATRIAL FIBRILLATION
ATRIAL FIBRILLATION - ISOLATED EPISODE
ATRIAL FIBRILLATION - PAROXYSMAL
ATRIAL FIBRILLATION ABLATION
ATRIAL FIBRILLATION, NON-VALVULAR
ATRIAL FIBRILLATION, VALVULAR
FIBRILLATION - ATRIAL
FIBRILLATION ATRIUM - PAROXYSMAL
FIBRILLATION, ATRIAL
NON-VALVULAR ATRIAL FIBRILLATION
PAROXYSMAL ATRIAL FIBRILLATION
RAPID AF
RAPID ATRIAL FIBRILLATION
VALVULAR ATRIAL FIBRILLATION

The following free text strings have been used to search for terms which may indicate records for inclusion:

A FIB
A.F
A/F
AF
ATRIAL F
FIBRILLATION

This list was approved by NPS MedicineWise medical advisors in August 2018.

Cardiovascular disease (CVD)

We have included coronary heart disease (CHD), peripheral vascular disease (PVD), stroke and transient ischaemic attack (TIA), and any relevant synonyms in our definition of CVD.

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion in CHD:

AAA
AAA RUPTURE
ABDOMINAL AORTIC ANEURYSM
ABDOMINAL AORTIC ANEURYSM RUPTURE
ACS (ACUTE CORONARY SYNDROME)
ACUTE CORONARY INSUFFICIENCY
ACUTE CORONARY SYNDROME
ACUTE MYOCARDIAL INFARCTION
AMI
AMI (ACUTE MYOCARDIAL INFARCTION)
ANEURYSM OF ABDOMINAL AORTA
ANEURYSM OF THORACIC AORTA
ANGINA
ANGINA PECTORIS
ANGINA PECTORIS - UNSTABLE
ANGINA, STABLE
ANGINA, UNSTABLE
ANTERIOR MYOCARDIAL INFARCT
ANTEROLATERAL MYOCARDIAL INFARCT
AORTOFEMORAL BYPASS OCCLUSION
AORTOILIAC BYPASS OCCLUSION
AORTOILIAC STENT BLOCKAGE
AORTOILIAC STENT OCCLUSION
ARTERIAL INSUFFICIENCY
ARTERIOSCLEROTIC ARTERIAL INSUFFICIENCY
ATHEROSCLEROTIC HEART DISEASE
BLOCKAGE CORONARY ARTERY
BLOCKED AORTOFEMORAL BYPASS
BLOCKED AORTOILIAC BYPASS
BLOCKED AORTOILIAC STENT
BLOCKED CORONARY ARTERY BYPASS GRAFT
BLOCKED FEMORO-POPLITEAL BYPASS
BLOCKED POPLITEAL ARTERY STENT
CHRONIC STABLE ANGINA
CORONARY ARTERY BYPASS GRAFT BLOCKAGE
CORONARY ARTERY BYPASS GRAFT OCCLUSION
CORONARY ARTERY DISEASE
CORONARY ARTERY STENT BLOCKED
CORONARY HEART DISEASE
CORONARY INSUFFICIENCY
CORONARY OCCLUSION
FEMORO-POPLITEAL BYPASS BLOCKAGE
FEMORO-POPLITEAL BYPASS OCCLUSION
HEART ATTACK
HEART DISEASE, ATHEROSCLEROTIC
HEART DISEASE, CORONARY
HEART DISEASE, ISCHAEMIC
IHD
IHD (ISCHAEMIC HEART DISEASE)
INFERIOR MYOCARDIAL INFARCTION
ISCHAEMIC HEART DISEASE
ISCHAEMIC VASCULAR DISEASE
MI
MYOCARDIAL DAMAGE
MYOCARDIAL INFARCTION
MYOCARDIAL INFARCTION - ANTERIOR

MYOCARDIAL INFARCTION - ANTEROLATERAL

MYOCARDIAL INFARCTION - INFERIOR
MYOCARDIAL INFARCTION - POSTERIOR
MYOCARDIAL INFARCTION - SILENT
MYOCARDIAL INFARCTION - SUBENDOCARDIAL
MYOCARDIAL INFARCTION - SUPERIOR
MYOCARDIAL INFARCTION - WITH ST ELEVATION
MYOCARDIAL INFARCTION - WITHOUT ST ELEVATION
MYOCARDIAL INFARCTION, ANTERIOR
MYOCARDIAL INFARCTION, ANTEROLATERAL
MYOCARDIAL INFARCTION, INFERIOR
MYOCARDIAL INFARCTION, NON STEMI
MYOCARDIAL INFARCTION, POSTERIOR
MYOCARDIAL INFARCTION, STEMI
MYOCARDIAL INFARCTION, SUBENDOCARDIAL
MYOCARDIAL INFARCTION, SUPERIOR
MYOCARDIAL INSUFFICIENCY
NON ST ELEVATION MYOCARDIAL INFARCTION
NON-ST-ELEVATION MYOCARDIAL INFARCTION (NSTEMI)
NSTEMI
NSTEMI (NON-ST-ELEVATION MYOCARDIAL INFARCTION)
OBSTRUCTED AORTOFEMORAL BYPASS
OBSTRUCTED AORTOILIAC BYPASS
OBSTRUCTED AORTOILIAC STENT
OBSTRUCTED CORONARY ARTERY BYPASS GRAFT
OBSTRUCTED FEMORO-POPLITEAL BYPASS
OBSTRUCTED POPLITEAL ARTERY STENT
OCCLUDED AORTOFEMORAL BYPASS
OCCLUDED AORTOILIAC BYPASS
OCCLUDED AORTOILIAC STENT
OCCLUDED POPLITEAL ARTERY STENT
OCCLUSION - CORONARY ARTERY
OCCLUSION OF AORTIC BIFURCATION BYPASS GRAFT
OCCLUSION OF FEMOROPOPLITEAL BYPASS GRAFT
OCCLUSION, CORONARY ARTERY
POPLITEAL ARTERY STENT BLOCKAGE
POPLITEAL ARTERY STENT OCCLUSION
POSTERIOR MYOCARDIAL INFARCT
PREINFARCTION SYNDROME
RUPTURE OF ABDOMINAL AORTIC ANEURYSM
RUPTURED AAA
SILENT MYOCARDIAL INFARCTION
ST ELEVATION MYOCARDIAL INFARCTION
STABLE ANGINA
STEMI
STEMI (ST-ELEVATION MYOCARDIAL INFARCTION)
SUBENDOCARDIAL INFARCT
SUBENDOCARDIAL MYOCARDIAL INFARCT
SUPERIOR MYOCARDIAL INFARCT
THORACIC AORTIC ANEURYSM
UNSTABLE ANGINA
UNSTABLE ANGINA - HIGH RISK
UNSTABLE ANGINA - LOW RISK
UNSTABLE ANGINA - MODERATE RISK(blank)

The following free text strings have been used to search for terms which may indicate records for inclusion:

- AAA
- ACUTE CORONARY SYNDROME
- ANEURYSM OF THORACIC AORTA
- ANGINA
- ANTERIOR MYOCARDIAL INFARCT
- ANTEROLATERAL MYOCARDIAL INFARCT
- AORTOFEMORAL BYPASS OCCLUSION
- AORTOILIAC BYPASS OCCLUSION
- AORTOILIAC STENT BLOCKAGE
- AORTOILIAC STENT OCCLUSION
- ARTERIAL INSUFFICIENCY
- ATHEROSCLEROTIC HEART DISEASE
- BLOCKAGE CORONARY ARTERY
- BLOCKED AORTOFEMORAL BYPASS
- BLOCKED AORTOILIAC BYPASS
- BLOCKED AORTOILIAC STENT
- BLOCKED CORONARY ARTERY BYPASS GRAFT
- BLOCKED FEMORO-POPLITEAL BYPASS
- BLOCKED POPLITEAL ARTERY STENT
- CORONARY ARTERY BYPASS GRAFT BLOCKAGE
- CORONARY ARTERY BYPASS GRAFT OCCLUSION
- CORONARY ARTERY DISEASE
- CORONARY ARTERY STENT BLOCKED
- CORONARY HEART DISEASE
- CORONARY INSUFFICIENCY
- CORONARY OCCLUSION
- FEMORO-POPLITEAL BYPASS BLOCKAGE
- FEMORO-POPLITEAL BYPASS OCCLUSION
- HEART ATTACK
- HEART DISEASE, ATHEROSCLEROTIC
- HEART DISEASE, CORONARY
- IHD
- MI
- MYOCARDIAL DAMAGE
- MYOCARDIAL INFARCTION
- MYOCARDIAL INSUFFICIENCY
- OBSTRUCTED AORTOFEMORAL BYPASS
- OBSTRUCTED AORTOILIAC BYPASS
- OBSTRUCTED AORTOILIAC STENT
- OBSTRUCTED CORONARY ARTERY BYPASS GRAFT
- OBSTRUCTED FEMORO-POPLITEAL BYPASS
- OBSTRUCTED POPLITEAL ARTERY STENT
- OCCLUDED AORTOFEMORAL BYPASS
- OCCLUDED AORTOILIAC BYPASS
- OCCLUDED AORTOILIAC STENT
- OCCLUDED POPLITEAL ARTERY STENT
- OCCLUSION - CORONARY ARTERY
- OCCLUSION OF AORTIC BIFURCATION BYPASS GRAFT
- OCCLUSION OF FEMOROPOPLITEAL BYPASS GRAFT
- OCCLUSION, CORONARY ARTERY
- POPLITEAL ARTERY STENT BLOCKAGE
- POPLITEAL ARTERY STENT OCCLUSION
- POSTERIOR MYOCARDIAL INFARCT
- POSTPERICARDIOTOMY SYNDROME
- PREINFARCTION SYNDROME
- SUBENDOCARDIAL INFARCT

- SUBENDOCARDIAL MYOCARDIAL INFARCT
- SUPERIOR MYOCARDIAL INFARCT
- THORACIC AORTIC ANEURYSM

This list was approved by NPS MedicineWise medical advisors in August 2018.

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion in PVD:

ARTERIOSCLEROSIS OBLITERANS
ARTERITIS - DIABETES MELLITUS
BUERGER'S DISEASE
DIABETES WITH VASCULAR CHANGES
DIABETIC ENDARTERITIS
DIABETIC PERIPHERAL VASCULAR DISEASE
DIABETIC VASCULAR DISEASE - PERIPHERAL
OBLITERATIVE VASCULAR DISEASE
OCCLUSIVE VASCULAR DISEASE
OCCLUSIVE VASCULAR DISEASE (BUERGER'S DISEASE)
PERIPHERAL ARTERIAL DISEASE
PERIPHERAL ARTERIAL OCCLUSIVE DISEASE (BUERGER'S DISEASE)
PERIPHERAL VASCULAR DISEASE
PERIPHERAL VASCULAR DISEASE, DIABETIC
PVD
THROMBANGIITIS OBLITERANS
THROMBOANGIITIS OBLITERANS

The following free text strings have been used to search for terms which may indicate records for inclusion:

ARTERIOSCLEROSIS OBLITERANS
ARTERITIS - DIABETES MELLITUS
BUERGER
DIABETES WITH VASCULAR CHANGES
DIABETIC ENDARTERITIS
DIABETIC VASCULAR DISEASE - PERIPHERAL
OBLITERATIVE VASCULAR DISEASE
OCCLUSIVE VASCULAR DISEASE
P.V.D
PERIPHERAL ANGIOPATHY
PERIPHERAL ARTERIAL DISEASE
PERIPHERAL VASCULAR DISEASE
PVD
THROMBANGIITIS OBLITERANS
THROMBOANGIITIS OBLITERANS

This list was approved by NPS MedicineWise medical advisors in August 2018.

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion in stroke:

CEREBRAL HAEMORRHAGE
CEREBRAL INFARCTION
CEREBROVASCULAR ACCIDENT
CVA
CVA (CEREBROVASCULAR ACCIDENT)
HAEMORRHAGE - INTRACEREBRAL
HAEMORRHAGE, INTRACEREBRAL
HAEMORRHAGIC CVA
HAEMORRHAGIC STROKE
INTRACEREBRAL BLEED
INTRACEREBRAL HAEMORRHAGE

INTRACRANIAL HAEMORRHAGE
ISCHAEMIC STROKE
LACUNAR INFARCT
LACUNAR STROKE
MIGRAINOUS STROKE
MIGRANOUS STROKE
STROKE
STROKE - HAEMORRHAGIC
STROKE - ISCHAEMIC
STROKE - LACUNAR
STROKE - MIGRANOUS
STROKE - THROMBOTIC
STROKE, HAEMORRHAGIC
STROKE, ISCHAEMIC
STROKE, LACUNAR
STROKE, MIGRAINOUS
STROKE, THROMBOTIC
THROMBOTIC – STROKEf
THROMBOTIC STROKE
VISUAL CORTEX STROKE

The following free text strings have been used to search for terms which may indicate records for inclusion:

C.V.A
CEREBRAL HAEMORRHAGE
CEREBRAL INFARCTION
CEREBROVASCULAR ACCIDENT
CVA
HAEMORRHAGE - INTRACEREBRAL
HAEMORRHAGE, INTRACEREBRAL
INTRACEREBRAL BLEED
INTRACRANIAL HAEMORRHAGE
LACUNAR INFARCT
STROKE

Free text entries referring to a traumatic stroke caused by a fall or MVA for example are NOT included.

This list was approved by NPS MedicineWise medical advisors in January 2019.

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion in TIA:

ARTERIAL EMBOLISM - MINOR
CEREBRAL TIA
CEREBRAL TRANSIENT ISCHAEMIA
CEREBRAL TRANSIENT ISCHAEMIC ATTACKS
SYNCOPE, TIA
TIA
TIA (TRANSIENT ISCHAEMIC ATTACK)
TRANSIENT ISCHAEMIC ATTACK

The following text strings have been used to search for terms which may indicate records for inclusion:

ARTERIAL EMBOLISM - MINOR
CEREBRAL TRANSIENT ISCHAEMIA
T.I.A
TIA
TRANSIENT ISCHAEMIC ATTACK

This list was approved by NPS MedicineWise medical advisors in January 2019.

Chronic kidney disease (CKD)

We have included chronic kidney disease stages 1 through 5, and chronic kidney disease (unspecified) in our definition. The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ANAEMIA - CHRONIC RENAL FAILURE
CAPD
CAPD (CONTINUOUS AMBULATORY PERITONEAL DIALYSIS)
CATHETERISATION - PERITONEUM
CATHETERISATION OF PERITONEUM
CHRONIC KIDNEY DISEASE
CHRONIC KIDNEY DISEASE - STAGE 1
CHRONIC KIDNEY DISEASE - STAGE 2
CHRONIC KIDNEY DISEASE - STAGE 3
CHRONIC KIDNEY DISEASE - STAGE 4
CHRONIC KIDNEY DISEASE - STAGE 5
CHRONIC KIDNEY DISEASE, STAGE 1
CHRONIC KIDNEY DISEASE, STAGE 2
CHRONIC KIDNEY DISEASE, STAGE 3
CHRONIC KIDNEY DISEASE, STAGE 3A
CHRONIC KIDNEY DISEASE, STAGE 3B
CHRONIC KIDNEY DISEASE, STAGE 4
CHRONIC KIDNEY DISEASE, STAGE 5
CHRONIC RENAL FAILURE
CHRONIC RENAL FAILURE - HYPERPARATHYROIDISM
CKD (CHRONIC KIDNEY DISEASE) STAGE 1
CKD (CHRONIC KIDNEY DISEASE) STAGE 2
CKD (CHRONIC KIDNEY DISEASE) STAGE 3
CKD (CHRONIC KIDNEY DISEASE) STAGE 4
CKD (CHRONIC KIDNEY DISEASE) STAGE 5
CONTINUOUS AMBULATORY PERITONEAL DIALYSIS
DIALYSIS
DIALYSIS - HAEMODIALYSIS
DIALYSIS - PERITONEAL
DIALYSIS, PERITONEAL
HAEMODIALYSIS
HEMODIALYSIS
KIDNEY DISEASE - CHRONIC - STAGE 1
KIDNEY DISEASE - CHRONIC - STAGE 2
KIDNEY DISEASE - CHRONIC - STAGE 3
KIDNEY DISEASE - CHRONIC - STAGE 4
KIDNEY DISEASE - CHRONIC - STAGE 5
KIDNEY FAILURE - CHRONIC
KIDNEY FAILURE, CHRONIC
PERITONEAL CATHERISATION FOR DIALYSIS
PERITONEAL CATHETERISATION FOR DIALYSIS
PERITONEAL DIALYSIS
RENAL DIALYSIS
RENAL DISEASE - CHRONIC - STAGE 1
RENAL DISEASE - CHRONIC - STAGE 2
RENAL DISEASE - CHRONIC - STAGE 3
RENAL DISEASE - CHRONIC - STAGE 4
RENAL DISEASE - CHRONIC - STAGE 5
RENAL FAILURE, CHRONIC
RENAL INSUFFICIENCY - CHRONIC
SURGERY - ABDOMEN - DIALYSIS - CATHETERISATION

The following free text strings have been used to search for terms which may indicate records for inclusion:

CAPD
CHRONIC KIDNEY DISEASE
CKD
CRF
DIALYSIS
KIDNEY DISEASE - CHRONIC - STAGE 1
KIDNEY DISEASE - CHRONIC - STAGE 2
KIDNEY DISEASE - CHRONIC - STAGE 3
KIDNEY DISEASE - CHRONIC - STAGE 4
KIDNEY DISEASE - CHRONIC - STAGE 5
KIDNEY FAILURE
RENAL DISEASE - CHRONIC - STAGE 1
RENAL DISEASE - CHRONIC - STAGE 2
RENAL DISEASE - CHRONIC - STAGE 3
RENAL DISEASE - CHRONIC - STAGE 4
RENAL DISEASE - CHRONIC - STAGE 5
RENAL FAILURE
RENAL IMPAIRMENT
RENAL INSUFFICIENCY - CHRONIC

Chronic obstructive pulmonary disease (COPD)

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ACUTE EXACERBATION OF COPD
BRONCHITIS - CHRONIC
BRONCHITIS, CHRONIC
CAL (CHRONIC AIRWAYS LIMITATION)
CHRONIC AIRWAYS LIMITATION
CHRONIC BRONCHITIS
CHRONIC BRONCHITIS - INFECTIVE EXACERBATION
CHRONIC BRONCHITIS, INFECTIVE EXACERBATION
CHRONIC OBSTRUCTIVE AIRWAYS DISEASE
CHRONIC OBSTRUCTIVE PULMONARY DISEASE
COAD
COAD - INFECTIVE EXACERBATION
COAD (CHRONIC OBSTRUCTIVE AIRWAYS DISEASE)
COAD, INFECTIVE EXACERBATION
COPD
COPD - INFECTIVE EXACERBATION
COPD (CHRONIC OBSTRUCTIVE PULMONARY DISEASE)
COPD, INFECTIVE EXACERBATION
EMPHYSEMA
EMPHYSEMA - INFECTIVE EXACERBATION
INFECTIVE EXACERBATION OF CHRONIC BRONCHITIS
INFECTIVE EXACERBATION OF COAD
INFECTIVE EXACERBATION OF COPD

The following free text strings have been used to search for terms which may indicate records for inclusion:

BRONCHITIS - CHRONIC
BRONCHITIS, CHRONIC
CHRONIC AIRWAYS LIMITATION
CHRONIC BRONCHITIS
CHRONIC OBSTRUCTIVE AIRWAYS DISEASE
CHRONIC OBSTRUCTIVE PULMONARY DISEASE
COAD

COPD
EMPHYSEMA

This list was approved by NPS MedicineWise medical advisors in August 2018.

Depression

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ADJUSTMENT DISORDER (CHRONIC) WITH DEPRESSED AND ANXIOUS MOOD
ADJUSTMENT DISORDER (CHRONIC) WITH DEPRESSED MOOD
ADJUSTMENT DISORDER WITH DEPRESSED AND ANXIOUS MOOD
ADJUSTMENT DISORDER WITH DEPRESSED MOOD
ADJUSTMENT DISORDER WITH MIXED ANXIETY AND DEPRESSED MOOD
ANXIETY/DEPRESSION
CHRONIC ADJUSTMENT DISORDER WITH DEPRESSED AND ANXIOUS MOOD
CHRONIC ADJUSTMENT DISORDER WITH DEPRESSED MOOD
DEPRESSION
DEPRESSION - ENDOGENOUS
DEPRESSION - MAJOR
DEPRESSION - MINOR
DEPRESSION - POST NATAL
DEPRESSION - REACTIVE
DEPRESSION - RECURRENT
DEPRESSION - SUBSYNDROMAL
DEPRESSION WITH MELANCHOLIC FEATURES
DEPRESSION, ENDOGENOUS
DEPRESSION, MELANCHOLIC
DEPRESSION, NON MELANCHOLIC
DEPRESSION, ORGANIC
DEPRESSION, POSTNATAL
DEPRESSION, PSYCHOTIC
DEPRESSION, REACTIVE
DEPRESSION/ANXIETY
DEPRESSIVE ANXIETY DISORDER
DEPRESSIVE EPISODE, MAJOR
ENDOGENOUS DEPRESSION
INSOMNIA - DEPRESSION-RELATED
MAJOR DEPRESSION
MAJOR DEPRESSIVE DISORDER
MAJOR DEPRESSIVE EPISODE
MELANCHOLIA
MELANCHOLIC DEPRESSION
MIXED ANXIETY DEPRESSION
MIXED ANXIETY/DEPRESSIVE DISORDER
MIXED DEPRESSION ANXIETY
NEUROTIC DEPRESSION
NON MELANCHOLIC DEPRESSION
ORGANIC DEPRESSION
POST NATAL DEPRESSION
POSTNATAL DEPRESSION
PSYCHOTIC DEPRESSION
REACTIVE DEPRESSION

The following free text strings have been used to search for terms which may indicate records for inclusion:

- ADJUSTMENT DISORDER
- DEPRES
- MELANCHOLIA

Dyslipidaemia

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

DYSLIPIDAEMIA
FAMILIAL HYPERCHOLESTEROLAEMIA
FAMILIAL HYPERCHOLESTEROLEMIA
HETEROZYGOUS FAMILIAL HYPERCHOLESTEROLEMIA
HIGH CHOLESTEROL
HOMOZYGOUS FAMILIAL HYPERCHOLESTEROLEMIA
HYPERCHOLESTEROLAEMIA
HYPERCHOLESTEROLAEMIA, FAMILIAL
HYPERLIPIDAEMIA
HYPERLIPIDAEMIA - CONTROLLED
HYPERLIPIDAEMIA TYPE 2
HYPERLIPOPROTEINAEMIA - TYPE2
HYPERLIPOPROTEINAEMIA, TYPE 2
HYPERLIPOPROTEINEMIA TYPE IV
HYPERLIPOPROTEINEMIA, TYPE IIA
HYPERTRIGLYCERIDAEMIA
TYPE 2 HYPERLIPOPROTEINAEMIA

The following free text strings have been used to search for terms which may indicate records for inclusion:

DYSLIP
HDL
HIGH CHOLEST
HIGH LIPIDS
HYPERCHO
HYPERLIP
HYPERTR

Gastro-oesophageal reflux disease (GORD)

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ACID REFLUX
ACID REGURGITATION
GASTRO-OESOPHAGEAL REFLUX
GOR
GOR (GASTRO-OESOPHAGEAL REFLUX)
GORD
GORD (GASTRO-OESOPHAGEAL REFLUX DISEASE)
HEARTBURN
LARYNGITIS, REFLUX
LARYNGO PHARYNGEAL REFLUX
LARYNGOPHARYNGEAL REFLUX
NON-EROSIVE REFLUX DISEASE
OESOPHAGEAL REFLUX
OESOPHAGITIS, REFLUX
REFLUX - GASTRO-OESOPHAGEAL
REFLUX - LARYNGO PHARYNGEAL
REFLUX LARYNGITIS
REFLUX OESOPHAGITIS
REFLUX, GASTRO-OESOPHAGEAL
REFLUX, LARYNGOPHARYNGEAL

The following free text strings have been used to search for terms which may indicate records for inclusion:

ACID REGURGITATION
GER
GOR
HEARTBURN
REFLUX

This list was approved by NPS MedicineWise medical advisors in August 2018.

Heart failure

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ACUTE CARDIAC FAILURE
ACUTE HEART FAILURE
BIVENTRICULAR HEART FAILURE
CARDIAC FAILURE
CARDIAC FAILURE, ACUTE
CCF
CHRONIC HEART FAILURE
CONGESTIVE CARDIAC FAILURE
CONGESTIVE HEART FAILURE
COR PULMONALE
DIASTOLIC CARDIAC DYSFUNCTION
DIASTOLIC HEART FAILURE
HEART FAILURE
HEART FAILURE - ACUTE
HEART FAILURE - BIVENTRICULAR
HEART FAILURE - CHRONIC
HEART FAILURE - HIGH OUTPUT
HEART FAILURE - LEFT
HEART FAILURE - MID RANGE EJECTION FRACTION
HEART FAILURE - PRESERVED EJECTION FRACTION
HEART FAILURE - REDUCED EJECTION FRACTION
HEART FAILURE - RIGHT
HEART FAILURE, ACUTE
HEART FAILURE, HIGH OUTPUT
HEART FAILURE, LEFT
HFMREF
HFPEF
HFREF
HIGH OUTPUT CARDIAC FAILURE
HIGH OUTPUT HEART FAILURE
HYPERTENSIVE HEART FAILURE
LEFT HEART FAILURE
LEFT VENTRICULAR FAILURE
LHF
LHF (LEFT HEART FAILURE)
LVF
LVF (LEFT VENTRICULAR FAILURE)
RHF
RHF (RIGHT HEART FAILURE)
RIGHT HEART FAILURE
RIGHT VENTRICULAR FAILURE
RVF
RVF (RIGHT VENTRICULAR FAILURE)
SYSTOLIC CARDIAC DYSFUNCTION

SYSTOLIC HEART FAILURE
VENTRICULAR DIASTOLIC DYSFUNCTION

The following free text strings have been used to search for terms which may indicate records for inclusion:

CARDIAC FAILURE
CCF
COR PULMONALE
DIASTOLIC CARDIAC DYSFUNCTION
HEART FAILURE
HF
LEFT VENTRICULAR FAILURE
LVF
RIGHT VENTRICULAR FAILURE
RVF
SYSTOLIC CARDIAC DYSFUNCTION
VENTRICULAR DIASTOLIC DYSFUNCTION

This list was approved by NPS MedicineWise medical advisors in August 2018.

Hypertension

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

ANTIHYPERTENSIVE AGENT PRESCRIPTION
BLOOD PRESSURE LABILE
BLOOD PRESSURE REVIEW
BP LABILE
BP UNSTABLE
DIASTOLIC HYPERTENSION
ESSENTIAL HYPERTENSION
HBP
HIGH BLOOD PRESSURE
HT (HYPERTENSION)
HYPERTENSION
HYPERTENSION - CONTROLLED
HYPERTENSION - ISOLATED SYSTOLIC
HYPERTENSION - LABILE
HYPERTENSION - LIFE STYLE MANAGEMENT
HYPERTENSION - MALIGNANT
HYPERTENSION - PREGNANCY
HYPERTENSION - RENOVASCULAR
HYPERTENSION - UNSTABLE
HYPERTENSION IN PREGNANCY
HYPERTENSION REVIEW
HYPERTENSION, ISOLATED SYSTOLIC
HYPERTENSION, DIASTOLIC
HYPERTENSION, ESSENTIAL
HYPERTENSION, MALIGNANT
HYPERTENSION, RENOVASCULAR
ISOLATED SYSTOLIC HYPERTENSION
LABILE BLOOD PRESSURE
LABILE BP
LABILE HYPERTENSION
MALIGNANT HYPERTENSION
PIH
PREGNANCY INDUCED HYPERTENSION
PRIMARY HYPERTENSION
RENAL HYPERTENSION

RENOVASCULAR HYPERTENSION
REVIEW - BP
SEVERE REFRACTORY HYPERTENSION

The following free text strings have been used to search for terms which may indicate records for inclusion:

BLOOD PRESSURE LABILE
BLOOD PRESSURE REVIEW
BP LABILE
BP UNSTABLE
H/T
HBP
HIGH BLOOD PRESSURE
HIGH BP
HT
HYPER TENSION
HYPERTENSION
LABILE BLOOD PRESSURE
LABILE BP
PIH
REVIEW - BP

This list was approved by NPS MedicineWise medical advisors in January 2019.

Osteoporosis

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

OSTEOPAENIA
OSTEOPENIA
OSTEOPOROSIS
OSTEOPOROSIS - CORTICOSTEROID INDUCED
OSTEOPOROSIS - NO FRACTURE
OSTEOPOROSIS - PREVENTIVE CARE
OSTEOPOROSIS WITH FRACTURE
OSTEOPOROSIS, DISUSE
OSTEOPOROSIS, STEROID INDUCED
PATHOLOGICAL FRACTURE DUE TO OSTEOPOROSIS
POST MENOPAUSAL OSTEOPOROSIS
PREVENTIVE CARE - OSTEOPOROSIS
STEROID INDUCED OSTEOPOROSIS
STEROID OSTEOPATHY

The following free text strings have been used to search for terms which may indicate records for inclusion:

OP
OSTEOPOR

This list was approved by NPS MedicineWise medical advisors in August 2018.

Type 2 diabetes mellitus

We have defined type 2 DM to include DM not specified.

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

DIABETES MELLITUS - NIDDM
DIABETES MELLITUS - TYPE II
DIABETES MELLITUS, NIDDM
DIABETES MELLITUS, TYPE 2

DIABETES TYPE II REQUIRING INSULIN
NIDDM
NIDDM - REQUIRING INSULIN
NIDDM (NON INSULIN DEPENDENT DIABETES MELLITUS)
NON INSULIN DEPENDENT DIABETES MELLITUS
T2DM
TYPE 2 DIABETES MELLITUS

The following text strings have been used to search for terms which may indicate records for inclusion:

DIABETES
NIDDM
T11
T2DM
TII
TYPE 11
TYPE 2
TYPE II
TYPE TWO
TYPE2

This list was approved by NPS MedicineWise medical advisors in January 2019.

Type 2 diabetes unspecified

Diabetes Unspecified is generally merged in with Type 2 Diabetes Mellitus for a complete picture of patients with Type 2 Diabetes Mellitus.

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

CORTISONE INDUCED DIABETES
DIABETES
DIABETES - CONTROLLED
DIABETES - CORTISONE INDUCED
DIABETES - UNSTABLE
DIABETES MELLITUS
LATENT AUTOIMMUNE DIABETES OF ADULTS
UNSTABLE DIABETES

The following free text strings have been used to search for terms which may indicate records for inclusion:

DIABETES
DIABETES - CONTROLLED
DIABETES - UNSTABLE
DIABETES MELLITUS
UNSTABLE DIABETES

Infectious diseases described in this report:

Chlamydia

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

CHLAMYDIA INFECTION

CHLAMYDIA TRACHOMATIS INFECTION
CHLAMYDIA URETHRITIS
CHLAMYDIAL PID

INFECTION - CHLAMYDIA TRACHOMATIS
PID, CHLAMYDIAL
URETHRITIS, CHLAMYDIAL

The following text strings have been used to search for terms which may indicate records for inclusion:

CHLAMYDIA

Note: This flag focuses on sexually transmitted chlamydia.

This list was approved by NPS MedicineWise medical advisors in in January 2019.

Influenza and ILI

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

AVIAN INFLUENZA
BIRD FLU
FLU
H1N1 INFLUENZA
H5N1 INFLUENZA
HUMAN SWINE INFLUENZA INFECTION
INFECTION - INFLUENZA VIRUS
INFECTION - PARAINFLUENZA
INFECTION - PARAINFLUENZA 1 VIRUS
INFECTION - PARAINFLUENZA 2 VIRUS
INFECTION - PARAINFLUENZA 3 VIRUS
INFLUENZA
INFLUENZA A
INFLUENZA A INFECTION
INFLUENZA B
INFLUENZA B INFECTION
INFLUENZA H1N1
INFLUENZA INFECTION
INFLUENZA LIKE ILLNESS
PARA INFLUENZA 1 INFECTION
PARA INFLUENZA 2 INFECTION
PARA INFLUENZA 3 INFECTION
PARAINFLUENZA INFECTION
PARAINFLUENZA TYPE 1 INFECTION
PARAINFLUENZA TYPE 2 INFECTION
PARAINFLUENZA TYPE 3 INFECTION
PIG FLU - H1N1 INFECTION
SWINE FLU

The following free text strings have been used to search for terms which may indicate records for inclusion:

FLU
H1N1
H5N5
SWINE

This list was approved by NPS MedicineWise medical advisors in in December 2018.

Pertussis

The following coded terms (from Docle or Pyefinch) have been used to identify records for inclusion:

BORDETELLA PERTUSSIS INFECTION
INFECTION - BORDETELLA PERTUSSIS
PARAPERTUSSIS
PERTUSSIS
PERTUSSIS INFECTION
WHOOPING COUGH

The following text strings have been used to search for terms which may indicate records for inclusion:

PERTUS
WHOOPING
WHOP
WOOP

This list was approved by NPS MedicineWise medical advisors in in December 2018.

APPENDIX 5. STATISTICAL METHODS AND WEIGHTING

Data analysis

For the descriptive analyses, numbers, rates per 100 encounters, rates per 100 patients, and means were calculated using SAS procedures including PROC SURVEYFREQ. Calculations did not include missing data, and all tables include notes on the proportion of records missing based on the unweighted MedicineInsight data. For the analyses of unweighted data, 95% confidence intervals (CIs) were adjusted for cluster by practice-site, where appropriate. For the analyses using weighted data (please see below), estimates of errors were calculated using the 'delete-a-group jack-knife' method in the SURVEYFREQ procedure. For comparisons within or between categories, and with other selected data sources, a difference between two point estimates was deemed statistically significant if there was no overlap of the 95% CIs, equivalent to $p < 0.006$ for each separate comparison.[39] Analysis of the data was performed using SAS version 9.4 Enterprise Guide 7.15 (SAS Institute Inc, Cary, NC, USA).

Weighting

The weighting procedure was developed by the ABS to assess and ensure the representativeness of the MedicineInsight data for this report.

Weighting is the process of adjusting results from data to infer results for the in-scope total population. To do this, a weight is allocated to each sample unit; for example, an encounter or a pathology test. The weight is a value which indicates how many population units are represented by the sample unit. Encounter weights were calculated then applied to patients and other data, as all clinical encounters and other data are enumerated for selected patients. The steps used to derive encounter weights are described below.

The weighting procedure has been developed based on three major factors: (1) the known characteristics of MedicineInsight practices and other data; (2) the estimates that are being produced; and (3) the population-level information that is available.

Encounter weighting

A multi-stage weighting procedure was used to calculate weights.

Stage 1: Initial selection weight

The first step of the weighting procedure was to assign an initial selection weight to included MedicineInsight practices. An initial weight was calculated for each practice site, defined as the inverse of the probability of each practice site being selected at the PHN level. The General Practice population data used for the initial weights is the Health Services Directory as at 30th September 2017.[6]

The initial weight given to each practice site depends on the number of practices at the practice site, and on the number of practices in the PHN, according to the following formula:

$$w_{practice\ site\ i,PHN\ p} = \frac{Npractices_{PHN\ p}}{npractices_{PHN\ p}} \times \frac{1}{npractices_{practice\ site\ i}}$$

In this formula:

- $w_{practice\ site\ i,PHN\ p}$ is the weight of practice site i within PHN p.
- $Npractices_{PHN\ p}$ is the population number of practices within PHN p.
- $npractices_{PHN\ p}$ is the MedicineInsight number of practices in PHN p.
- $npractices_{practice\ site\ i}$ is the number of practices at practice site i.

This stage ensured that any differences in practice representation between PHNs are reflected in the final weights.

Stage 2: Encounter weights: calibration of encounters to benchmarks

An initial encounter weight was first assigned by allocating the initial selection weight for each practice site to all in-scope encounters at the practice site.

The encounter weights were then calibrated so they add to known independent population data, known as 'benchmarks', in designated categories. Weights calibrated against population benchmarks ensure that the GPIR 2017–18 statistics conform to independently known demographic distributions of the encounter population, rather than to the distribution within the MedicineInsight data. Calibration to benchmarks helps to compensate for over- or under-representation of particular categories of encounters, which may occur due to the non-random nature of MedicineInsight practice and patient recruitment.

The benchmark used for encounter weighting was the number of episodes of care with a General Practitioner from the Medicare Benefits Schedule in 2017–18. An episode of care was defined as one or more MBS claims from the same patient in the same day. Medicare claims from the following MBS claim groups were included:

- A1, A2, A5, A6, A7, A11, A14, A15 (subgroup 1 and items 735-758 only), A17, A18, A19, A20, A22, A23, A27, A30. This is equivalent to the Department of Health broad types of service A, B and M, which is the basis for GP attendance services.

The encounter weights were calibrated to the following benchmarks:

- PHN of patient x Age group of patient x Sex
- SEIFA Index of Relative Socio-Economic Advantage and Disadvantage (IRSAD) decile of patient x Age Group of patient x Sex

The age groups used for calibration were: 0–4 years, 5–9, 10–14, 15–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45–49, 50–54, 55–59, 60–64, 65–69, 70–74, 75–79, 80–84, 85 and over.

This weighting procedure ensured that all encounters involving the same patient (at the same practice) are given the same weight.

The encounter weight was applied directly to patient and other tables. That is, the patient weight was the same as one of that patient's encounters. The weight for each prescription and pathology result was then equal to that patient's weight.

Stage 3: Assignment of weights for encounters unable to be calibrated

There were a small number of encounters that were not able to be included in Stage 2:

- Data from patients with a postcode that could not be matched to a PHN or SEIFA IRSAD decile, eg, a Post Office Box postcode, or a missing or incorrectly entered postcode. Data that were unable to be matched to a PHN and SEIFA IRSAD decile could not be included in the calibration process.
- Data from patients with missing age, or with Sex missing or not Male or Female. Population data was only available for Males and Females, and a valid age is also needed for the calibration process.

Encounters from these patients were assigned the practice site weight from Stage 1.

Data excluded from the weighting procedure

The following MedicineInsight data were not included in the weighting procedure and were therefore excluded from the GPIR 2017/18 cohort:

- Data from one practice site where a specific data quality issue was raised following inclusion in the original cohort.
- Data from patients residing in the Western Queensland PHN. There are no MedicineInsight practices from Western Queensland PHN, however there was a small number of patients residing in Western Queensland PHN who had a clinical encounter at a MedicineInsight practice. These patients were removed as the activity of these patients is not an accurate representation of all activity from patients residing in Western Queensland PHN. Including these patients would give them an abnormally large weight.

These exclusions resulted in 8,268 patients and 70,547 clinical encounters being removed – approximately 0.3% of the GPIR 2017–18 cohort.

Limitations of weighting procedure

There is a small mismatch in scope between MedicineInsight encounters and the MBS billing data, for two reasons:

1. The MBS does not cover all patients who are seen by a GP. Specifically, the MBS data do not include services funded by other organisations such as the DVA National Treatment Account, state and territory community-controlled health centres, worker's compensation, and other insurance schemes and services paid in full by a patient who is not eligible for Medicare-funded services, such as international visitors not covered by international reciprocal healthcare agreements.
2. The MBS does not pay GPs for activities that are not face-to-face clinical encounters. This includes telephone encounters and other work that the GP does when the patient is not present, but are still recorded by the CIS as a clinical encounter.

The proportion of MedicineInsight encounters in these non-MBS billable categories has not been investigated thoroughly, as MedicineInsight clinical encounters are not able to be directly linked to MBS bills.

In the first mismatch, BEACH 2015–16 estimated that 97.4% of GP consultations were MBS/DVA billable, leaving 2.6% of encounters not funded by MBS/DVA.

In the second mismatch, A BEACH SAND publication estimated that 12.1% of GP consultations included non-billable time, with rates varying between 11% and 13% depending on the age and sex of the GP, and age of the patient.[40]

These mismatches result in a very slight increase in the size of the weights. Although the size of the weights has increased, all statistics in the GPIR are proportions, rather than totals; and proportions are far less affected by changes in magnitude of weights due to issues such as those described. It is highly unlikely that these issues will have any significant impact on the quality of statistics in this report.

Patient weighting

The patient weight was defined as the same weight as one of the patient's encounters. From a weighting perspective, as all in-scope encounters from MedicineInsight patients are included, it is reasonable for a patient and their encounters to have the same weight.

It was not possible to weight the patient data set to patient-level population data because MedicineInsight data were not recorded at the patient level, but at the patient-by-practice level and data are not collected on the activities of MedicineInsight patients at non-MedicineInsight practices. This means that MedicineInsight patient activity data are not comparable to available population patient activity data such as MBS. Data are unlikely to ever become available on the activities of MedicineInsight patients occurring at non-MedicineInsight practices and no weighting enhancement can address this issue.

Prescriptions and pathology weighting

The encounter weight was also used for prescriptions and pathology results. Prescription and pathology results data were not weighted separately (using prescription and pathology result population data) as suitable population data were not available.

Future weighting enhancements

While the weighting procedure is considered suitable to enable nationally representative statistics to be produced, several possible further enhancements could be made to further improve the representativeness of the MedicineInsight data for future national-level reports.

Weighting for data items with high non-response

Statistics for data items with high rates of non-response could be improved by reweighting those data items specifically using responding units only. This would be especially beneficial if it is suspected that missing data are not random, for example if less healthy or older patients are more likely to have a response than younger patients. The most notable example of this is BMI, which was not recorded for 64.8% of MedicineInsight patients.

APPENDIX 6. ADDITIONAL ANALYSES

Patients by PHN

Primary Health Network	MedicineInsight patients 2017–18 Unweighted		MedicineInsight patients 2017–18, Weighted	National data 2017–18[1]	
	Number	%	%	Number	%
Adelaide	36,419	1.33	4.79	1,090,811	5.05
Australian Capital Territory	63,440	2.32	1.39	355,002	1.64
Brisbane North	74,917	2.74	3.88	868,758	4.02
Brisbane South	135,412	4.95	4.86	1,012,442	4.69
Central and Eastern Sydney	99,518	3.64	3.49	1,297,514	6.01
Central Queensland, Wide Bay, Sunshine Coast	163,422	5.97	6.42	772,372	3.58
Country SA	Suppressed	-	Suppressed	439,651	-
Country WA	106,535	3.89	1.94	439,650	2.04
Darling Downs and West Moreton	41,533	1.52	2.33	510,545	2.36
Eastern Melbourne	120,707	4.41	6.12	1,331,342	6.16
Gippsland	36,248	1.33	1.1	252,752	1.17
Gold Coast	101,608	3.71	2.86	541,955	2.51
Hunter New England and Central Coast	350,876	12.83	4.99	1,133,376	5.25
Murray	74,422	2.72	2.14	551,031	2.55
Murrumbidgee	Suppressed	-	Suppressed	213,626	-
Nepean Blue Mountains	19,760	0.72	1.74	344,687	1.60
North Coast	96,817	3.54	1.9	471,737	2.18
North Western Melbourne	202,149	7.39	7.76	1,493,360	6.91
Northern Queensland	32,280	1.18	2.87	602,325	2.79
Northern Sydney	100,352	3.67	3.73	807,921	3.74
Northern Territory	41,212	1.51	1.02	190,947	0.88
Perth North	115,886	4.24	3.9	929,122	4.30
Perth South	131,198	4.8	3.83	862,061	3.99
South Eastern Melbourne	96,499	3.53	6.25	1,355,977	6.28
South Eastern NSW	95,207	3.48	2.38	550,400	2.55
South Western Sydney	27,973	1.02	5.11	929,351	4.30
Tasmania	179,664	6.57	1.77	459,167	2.13
Western NSW	36,270	1.33	1.16	271,089	1.25
Western Queensland	0	0	0	53,577	0.25
Western Sydney	78,254	2.86	5.13	890,550	4.12
Western Victoria	51,069	1.87	2.25	575,789	2.67
TOTAL	2,735,682	100	100	21,598,887	100

APPENDIX 7: 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 A7.1: 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 original prescriptions (n = 11,968,767)	Percentage of prescriptions without a unique ATC code (n = 1,009,891)
mupirocin	72,696	0.61%	7.20%
hydrocortisone	19,268	0.16%	1.91%
metronidazole	17,054	0.14%	1.69%
bisoprolol fumarate	15,492	0.13%	1.53%
ferric carboxymaltose	15,391	0.13%	1.52%
fluticasone furoate	14,556	0.12%	1.44%
sitagliptin, metformin	13,975	0.12%	1.38%
dutasteride, tamsulosin hydrochloride	13,604	0.11%	1.35%
candesartan cilexetil, hydrochlorothiazide	13,396	0.11%	1.33%
neisseria meningitidis vaccine	12,852	0.11%	1.27%
clotrimazole (antifungal)	12,604	0.11%	1.25%
chloramphenicol (anti-infective eye, skin, gyn)	12,143	0.10%	1.20%
adrenaline (epinephrine)	11,639	0.10%	1.15%
meningococcal vaccine	10,664	0.09%	1.06%
olmesartan	10,648	0.09%	1.05%
azelastine, fluticasone propionate	10,597	0.09%	1.05%
ferrous sulfate, ascorbic acid	9472	0.08%	0.94%
clindamycin	9003	0.08%	0.89%
tiotropium bromide	8829	0.07%	0.87%
dutasteride/tamsulosin	8506	0.07%	0.84%
fluticasone furoate, vilanterol	8304	0.07%	0.82%

APPENDIX 8: NUMBER AND PROPORTION OF PRESCRIPTIONS BY ALL ATC 3 CODES

Table A8.1: Number and proportion (%) of original and total prescriptions for all ATC level 3 classes recorded in MedicineInsight, FY 2017–18 (unweighted data only)

ATC code	Description	Original prescriptions		Total prescriptions	
		N	%	N	%
A01A	Stomatological preparations	4,125	0.0	5,557	0.0
A02A	Antacids	11	0.0	19	0.0
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	651,646	6.0	2,790,759	8.2
A03A	Drugs for functional gastrointestinal disorders	6,850	0.1	15,962	0.1
A03F	Antispasmodics and anticholinergics in combination with other drugs	102,005	0.9	133,508	0.4
A04A	Antiemetics and antinauseants	56,727	0.5	85,528	0.3
A05A	Bile therapy	1,097	0.0	3,300	0.0
A06A	Drugs for constipation	40,474	0.4	160,432	0.5
A07A	Intestinal anti-infectives	11,345	0.1	14,099	0.0
A07B	Intestinal adsorbents	6	0.0	24	0.0
A07D	Antipropulsives	11,415	0.1	25,601	0.1
A07E	Intestinal anti-inflammatory agents	11,062	0.1	56,734	0.2
A07F	Antidiarrheal micro-organisms	7	0.0	7	0.0
A07X	Other antidiarrheals	45	0.0	145	0.0
A08A	Antiobesity preparations, excluding diet products	34,935	0.3	58,317	0.2
A09A	Digestives, including enzymes	<5	0.0	<5	0.0
A10A	Insulins and analogues	59,097	0.5	117,579	0.4
A10B	Blood glucose lowering drugs, excluding insulins	235,093	2.2	1,280,884	3.8
A11C	Vitamin A and D, including combinations of the two	31,582	0.3	69,373	0.2
A11H	Other plain vitamin preparations	373	0.0	1,036	0.0
A12A	Calcium	2,508	0.0	5,829	0.0
A12B	Potassium	14,135	0.1	27,689	0.1
A12C	Other mineral supplements	8,179	0.1	19,519	0.1
A14A	Anabolic steroids	<5	0.0	<5	0.0
A16A	Other alimentary tract and metabolism products	15	0.0	55	0.0
B01A	Antithrombotic agents	250,998	2.3	1,072,706	3.2
B02A	Antifibrinolytics	7,583	0.1	15,471	0.1
B02B	Vitamin K and other haemostatics	110	0.0	191	0.0
B03A	Iron preparations (NB – an additional 15,391 ferric carboxymaltose original prescriptions were identified which had no recorded ATC code)	5,906	0.1	11,402	0.0
B03B	Vitamin B12 and folic acid	55,648	0.5	64,833	0.2
B03X	Other anti-anaemic preparations	149	0.0	856	0.0
B05B	Intravenous solutions	<5	0.0	<5	0.0
B05X	Intravenous solution additives	28	0.0	62	0.0
B06A	Other haematological agents	19	0.0	58	0.0
C01A	Cardiac glycosides	18,543	0.2	35,566	0.1
C01B	Antiarrhythmics, class I and III	10,162	0.1	57,413	0.2
C01C	Cardiac stimulants excluding cardiac glycosides	121	0.0	335	0.0
C01D	Vasodilators used in cardiac diseases	44,391	0.4	239,301	0.7

ATC code	Description	Original prescriptions		Total prescriptions	
		N	%	N	%
C01E	Other cardiac preparations	1,400	0.0	7,437	0.0
C02A	Antiadrenergic agents, centrally acting	23,228	0.2	129,845	0.4
C02C	Antiadrenergic agents, peripherally acting	18,069	0.2	89,999	0.3
C02D	Arteriolar smooth muscle, agents acting on	2,932	0.0	8,176	0.0
C02K	Other antihypertensives	8	0.0	21	0.0
C03A	Low-ceiling diuretics, thiazides	10,751	0.1	19,801	0.1
C03B	Low-ceiling diuretics, excluding thiazides	19,776	0.2	38,587	0.1
C03C	High-ceiling diuretics	92,227	0.8	173,714	0.5
C03D	Potassium-sparing agents	21,940	0.2	107,788	0.3
C03X	Other diuretics	<5	0.0	10	0.0
C04A	Peripheral vasodilators	90	0.0	299	0.0
C05A	Agents for treatment of haemorrhoids and anal fissures for topical use	34,304	0.3	146,289	0.4
C07A	Beta blocking agents	194,182	1.8	1,030,948	3.0
C08C	Selective calcium channel blockers with mainly vascular effects	144,059	1.3	814,313	2.4
C08D	Selective calcium channel blockers with direct cardiac effects	36,580	0.3	207,919	0.6
C08E	Non-selective calcium channel blockers	156	0.0	787	0.0
C09A	ACE inhibitors, plain	232,111	2.1	1,319,073	3.9
C09B	ACE inhibitors, combinations	77,398	0.7	443,158	1.3
C09C	Angiotensin II receptor blockers (ARBs), plain	240,643	2.2	1,373,077	4.0
C09D	Angiotensin II receptor blockers (ARBs), combinations	148,763	1.4	852,036	2.5
C10A	Lipid modifying agents, plain	549,141	5.0	3,300,452	9.7
C10B	Lipid modifying agents, combinations	55,665	0.5	324,934	1.0
D01A	Antifungals for topical use	43,549	0.4	63,672	0.2
D01B	Antifungals for systemic use	7,876	0.1	13,535	0.0
D05A	Antipsoriatics for topical use	14,008	0.1	29,866	0.1
D05B	Antipsoriatics for systemic use	406	0.0	1,105	0.0
D06A	Antibiotics for topical use	17	0.0	29	0.0
D06B	Chemotherapeutics for topical use	16,429	0.2	27,828	0.1
D07A	Corticosteroids, plain	334,922	3.1	598,246	1.8
D07C	Corticosteroids, combinations with antibiotics	34,067	0.3	52,363	0.2
D08A	Antiseptics and disinfectants	80	0.0	141	0.0
D10A	Anti-acne preparations for topical use	4,287	0.0	8,987	0.0
D11A	Other dermatological preparations	8,316	0.1	16,680	0.1
G01A	Anti-infectives and antiseptics, excluding combinations with corticosteroids	3,919	0.0	5,106	0.0
G02A	Uterotonics	<5	0.0	7	0.0
G02C	Other gynaecologicals	21	0.0	118	0.0
G03A	Hormonal contraceptives for systemic use	198,340	1.8	484,249	1.4
G03B	Androgens	4,534	0.0	17,603	0.1
G03C	Oestrogens	94,563	0.9	305,388	0.9
G03D	Progestogens	14,999	0.1	36,740	0.1
G03F	Progestogens and oestrogens in combination	10,374	0.1	46,003	0.1
G03G	Gonadotropins and other ovulation stimulants	57	0.0	154	0.0
G03H	Antiandrogens	31,188	0.3	96,041	0.3
G03X	Other sex hormones and modulators of the genital system	1,474	0.0	8,613	0.0

ATC code	Description	Original prescriptions		Total prescriptions	
		N	%	N	%
G04B	Urologicals	80,469	0.7	336,194	1.0
G04C	Drugs used in benign prostatic hypertrophy (NB – an additional 22,110 dutasteride + tamulosin original prescriptions were identified which had no recorded ATC code)	10,556	0.1	54,683	0.2
H01A	Anterior pituitary lobe hormones and analogues	29	0.0	87	0.0
H01B	Posterior pituitary lobe hormones	746	0.0	3,462	0.0
H01C	Hypothalamic hormones	31	0.0	125	0.0
H02A	Corticosteroids for systemic use, plain	222,380	2.0	425,761	1.3
H03A	Thyroid preparations	126,228	1.2	239,856	0.7
H03B	Antithyroid preparations	5,843	0.1	14,655	0.0
H04A	Glycogenolytic hormones	2,652	0.0	5,010	0.0
H05A	Parathyroid hormones and analogues	85	0.0	481	0.0
H05B	Anti-parathyroid agents	47	0.0	227	0.0
J01A	Tetracyclines	134,986	1.2	323,398	1.0
J01B	Amphenicols	16	0.0	24	0.0
J01C	Beta-lactam antibacterials, penicillins	724,339	6.6	946,099	2.8
J01D	Other beta-lactam antibacterials	351,078	3.2	494,302	1.5
J01E	Sulfonamides and trimethoprim	91,251	0.8	127,264	0.4
J01F	Macrolides, lincosamides and streptogramins	173,014	1.6	250,376	0.7
J01G	Aminoglycoside antibacterials	81	0.0	191	0.0
J01M	Quinolone antibacterials	18,831	0.2	26,736	0.1
J01X	Other antibacterials	14,637	0.1	30,700	0.1
J02A	Antimycotics for systemic use	14,183	0.1	28,479	0.1
J04A	Drugs for treatment of tuberculosis	433	0.0	827	0.0
J04B	Drugs for treatment of lepra	<5	0.0	<5	0.0
J05A	Direct acting antiviral drugs	57,637	0.5	147,999	0.4
J06B	Immunoglobulins	<5	0.0	6	0.0
J07A	Bacterial vaccines (NB – an additional 23,516 meningococcal vaccine original prescriptions were identified which had no recorded ATC code)	32,652	0.3	32,979	0.1
J07B	Viral vaccines	71,603	0.7	95,294	0.3
J07C	Bacterial and viral vaccines	17,156	0.2	17,446	0.1
L01A	Alkylating agents	164	0.0	438	0.0
L01B	Antimetabolites	17,755	0.2	27,350	0.1
L01C	Plant alkaloids and other natural products	25	0.0	27	0.0
L01D	Cytotoxic antibiotics and related substances	<5	0.0	24	0.0
L01X	Other antineoplastic agents	609	0.0	2,062	0.0
L02A	Hormones and related agents	1,344	0.0	2,973	0.0
L02B	Hormone antagonists and related agents	8,807	0.1	50,265	0.2
L03A	Immunostimulants	618	0.0	3,647	0.0
L04A	Immunosuppressants	15,320	0.1	64,955	0.2
M01A	Anti-inflammatory and antirheumatic products, non-steroids	326,647	3.0	830,857	2.5
M01C	Specific antirheumatic agents	90	0.0	233	0.0
M02A	Topical products for joint and muscular pain	2,265	0.0	2,746	0.0
M03B	Muscle relaxants, centrally acting agents	6,308	0.1	26,766	0.1
M03C	Muscle relaxants, directly acting agents	118	0.0	353	0.0
M04A	Antigout preparations	84,193	0.8	263,742	0.8

ATC code	Description	Original prescriptions		Total prescriptions	
		N	%	N	%
M05B	Drugs affecting bone structure and mineralisation	78,470	0.7	114,723	0.3
M09A	Other drugs for disorders of the musculoskeletal system	<5	0.0	<5	0.0
N01A	Anaesthetics, general	46	0.0	97	0.0
N01B	Anaesthetics, local	25	0.0	46	0.0
N02A	Opioids	1,169,391	10.7	1,528,633	4.5
N02B	Other analgesics and antipyretics	81,538	0.7	302,926	0.9
N02C	Antimigraine preparations	48,116	0.4	239,444	0.7
N03A	Antiepileptics	214,281	2.0	942,826	2.8
N04A	Anticholinergic agents	898	0.0	2,292	0.0
N04B	Dopaminergic agents	16,826	0.2	61,927	0.2
N05A	Antipsychotics	186,503	1.7	462,194	1.4
N05B	Anxiolytics	312,752	2.9	340,833	1.0
N05C	Hypnotics and sedatives	290,448	2.7	410,747	1.2
N06A	Antidepressants	718,209	6.6	3,328,204	9.8
N06B	Psychostimulants, agents used for ADHD and nootropics	9,207	0.1	39,629	0.1
N06D	Anti-dementia drugs	9,790	0.1	54,869	0.2
N07A	Parasympathomimetics	224	0.0	1,080	0.0
N07B	Drugs used in addictive disorders	76,119	0.7	115,309	0.3
N07C	Antivertigo preparations	5,300	0.1	12,920	0.0
N07X	Other nervous system drugs	650	0.0	3,600	0.0
P01A	Agents against amoebiasis and other protozoal diseases	28,883	0.3	35,555	0.1
P01B	Antimalarials	7,601	0.1	14,052	0.0
P02B	Antitrematodals	149	0.0	149	0.0
P02C	Antinematodal agents	1,806	0.0	2,374	0.0
P03A	Ectoparasiticides, including scabicides	7,145	0.1	12,006	0.0
R01A	Decongestants and other nasal preparations for topical use	18,816	0.2	43,924	0.1
R01B	Nasal decongestants for systemic use	7,070	0.1	10,042	0.0
R02A	Throat preparations	<5	0.0	<5	0.0
R03A	Adrenergics, inhalants	315,203	2.9	1,543,606	4.6
R03B	Other drugs for obstructive airway diseases, inhalants	79,649	0.7	382,726	1.1
R03C	Adrenergics for systemic use	64	0.0	120	0.0
R03D	Other systemic drugs for obstructive airway diseases	12,079	0.1	54,396	0.2
R05C	Expectorants, excluding combinations with cough suppressants	5,780	0.1	7,138	0.0
R05D	Cough suppressants, excluding combinations with expectorants	22,034	0.2	23,692	0.1
R05F	Cough suppressants and expectorants, combinations	7	0.0	7	0.0
R06A	Antihistamines for systemic use	42,365	0.4	57,994	0.2
S01A	Anti-infectives	61,154	0.6	76,274	0.2
S01B	Anti-inflammatory agents	10,701	0.1	25,157	0.1
S01E	Antiglaucoma preparations and miotics	20,984	0.2	114,456	0.3
S01F	Mydriatics and cycloplegics	40	0.0	78	0.0
S01G	Decongestants and antiallergics	1,189	0.0	3,991	0.0
S01H	Local anaesthetics	<5	0.0	<5	0.0
S01J	Diagnostic agents	<5	0.0	<5	0.0
S01K	Surgical aids	2,460	0.0	14,774	0.0

ATC code	Description	Original prescriptions		Total prescriptions	
		N	%	N	%
S01L	Ocular vascular disorder agents	5	0.0	11	0.0
S02A	Anti-infectives	875	0.0	1,236	0.0
S02C	Corticosteroids and anti-infectives in combination	70,896	0.7	113,252	0.3
S03A	Anti-infectives	3,571	0.0	5,283	0.0
V03A	All other therapeutic products	1,065	0.0	2,945	0.0
V08A	X-ray contrast media, iodinated	<5	0.0	<5	0.0
	Total	10,958,876	100.0	33,957,941	100.0

APPENDIX 9: PBS/RPBS AND PRIVATE PRESCRIPTION BREAKDOWN BY ALL ATC 3 CODES

Table A9.1: Number and proportion (%) of private and PBS subsidised original prescriptions for all ATC level 3 classes recorded in MedicineInsight, FY 2017–18 (unweighted data only)

ATC code	Description	PBS/RPBS		Private	
		N	%	N	%
A01A	Stomatological preparations	12	0.3	4,113	99.7
A02A	Antacids	0	0.0	11	100.0
A02B	Drugs for peptic ulcer and gastro-oesophageal reflux disease (GORD)	642,255	98.6	9,391	1.4
A03A	Drugs for functional gastrointestinal disorders	336	4.9	6,514	95.1
A03F	Antispasmodics and anticholinergics in combination with other drugs	92,735	90.9	9,270	9.1
A04A	Antiemetics and antinauseants	25,456	44.9	31,271	55.1
A05A	Bile therapy	1,030	93.9	67	6.1
A06A	Drugs for constipation	25,074	62.0	15,400	38.1
A07A	Intestinal anti-infectives	3,362	29.6	7,983	70.4
A07B	Intestinal adsorbents	6	100.0	0	0.0
A07D	Antipropulsives	4,084	35.8	7,331	64.2
A07E	Intestinal anti-inflammatory agents	10,604	95.9	458	4.1
A07F	Antidiarrheal micro-organisms	0	0.0	7	100.0
A07X	Other antidiarrheals	0	0.0	45	100.0
A08A	Antiobesity preparations, excluding diet products	23	0.1	34,912	99.9
A09A	Digestives, including enzymes	0	0.0	<5	100.0
A10A	Insulins and analogues	58,752	99.4	345	0.6
A10B	Blood glucose lowering drugs, excluding insulins	229,996	97.8	5,097	2.2
A11C	Vitamin A and D, including combinations of the two	1,118	3.5	30,464	96.5
A11H	Other plain vitamin preparations	9	2.4	364	97.6
A12A	Calcium	105	4.2	2,403	95.8
A12B	Potassium	13,152	93.1	983	7.0
A12C	Other mineral supplements	2,335	28.6	5,844	71.5
A14A	Anabolic steroids	0	0.0	<5	100.0
A16A	Other alimentary tract and metabolism products	<5	20.0	12	80.0
B01A	Antithrombotic agents	227,731	90.7	23,267	9.3
B02A	Antifibrinolytics	7,566	99.8	17	0.2
B02B	Vitamin K and other haemostatics	<5	1.8	108	98.2
B03A	Iron preparations	2,771	46.9	3,135	53.1
B03B	Vitamin B12 and folic acid	42,146	75.7	13,502	24.3
B03X	Other antianaemic preparations	142	95.3	7	4.7
B05B	Intravenous solutions	0	0.0	<5	100.0
B05X	Intravenous solution additives	0	0.0	28	100.0
B06A	Other haematological agents	5	26.3	14	73.7
C01A	Cardiac glycosides	18,529	99.9	14	0.1
C01B	Antiarrhythmics, class I and III	10,006	98.5	156	1.5
C01C	Cardiac stimulants excluding cardiac glycosides	0	0.0	121	100.0
C01D	Vasodilators used in cardiac diseases	44,293	99.8	98	0.2
C01E	Other cardiac preparations	1,087	77.6	313	22.4

ATC code	Description	PBS/RPBS		Private	
		N	%	N	%
C02A	Antiadrenergic agents, centrally acting	23,154	99.7	74	0.3
C02C	Antiadrenergic agents, peripherally acting	17,941	99.3	128	0.7
C02D	Arteriolar smooth muscle, agents acting on	2,928	99.9	<5	0.1
C02K	Other antihypertensives	<5	50.0	<5	50.0
C03A	Low-ceiling diuretics, thiazides	10,730	99.8	21	0.2
C03B	Low-ceiling diuretics, excluding thiazides	19,503	98.6	273	1.4
C03C	High-ceiling diuretics	89,604	97.2	2,623	2.8
C03D	Potassium-sparing agents	21,257	96.9	683	3.1
C03X	Other diuretics	0	0.0	<5	100.0
C04A	Peripheral vasodilators	25	27.8	65	72.2
C05A	Agents for treatment of haemorrhoids and anal fissures for topical use	27,378	79.8	6,926	20.2
C07A	Beta blocking agents	193,429	99.6	753	0.4
C08C	Selective calcium channel blockers with mainly vascular effects	143,822	99.8	237	0.2
C08D	Selective calcium channel blockers with direct cardiac effects	35,605	97.3	975	2.7
C08E	Non-selective calcium channel blockers	155	99.4	<5	0.6
C09A	ACE inhibitors, plain	231,276	99.6	835	0.4
C09B	ACE inhibitors, combinations	77,248	99.8	150	0.2
C09C	Angiotensin II receptor blockers (ARBs), plain	240,156	99.8	487	0.2
C09D	Angiotensin II receptor blockers (ARBs), combinations	148,373	99.7	390	0.3
C10A	Lipid modifying agents, plain	545,446	99.3	3,695	0.7
C10B	Lipid modifying agents, combinations	55,503	99.7	162	0.3
D01A	Antifungals for topical use	1,331	3.1	42,218	96.9
D01B	Antifungals for systemic use	3,083	39.1	4,793	60.9
D05A	Antipsoriatics for topical use	12,848	91.7	1,160	8.3
D05B	Antipsoriatics for systemic use	399	98.3	7	1.7
D06A	Antibiotics for topical use	0	0.0	17	100.0
D06B	Chemotherapeutics for topical use	4,995	30.4	11,434	69.6
D07A	Corticosteroids, plain	256,834	76.7	78,088	23.3
D07C	Corticosteroids, combinations with antibiotics	17,080	50.1	16,987	49.9
D08A	Antiseptics and disinfectants	25	31.3	55	68.8
D10A	Anti-acne preparations for topical use	6	0.1	4,281	99.9
D11A	Other dermatological preparations	4,798	57.7	3,518	42.3
G01A	Antiinfectives and antiseptics, excluding combinations with corticosteroids	10	0.3	3,909	99.7
G02A	Uterotonics	0	0.0	<5	100.0
G02C	Other gynaecologicals	21	100.0	0	0.0
G03A	Hormonal contraceptives for systemic use	162,943	82.2	35,397	17.9
G03B	Androgens	2,489	54.9	2,045	45.1
G03C	Oestrogens	76,814	81.2	17,749	18.8
G03D	Progestogens	12,401	82.7	2,598	17.3
G03F	Progestogens and oestrogens in combination	1,617	15.6	8,757	84.4
G03G	Gonadotropins and other ovulation stimulants	42	73.7	15	26.3
G03H	Antiandrogens	738	2.4	30,450	97.6
G03X	Other sex hormones and modulators of the genital system	1,377	93.4	97	6.6
G04B	Urologicals	14,062	17.5	66,407	82.5

ATC code	Description	PBS/RPBS		Private	
		N	%	N	%
G04C	Drugs used in benign prostatic hypertrophy	1,660	15.7	8,896	84.3
H01A	Anterior pituitary lobe hormones and analogues	6	20.7	23	79.3
H01B	Posterior pituitary lobe hormones	673	90.2	73	9.8
H01C	Hypothalamic hormones	24	77.4	7	22.6
H02A	Corticosteroids for systemic use, plain	220,032	98.9	2,348	1.1
H03A	Thyroid preparations	120,860	95.8	5,368	4.3
H03B	Antithyroid preparations	5,830	99.8	13	0.2
H04A	Glycogenolytic hormones	2,648	99.9	<5	0.2
H05A	Parathyroid hormones and analogues	78	91.8	7	8.2
H05B	Anti-parathyroid agents	<5	6.4	44	93.6
J01A	Tetracyclines	118,174	87.6	16,812	12.5
J01B	Amphenicols	0	0.0	16	100.0
J01C	Beta-lactam antibacterials, penicillins	715,228	98.7	9,111	1.3
J01D	Other beta-lactam antibacterials	349,068	99.4	2,010	0.6
J01E	Sulfonamides and trimethoprim	90,681	99.4	570	0.6
J01F	Macrolides, lincosamides and streptogramins	155,209	89.7	17,805	10.3
J01G	Aminoglycoside antibacterials	73	90.1	8	9.9
J01M	Quinolone antibacterials	10,484	55.7	8,347	44.3
J01X	Other antibacterials	14,338	98.0	299	2.0
J02A	Antimycotics for systemic use	4,718	33.3	9,465	66.7
J04A	Drugs for treatment of tuberculosis	231	53.4	202	46.7
J04B	Drugs for treatment of lepra	0	0.0	<5	100.0
J05A	Direct acting antiviral drugs	35,382	61.4	22,255	38.6
J06B	Immunoglobulins	0	0.0	<5	100.0
J07A	Bacterial vaccines	1,042	3.2	31,610	96.8
J07B	Viral vaccines	67	0.1	71,536	99.9
J07C	Bacterial and viral vaccines	47	0.3	17,109	99.7
L01A	Alkylating agents	164	100.0	0	0.0
L01B	Antimetabolites	2,454	13.8	15,301	86.2
L01C	Plant alkaloids and other natural products	21	84.0	<5	16.0
L01D	Cytotoxic antibiotics and related substances	<5	100.0	0	0.0
L01X	Other antineoplastic agents	544	89.3	65	10.7
L02A	Hormones and related agents	1,330	99.0	14	1.0
L02B	Hormone antagonists and related agents	8,642	98.1	165	1.9
L03A	Immunostimulants	610	98.7	8	1.3
L04A	Immunosuppressants	15,061	98.3	259	1.7
M01A	Anti-inflammatory and antirheumatic products, non-steroids	297,259	91.0	29,388	9.0
M01C	Specific antirheumatic agents	90	100.0	0	0.0
M02A	Topical products for joint and muscular pain	79	3.5	2,186	96.5
M03B	Muscle relaxants, centrally acting agents	6,262	99.3	46	0.7
M03C	Muscle relaxants, directly acting agents	117	99.2	<5	0.9
M04A	Antigout preparations	83,378	99.0	815	1.0
M05B	Drugs affecting bone structure and mineralisation	76,649	97.7	1,821	2.3
M09A	Other drugs for disorders of the musculo-skeletal system	0	0.0	<5	100.0

ATC code	Description	PBS/RPBS		Private	
		N	%	N	%
N01A	Anaesthetics, general	0	0.0	46	100.0
N01B	Anaesthetics, local	0	0.0	25	100.0
N02A	Opioids	1,032,107	88.3	137,284	11.7
N02B	Other analgesics and antipyretics	49,009	60.1	32,529	39.9
N02C	Antimigraine preparations	45,431	94.4	2,685	5.6
N03A	Antiepileptics	192,656	89.9	21,625	10.1
N04A	Anticholinergic agents	893	99.4	5	0.6
N04B	Dopaminergic agents	16,087	95.6	739	4.4
N05A	Antipsychotics	165,306	88.6	21,197	11.4
N05B	Anxiolytics	271,156	86.7	41,596	13.3
N05C	Hypnotics and sedatives	176,318	60.7	114,130	39.3
N06A	Antidepressants	697,939	97.2	20,270	2.8
N06B	Psychostimulants, agents used for ADHD and nootropics	7,723	83.9	1,484	16.1
N06D	Anti-dementia drugs	9,308	95.1	482	4.9
N07A	Parasympathomimetics	222	99.1	<5	0.9
N07B	Drugs used in addictive disorders	59,261	77.9	16,858	22.2
N07C	Antivertigo preparations	66	1.3	5,234	98.8
N07X	Other nervous system drugs	559	86.0	91	14.0
P01A	Agents against amoebiasis and other protozoal diseases	28,383	98.3	500	1.7
P01B	Antimalarials	4,015	52.8	3,586	47.2
P02B	Antitrematodals	124	83.2	25	16.8
P02C	Antinematodal agents	257	14.2	1,549	85.8
P03A	Ectoparasiticides, including scabicides	5,759	80.6	1,386	19.4
R01A	Decongestants and other nasal preparations for topical use	968	5.1	17,848	94.9
R01B	Nasal decongestants for systemic use	9	0.1	7,061	99.9
R02A	Throat preparations	0	0.0	<5	100.0
R03A	Adrenergics, inhalants	310,723	98.6	4,480	1.4
R03B	Other drugs for obstructive airway diseases, inhalants	78,985	99.2	664	0.8
R03C	Adrenergics for systemic use	14	21.9	50	78.1
R03D	Other systemic drugs for obstructive airway diseases	7,251	60.0	4,828	40.0
R05C	Expectorants, excluding combinations with cough suppressants	62	1.1	5,718	98.9
R05D	Cough suppressants, excluding combinations with expectorants	17,601	79.9	4,433	20.1
R05F	Cough suppressants and expectorants, combinations	0	0.0	7	100.0
R06A	Antihistamines for systemic use	4,042	9.5	38,323	90.5
S01A	Anti-infectives	16,024	26.2	45,130	73.8
S01B	Anti-inflammatory agents	10,416	97.3	285	2.7
S01E	Antiglaucoma preparations and miotics	20,716	98.7	268	1.3
S01F	Mydriatics and cycloplegics	7	17.5	33	82.5
S01G	Decongestants and antiallergics	752	63.3	437	36.8
S01H	Local anaesthetics	0	0.0	<5	100.0
S01J	Diagnostic agents	0	0.0	<5	100.0
S01K	Surgical aids	2,404	97.7	56	2.3
S01L	Ocular vascular disorder agents	<5	40.0	<5	60.0
S02A	Anti-infectives	81	9.3	794	90.7

ATC code	Description	PBS/RPBS		Private	
		N	%	N	%
S02C	Corticosteroids and anti-infectives in combination	60,997	86.0	9,899	14.0
S03A	Anti-infectives	3,330	93.3	241	6.8
V03A	All other therapeutic products	1,028	96.5	37	3.5
V08A	X-ray contrast media, iodinated	0	0.0	<5	100.0

APPENDIX 10. 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.
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.
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.	
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.

Term	Definition	Description
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	
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	Medical Director 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 Indices for Areas	An indication of the relative socio-economic wellbeing of an area. Calculated by ABS index of relative socio-economic advantage and disadvantage.
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.
UEC	urea electrolytes and creatinine	This test is a measure of kidney function.
URTI	upper respiratory tract infection	

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