Trends in Medication Use 2016-2021

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Contents

1   Introduction

This report presents the trends in medication use and depression diagnosis among Australian residential aged care services from 2016 to 2021. The report will show how medication use differs by state, acuity level, and changes over time.

2   Method

Data for 754 Australian residential services consisting of 80,264 monthly quality indicator counts were extracted from the MOA database for the period February 2016 (the earliest available under current definitions) to June 2021 and prepared for analysis. Preliminary data cleaning involved three key steps. First, implausible zero values which were likely to represent missing data were removed (1,449 counts removed). For example, a prevalence of zero for the diagnosis of depression in a service with 10 or more occupied beds. Second, some of the data were excluded based on unreasonable bed count, from before data entry validation rules were improved (31 counts removed). Finally, the counts for depression and antidepressant use were both excluded when either was missing for a service month (4,652 counts removed).

To account for differences in the mix of services in earlier periods compared to 2021 the data were standardised according to state and acuity (as defined by MOA Benchmarking groups using ACFI) in 2021. The benchmarking groups are consistent with MOA's Standard QI reports, i.e., the benchmarking group is determined from the percentage of care recipients with an ACFI classification of High Care in the service: B1 (<70%), B2 (70%-80%), B3 (80-95%), B4 (>95%). The diagnosis of depression prevalence is primarily included to allow comparisons with antidepressant medication use. Throughout this report polypharmacy will refer to nine or more medications (as per the MOA quality definition) however we recognise other conventions are common.

Combinations of state and benchmarking group with fewer than 250 observations over a benchmarking period were imputed using the benchmarking group across all states. Two sensitivity analyses were conducted: dropping missing values instead of using imputation; dropping services that didn't have data in both 2016 and 2021.

The equation used for calculating the standardised prevalence of quality indicator i and benchmarking period j is given below. The specifics can be be skipped without loss of understanding, but it has been included for the sake of completeness.

The prevalence is determined according to the formula:

$$\text{Prevalence}_{ij} = \Sigma_{s \in S,\ b \in B} w_{ijsb} \times P_{ijsb}$$

Where $i \in \{\text{Antidepressant}, \text{Antianxety}, ...\}$,
$j \in \{..., \text{July 2020 to Jun 2021}\}$,
$S = \{\text{NSW}, \text{VIC}, ...\}$,
$B = \{B1, B2, B3, B4\}$,
w_{ijsb} is the proportion of data for quality indicator i and period j which is a combination of state s and benchmark group b, and
P_{ijsb} is the prevalence of indicator i in period j for the combination of state s and benchmarking group b.

An equality of proportions test was conducted on each indicator comparing the standardised prevalence in the first and last year studied.
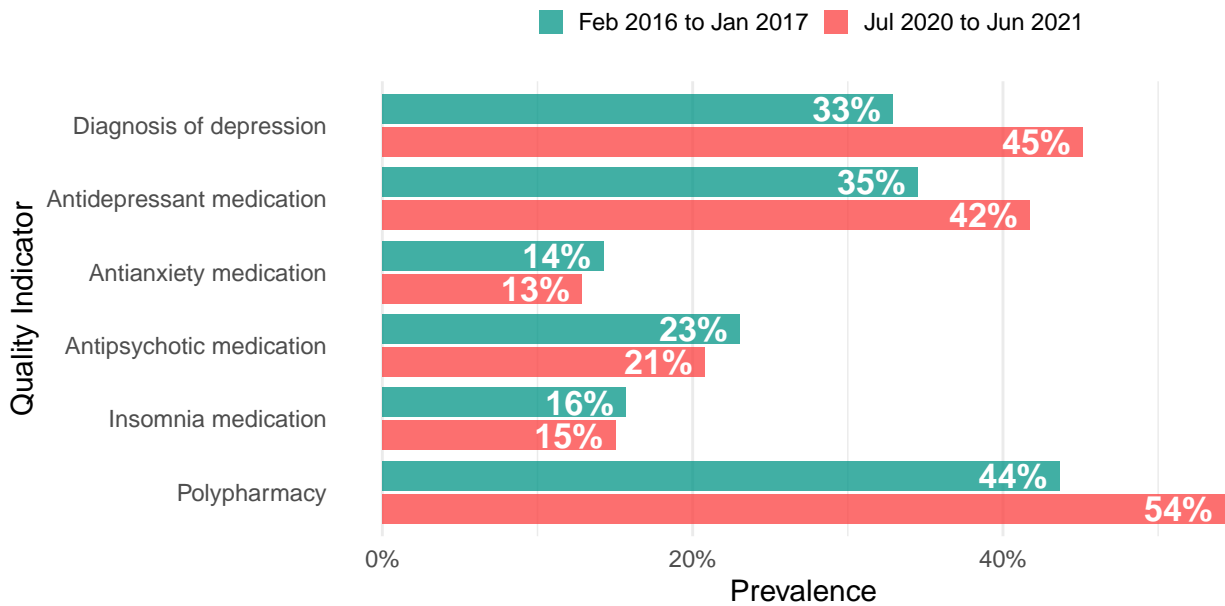
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Figure 1: Prevalence of the studied quality indicators standardised by state and benchmarking group during February 2016 to January 2017 and July 2020 to June 2021.

Quality Indicator	Prevalence 2016	Prevalence 2021	N 2016	N 2021	p value
Polypharmacy	43.6%	54.3%	12744	22803	<.001
Insomnia medication	15.7%	15.0%	10952	17341	.111
Antipsychotic medication	23.1%	20.8%	11853	23664	<.001
Antianxiety medication	14.2%	12.9%	11564	20889	<.001
Antidepressant medication	34.5%	41.7%	8827	18609	<.001
Diagnosis of depression	32.9%	45.2%	8827	18609	<.001

Table 1: Test for equality of proportions between prevalence in the first and last year. Sample size is set as the average number of consumers considered for the quality indicator in each month.

The standardised prevalence for each indicator in the first and last 12 months of the study period are shown in Figure 1. The standardised prevalence for the most recent year is identical to the unadjusted prevalence, because the most recent year was used for standardising the prevalence in each year. The test for equality of proportions using prevalence in the first and last year is shown in Table 1. The figure and table show that polypharmacy (p < .001), diagnosis of depression (p < .001), and antidepressant (p < .001) medication prevalence are higher in 2021 than they were in 2016. In contrast, the observed use of antianxiety (p < .001), antipsychotic (p < .001), and Insomnia (p = .111) medications declined slightly.
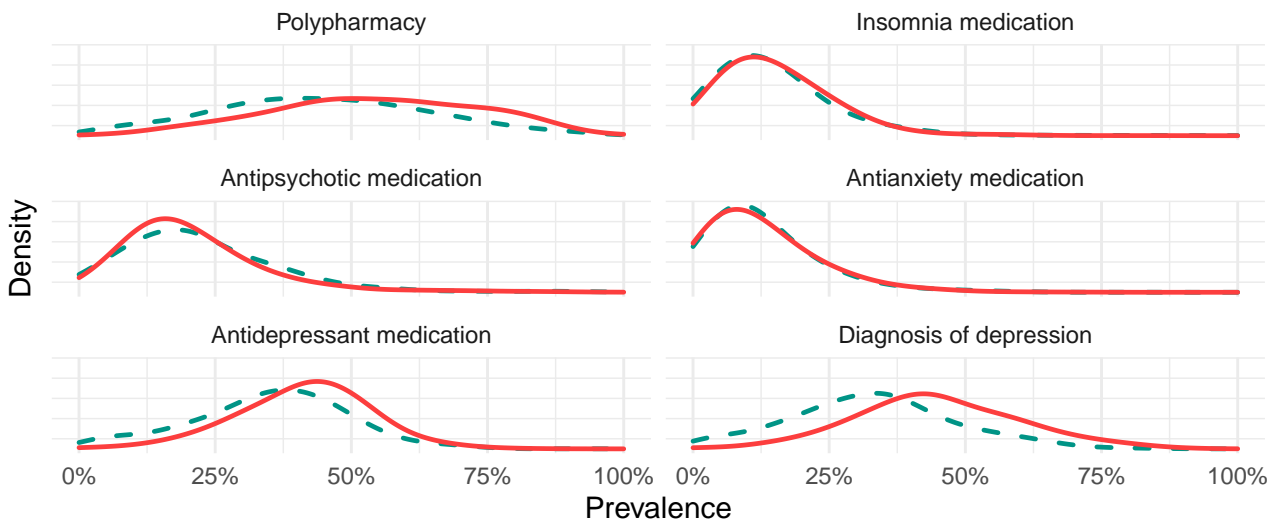
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Figure 2: Distributions of site month prevalence of the studied quality indicators during February 2016 to January 2017 and July 2020 to June 2021.

Quality Indicator	Median 2016	Median 2021	IQR 2016	IQR 2021	SD 2016	SD 2021
Polypharmacy	44%	54%	28%	28%	20%	19%
Insomnia medication	12%	13%	12%	13%	11%	10%
Antipsychotic medication	20%	18%	17%	14%	15%	13%
Antianxiety medication	11%	10%	11%	12%	10%	10%
Antidepressant medication	36%	42%	17%	16%	14%	12%
Diagnosis of depression	33%	44%	19%	20%	15%	15%

Table 2: Summary statistics for prevalence of the studied quality indicators during February 2016 to January 2017 and July 2020 to June 2021.

The distribution of site month prevalence for each quality indicator during the first and last year studied are visualised in Figure 2. The data do not show significant differences between 2016 and 2021 for the use of insomnia or antianxiety medications. Prevalence of depression, insomnia medications, antianxiety medications, and polypharmacy appear to have similar variation in 2021, this is supported by the interquartile range (IQR) and standard deviation (SD) in Table 2. Antidepressants and antipsychotics use appear to have a marginally lower variation across services in both periods, which is reflected in the SD and IQR.

The distributions also shows the most common prevalence reported (mode) by the location of the peak. The median is the "middle" prevalence and can be found by considering the vertical line which splits the curve into equal areas (under the curve). For example, in 2021 polypharmacy appears to have a mode just below 50% while the median is higher (54%). Note that the benchmark cannot be estimated from the density charts because the sample size for each prevalence is not shown (the benchmark calculation weights the data based on the number of residents in each home).
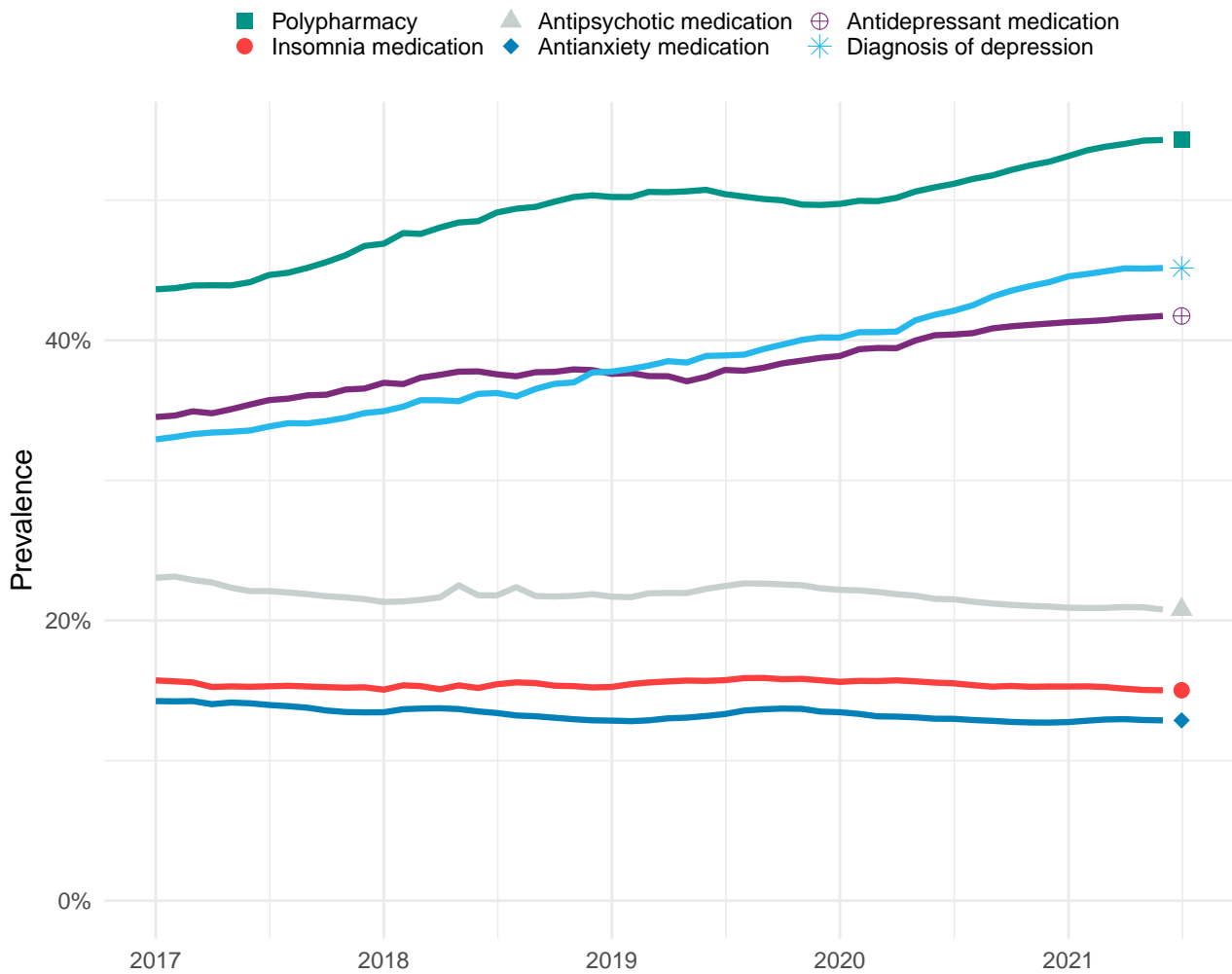
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Figure 3: Standardised 12 month prevalence of the studied quality indicators plotted over time, i.e., the first plotted prevalence is calculated from February 2016 to January 2017 and is plotted above January 2017.

The average prevalence was calculated using a 12-month moving average for each QI and is shown in Figure 3. To account for changes in the composition of homes with respect to location and acuity (ACFI levels), data were standardised using 2021 data. The lines show the prevalence of each quality indicator for the 12 months leading up to the plotted point.

The prevalence of antipsychotic medication use, insomnia medication use, and antianxiety medication use show a modest trend downwards. Polypharmacy, diagnosis of depression and antidepressant medication use all increased from 2016 to 2021.

Dropping missing values instead of imputing produced similar results. Dropping services that didn't have data available in both 2016 and 2021 also produced a similar trend, but with greater variation due to a smaller sample size.
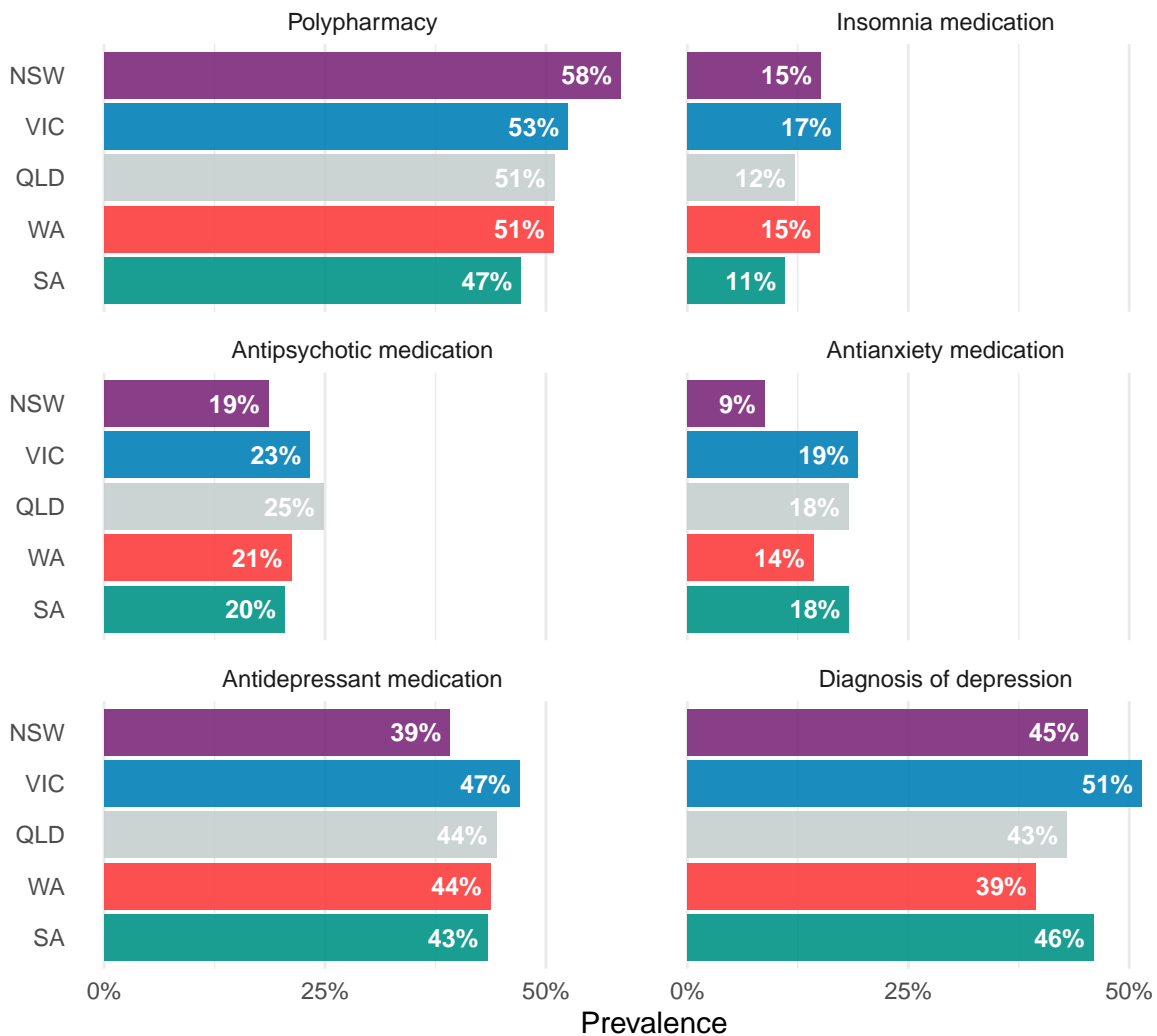
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Figure 4: Prevalence of the studied quality indicators by state during July 2020 to June 2021. States with 150 or more service months are shown.

3   Current differences in medication use

Bar charts of the indicators stratified by state are shown in Figure 4. The state-stratified prevalence for each quality indicator are the sum of counts divided by the sum of beds calculated separately for each state using the 12 month period leading up to and including June 2021.

In 2020-2021 MOA members in New South Wales (NSW), Queensland (QLD), and South Australia (SA) had a similar depression prevalence, whereas Victoria (VIC) had a higher prevalence and Western Australia (WA) had a lower prevalence. In comparison, AIHW found that in 2008-2012 the prevalence of depression in residential aged care in NSW, VIC, and QLD was similar while SA had a higher prevalence and WA had a lower prevalence [1]. Use of

antianxiety, antidepressant, and antipsychotic medication in NSW trails the other states, while insomnia medication use is similar. Polypharmacy on the other hand is highest in NSW and lowest in SA.
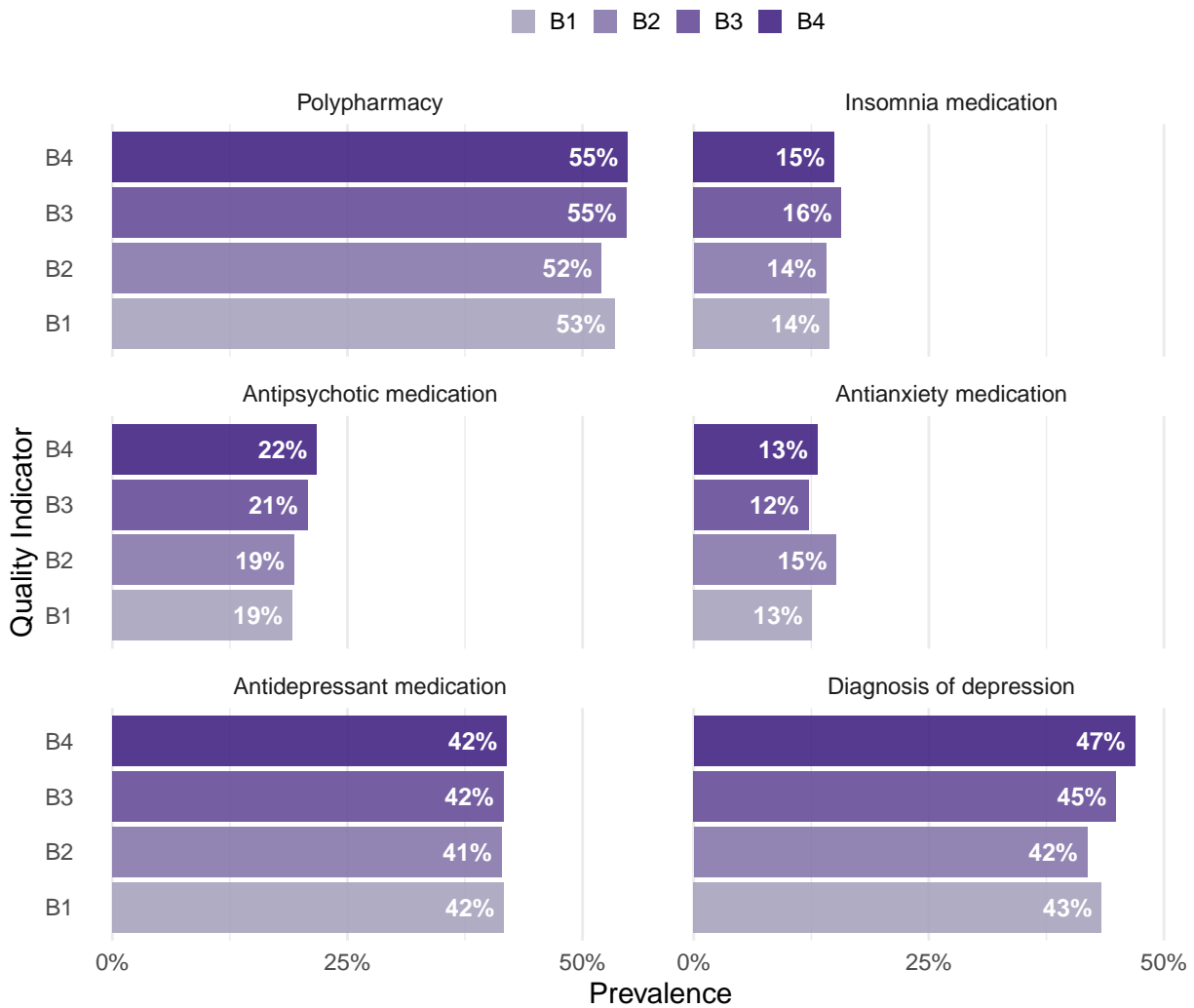
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Figure 5: Prevalence of the studied quality indicators by benchmarking group during July 2020 to June 2021.

Figure 5 shows the prevalence of each indicator stratified by average acuity. Diagnosis of depression is differentiated the most by average acuity as might be expected based on the correlation between dementia and depression [2]. Antipsychotic medication use and polypharmacy also appear to be associated with level of care, whereas the other quality indicators show fairly minor differences. Differences across benchmarking groups were smaller than differences seen between States.

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4 Discussion

The use of antipsychotics, insomnia, and antianxiety medications have decreased modestly through the study period. This could be a consequence of greater focus on non-pharmaceutical treatment. The distribution for antipsychotic medication in 2021 has a narrower tail in Figure 2. The mechanisms for this are not clear, however one possibility is that services may have improved the management of antipsychotic medication use. Alternatively, lower variation may also be explained by other factors such as sample size (i.e., larger services), MOA member characteristics or improvements to data quality. However, the changes in the use of antipsychotic, insomnia, and antianxiety medications are small, and potentially not of clinical significance.

We observed a steeper increase in the diagnosis of depression around 2020 seen in Figure 3. It's possible that this may reflect some impact of the COVID-19 pandemic, however we also noted that the monthly prevalence stratified by state and benchmarking group showed that the trend started prior to the pandemic. As expected, the proportion of residents diagnosed with depression was tightly correlated with the proportion of residents receiving anti-depressants. In more recent periods however, the diagnosis of depression appears to have increased more quickly than the use of anti-depressants. The relatively smaller increase in antidepressant medication use, compared to depression diagnosis, indicates that either a lower proportion of consumers use antidepressant medication pro re nata (PRN) or that a lower proportion of consumers diagnosed with depression are being treated with antidepressant medication. Unfortunately, we do not have the data needed to determine the reason for this trend. However, these data suggest that, on average, at least 3% of those with a diagnosis of depression were not being treated with medication during July 2020 to June 2021.

5 Conclusion

These data show an increase in the average prevalence of depression in Australian residential aged care between 2016 and 2021. Use of depression medication has also increased, but at a slower pace. Other psychotropic medication use experienced small declines. Despite this, polypharmacy has increased, but with greater variation among homes than other quality indicators.

References

[1] Australian Institute of Health and Welfare. *Depression in residential aged care 2008-2012*. 2013.

[2] Mark B Snowden et al. "Longitudinal association of dementia and depression". In: *The American Journal of Geriatric Psychiatry* 23.9 (2015), pp. 897–905.

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