2018–2019 ANNUAL EVALUATION REPORT

NPS MEDICINEWISE

ANNUAL EVALUATION REPORT

Evaluation report

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FOREWORD

It is with pleasure that I present this 22nd NPS MedicineWise Annual Evaluation Report to you. NPS MedicineWise continues to commit to evaluating the impact of its work on the quality use of medicines and medical tests by health professionals and consumers. Our evaluations inform our work to improve our services, products, and ultimately our impact.

This report demonstrates that seven quality use of medicines education programs saved the Pharmaceutical Benefits Scheme (PBS) $69,932,365, including programs addressing antibiotics, asthma, blood pressure, proton pump inhibitors (PPIs), opioids, depression and type 2 diabetes. A further $21,565,401 was estimated to be saved for the Medicare Benefits Schedule (MBS) from our program addressing the inappropriate use of computed tomography (CT) scans and ultrasounds in the investigation of non-specific abdominal pain. Our cost benefit analysis of the chronic pain program found that for every dollar spent on the program, $3.67 was gained in monetary benefit.

Our evaluation of more recent programs found significant changes in general practitioners' knowledge and practice as a consequence of programs addressing statins, neuropathic pain and PPIs. Choosing Wisely messages were also part of the neuropathic pain and PPI programs and the evaluation of the Choosing Wisely Australia's fourth year showed that it is beginning to have an influence on health policy and clinicians' practice in hospitals.

Australian Prescriber podcasts are being well received and several useful recommendations have been made by those who responded to the evaluation which will be addressed going forward.

Measuring adherence is challenging and we used the 10% PBS sample to examine patient adherence to metformin. While we were not able to measure an improvement in adherence based on this program, NPS MedicineWise is committed to addressing consumer needs and patient outcomes in our quality use of medicines and diagnostics programs.

As always, this Evaluation Report will inform our continuous improvement and innovation at NPS MedicineWise. In the future, NPS MedicineWise will continue to explore and refine our approaches to identify interventions, methodologies, and opportunities which have the greatest impact on quality use of medicines and tests, and patient outcomes, thus enabling us to fulfil our role as stewards for quality use of medicines and tests in Australia.

Steve Morris

CEO

ABOUT THIS REPORT

The Annual Evaluation Report for 2018-2019 includes the findings from program and product evaluations that were concluded and/or reported within this financial year period, irrespective of when the program or product was launched.

Table 1 outlines the evaluations included in this report together with the Australian Government Department of Health grant activity performance indicator they address.

TABLE 1: EVALUATIONS CONDUCTED/REPORTED IN 2018-19 AND INCLUDED IN THIS REPORT

Description	Programs included (launch year)	Grant activity performance indicator
PBS cost savings	Reducing antibiotic resistance (2014; initial launch 2012) Exploring inhaled medicines use and asthma control (2014) Blood pressure: Measure, manage and monitor (2015) Proton pump inhibitors: Too much of a good thing (2015) Chronic pain: Opioids and beyond (2015) Depression: Re-examining the options (2016) Type 2 diabetes: What's next after metformin? (2016)	PBS savings of $315m from 2015-16 to December 2019 (annual milestone of $70m)
MBS cost savings	Imaging for abdominal pain (2015)	MBS savings of $58.5m from 2015-16 to December 2019 (annual milestone of $13m)
Economic evaluation	Chronic pain: Opioids and beyond (2015)	Positive economic evaluation using substantiated cost-benefit analysis result for one therapeutic area per annum
Consumer adherence	Type 2 diabetes: What's next after metformin? (2016)	Savings or cost-effectiveness attributable to improved adherence as a result of NPS MedicineWise interventions
Program evaluation	Statins: Optimising therapy, addressing intolerance (2017) Neuropathic pain: Touchpoints for effective diagnosis and management (2018) Starting, stepping down and stopping medicines (2018)	Demonstrate impact of NPS MedicineWise programs on target audiences. Note; these survey results indicate short-intermediate term impact on attitudes, knowledge and practice of target audiences and inform the longer-term impacts on PBS/MBS activity and expenditure.
Product evaluation	Australian Prescriber Podcast (2017)	NPS MedicineWise must deliver Australian Prescriber…NPS MedicineWise must investigate new delivery methods and models to meet contemporary audience needs and to leverage new technologies and digital media channels
Program evaluation	Choosing Wisely Australia – The fourth year (2018-19)	Promote discussion and identification of unnecessary testing and interventions by opinion leaders and reduce use of low value tests (coordination of Choosing Wisely Australia)

A substantial amount of time between the launch of a program or product and the implementation of impact evaluation is required in order to reliably assess short-intermediate term behaviour change in

target audiences. If an evaluation was conducted too soon after participation in an intervention, we would only be able to measure changes in knowledge and 'intention to change behaviour' as opposed to 'actual reported behaviour change'.

For example, general practitioner (GP) surveys for educational programs at NPS MedicineWise are conducted, at a minimum, 6 months after program launch to allow sufficient time for GPs to have participated in program interventions, understand and reflect on the key messages and practice changes required of them and to have the opportunity within their practice to enact these changes with relevant patients. Additional time is then required for survey data to be received, processed, analysed and reported in a comprehensive evaluation report.

For outcomes evaluation, we use interrupted time series analysis as the gold standard approach for assessing impact and modelling cost savings to the PBS and MBS. Interrupted time series modelling can only be conducted once there are at least 24 months of PBS or MBS data available prior to the launch of a program and at least 12-18 months of PBS or MBS data available after the completion of the program, including visiting and small group case-based activities, as recommended in the literature to allow calculations for between-season comparisons. Typically, PBS and MBS data are provided with a 6-8 month time lag (ie data to end of June 2019 may not be available until February 2020), and this also impacts evaluation timelines. In consideration of these factors, we evaluate 5-10 previous programs for PBS cost savings for up to five years per report, and 1-2 previous programs for MBS cost savings, for up to three years per report.

The selection of programs for evaluation, and the appropriate methodology for analysis, also includes consideration of:

- The expected size of initial program impact
- Environmental changes in relation to the topic or recommendations of the program
- The strength of the recommendations of the program, and whether it was a new or reinforcing topic or set of activities
- The expected natural decay in the effect of a program to changes of prescribing behaviour.

EXECUTIVE SUMMARY

Overall impact of NPS MedicineWise on the quality use of medicines and medical tests in Australia

- Our economic evaluations confirm the value of NPS MedicineWise programs, with cost savings to the PBS and MBS, and positive cost benefits to the Australian Government Department of Health.
- We found improved GP knowledge and behaviour after we delivered educational programs on statins, neuropathic pain and PPI medicines.
- We have explored medicines adherence for people with diabetes who are prescribed metformin, using the 10% PBS data sample.
- We have provided important and valued services to health professionals and consumers with the Australian Prescriber podcast and the Choosing Wisely Australia program.

Financial impact

- NPS MedicineWise receives funding from the Australian Government Department of Health to deliver quality use of medicines (QUM) and quality use of diagnostics (QUD) programs that reduce government expenditure on PBS and MBS subsidies.
- NPS MedicineWise applied interrupted time series analysis, the gold standard approach for assessing impact and modelling of the financial impact of QUM and QUD programs, to the PBS and MBS. We analysed historical trends in the dispensing of government-subsidised medicines and provision of diagnostic imaging procedures and projected what the use of these medicines or tests would have been had the NPS MedicineWise programs not taken place. We then estimated the number of prescriptions or tests expected to have been averted by each program and estimated the amount of expenditure saved, based on the average government subsidy.
- We analysed the financial impact of seven different NPS MedicineWise QUM programs implemented between July 2014 and June 2018, including programs addressing antibiotics, asthma, blood pressure, proton pump inhibitors, opioids, depression and type 2 diabetes. Based on an analysis of PBS subsidy data provided by Services Australia, expenditure was estimated to have been reduced by a total of $69.93 million during the 2017–18 financial year.
- Estimated savings to the MBS from the 2015 program, which aimed to reduce the inappropriate use of computed tomography (CT) scans and ultrasounds in the investigation of non-specific abdominal pain, were $21.5 million due to reduced use of abdominal ultrasounds and CT scans. We did not see a significant increase in the estimated volume of abdominal X-rays, which were not the focus of the program messaging and activities, and suggested that GPs were not switching imaging modalities as a result of the NPS MedicineWise program.
- The economic evaluation of the 2015 *Chronic Pain: Opioids and beyond* program, using population-level PBS data, and a cost-benefit analysis of the interactive components of the program at the GP practice level using data from the MedicineInsight program, found economic benefits in terms of reducing costs to the PBS and a positive impact on the behaviour of GPs who participated in the interactive components of the program. The net benefit of the program was $8.8 million, calculated by the difference in the estimated savings from changing opioid dispensing patterns for the PBS and the estimated costs of the program. The benefit to cost ratio was 3.67, indicating that for every dollar spent on the program, $3.67 was gained in monetary benefit. The MedicineInsight analysis revealed the additional benefit of the interactive components of the Chronic Pain program on the outcomes investigated. The total program cost per GP was $435.67 as at June 2017, inclusive of visiting costs per GP of $256.75. The net benefit per GP can be conservatively estimated as $1,881.63, calculated by the difference in savings from changing opioid prescribing and encounter behaviour and the estimated benefit attributable. The benefit to cost ratio was calculated as 5.32, indicating that for every dollar spent on the program, $5.32 was gained in monetary benefit to the payer, the Australian Government Department of Health. This evaluation highlights the value of multimodal programs to improve clinical practice when the quality use of medicine issues are complex and multifaceted.

Impacts on GP practice

- The 2017 program *Statins: Optimising therapy, addressing intolerance* produced a significant increase in the proportion of GPs who are more likely to now assess cardiovascular (CV) risk and use an Australian CV risk calculator to inform their prescribing of lipid-lowering medicines (+18%), adequately trial statin therapy (+15%), and appropriately manage statin intolerance (+15%).
- The 2018 program *Neuropathic pain: Touchpoints for effective diagnosis and management* produced a significant improvement in GP knowledge that sensory loss at the site of maximal pain is a key diagnostic feature of neuropathic pain (+24%) and about the Choosing Wisely Australia recommendation to avoid prescribing pregabalin or gabapentin for non-neuropathic pain (+11%). The program succeeded in significantly increasing the proportion of GPs: who perform physical examination with sensory testing (+27%) and motor assessment (+13%) to help diagnose neuropathic pain; who would start a patient with neuropathic pain on low-dose amitriptyline (+32%); and who would conduct a trial for 6–8 weeks when prescribing amitriptyline (+33%).
- The 2018 program *Starting, stepping down and stopping medicines* produced significant improvements in GP knowledge: about the importance of reviewing patients within 4–8 weeks of starting PPI treatment for gastro-oesophageal reflux disease (GORD) (+16%); that a high-dose PPI is not appropriate for the initial treatment of GORD (+14%); and of the Royal Australian College of General Practitioners (RACGP) Choosing Wisely Australia recommendation about using PPIs long term for patients with uncomplicated disease (+13%). There was a significant increase of 16% in the proportion of GPs who would appropriately manage a new patient with GORD.

Metformin adherence study

- The 2016 NPS MedicineWise *Type 2 diabetes: what's next after metformin?* program reached more than 8700 GPs over a 12-month period. One of the three program objectives was to increase by 5% the proportion of people with diabetes who adhere to metformin when it is initiated, measured 24 months after the start of the program. In 2019, we evaluated patient adherence to metformin, using the 10% PBS data sample, in two cohorts of patients aged over 40 years who had initiated metformin therapy either before or after the program. Adherence was measured using a modified version of the proportion of days covered (PDC) for prescriptions dispensed within 12 months of initiating metformin for both cohorts.
- The 'before intervention' cohort consisted of 4564 patients and the 'after intervention' cohort consisted of 3294 patients. The sociodemographic distribution was similar between the two cohorts. Based on a PDC of ≥ 80%, overall adherence to metformin-containing medicines over a 12-month follow-up period was low, with only 57% of patients assessed as adequately adherent in both cohorts. There was no improvement in adequate adherence in the 'after intervention' cohort compared to the 'before intervention' cohort. Our ability to demonstrate improvement in metformin adherence may have been influenced by several factors, including:
  - Adherence was only one of several key messages delivered through the program and the primary audience of this message was the clinician, rather than the consumer, and the program was delivered in 'real-world' conditions rather than through a randomised controlled trial.
  - The 10% PBS sample includes a random selection of GPs in Australia, and we cannot compare GPs or practices who received the intervention with those who did not.
  - Poor patient adherence rates for metformin-containing medicines are well-documented in the literature and increased targeting of messaging towards the consumer is vital.

Australian Prescriber podcast

- At March 2019, there were 14,003 Australian Prescriber podcast email subscribers who receive an email alert each time a new episode is released. Each time a new episode is released, there is an average of 2600 downloads after one month

- Australian Prescriber podcast listeners feel that the podcast content is at the right level for their needs and that the podcasts meet their needs, are engaging, relevant and interesting. They value the wide range of topics available that are up to date, insightful, evidence-based and topical.
- Podcasts are generally listened to monthly and the current frequency and length of podcasts are appropriate for half the listeners.
- Improvements suggested by listeners include a broader scope of topics, improved sound quality and improved interviewing skills of hosts.

Choosing Wisely Australia: a successful fourth year

- Choosing Wisely Australia now has a membership of 45 (80%) medical colleges and societies. Membership has also extended to 34 Champion Health Services and nine consumer organisations and other supporters including private hospitals, state health departments and consumer groups.
- Choosing Wisely Australia is beginning to have an influence on health policy, with the MBS review taskforce recommendations reflecting Choosing Wisely Australia's implementation of the Better Care Victoria project and inclusion in the Queensland clinical senate report.
- The inclusion of Choosing Wisely Australia messages and recommendations in NPS MedicineWise educational programs had positive impacts on GP knowledge.
- Over three-quarters (77%) of surveyed clinicians in a hospital setting 'agreed' or 'strongly agreed' that there is a problem with the use of unnecessary tests, treatments and procedures in medical practice and 96% 'agreed' or 'strongly agreed' that health professionals have a responsibility to help reduce the inappropriate use of tests, treatments and procedures.

Potential enhancements for further exploration

- NPS MedicineWise are working with key stakeholders, including the Australian Government Department of Health, to identify priority areas for future evaluation.
- NPS MedicineWise will seek advice from external experts, as appropriate, to assist with the assessment and potential implementation of any enhancements to our evaluation methods such as the use of alternative data sources, additional statistical techniques, implementing MedicineInsight studies and other potential approaches to assessing health benefits, medicines switching and other patient outcomes using patient-level data.

PBS AND MBS COST SAVINGS

Introduction

NPS MedicineWise identifies areas of healthcare where strong evidence of the inappropriate use of medicines, medical tests or other health care practices exists. NPS MedicineWise's multifaceted behavioural change programs deliver evidence-based programs, products and community initiatives to improve clinical decisions and mitigate excessive expenditure or health risks that these practices may pose.

PBS savings

NPS MedicineWise receives funding from the Australian Government Department of Health to deliver programs on QUM that reduce government expenditure on PBS subsidies.

The expenditure savings assessed in this evaluation arise from QUM programs implemented in the financial years before 2018 which continued to accrue expenditure savings during the 2017–18 financial year. In the present report, expenditure savings arise from QUM programs implemented between July 2014 and June 2018 (2014–15 FY to 2017–18 FY). While the *Reducing antibiotic resistance* program was initially launched in February 2012, it is included in this evaluation report because an update to the program, with associated new products, was launched in November 2014.

Methods

When selecting programs to include for analysis, we considered the following criteria.

- Size and length of initial program impact, which can be quantified as either a reduction or an increase in the prescribing of medicines by GPs in available data
- Available data points on program medicines before and after the launch of a program to quantify this impact using time series analysis
- How strong the program recommendations were, and any further reinforcing activities NPS MedicineWise has implemented for a topic
- Other changes in evidence or the health or political environment since the launch of the program that could influence the prescribing behaviour of GPs.

NPS MedicineWise has applied interrupted time series analysis, the gold standard approach for assessing and modelling the financial impact of QUM programs to the PBS. To assess savings to the PBS, we selected seven NPS programs that met the criteria described above and analysed historical trends in the dispensing of government-subsidised medicines. Using time series analysis, we then projected what the use of these medicines would have been had the NPS MedicineWise programs not taken place. We estimated the number of prescriptions expected to have been averted by each program and estimated the amount of expenditure saved by applying the average government subsidy for each medicine.

Time series analysis has a number of built-in assumptions, and there are inherent limitations to this method of analysis, as outlined below.

- Previous patterns of dispensing of medicines are predictive of future patterns of dispensing, in the absence of the intervention.
- Modelling a change in trend of the time series by an intervention term assumes that the intervention has a permanent impact on GP behaviour . This is an important assumption given some evidence that the impacts of educational or information provision initiatives tend to be more transitory.
- All model variables selected in the final model account for and drive any changes in dispensing behaviour as observed over the study period. Environment scans conducted and the model selection process identify any significant major events that could drive dispensing.

- Events identified for modelling need to have clear times of impact . If an external event is identified either during the program, or at the same time of the launch, then it is difficult to model this event separately and it may instead be captured in the intervention term.
- The validity of conclusions and inference from time series models relies on fulfilling theoretical assumptions fundamental in applying time series analysis. These include but are not limited to: a linear relationship; normal distribution of residuals; residuals have no autocorrelation (ie, independence); and homoscedasticity of residuals across time (ie, equal variance). At each step of the model fitting process, these critical assumptions were checked to ensure the final model selected and reported for each program fulfils these criteria.
- Time series modelling on the volume of prescriptions does not calculate or output the expenditure of prescriptions.
- Time series modelling relies on the stability of the population of the patients and providers using medicines of interest.

For each program evaluated, we performed extensive environmental scans and, where appropriate, included these as non-intervention terms in our models. Each final model summary incorporated: seasonality and autoregressive–moving-average (ARMA) lags; model diagnostics (criteria such as Akaike information criterion [AIC], Schwarz information criterion [SBC] and Standard Error); residual diagnostics; tests for normality and stationarity; and the results of autocorrelation. Sensitivity analyses were also performed to ascertain the most appropriate model, for example using a decay or a non-decay term.

Results

Summary

Based on an analysis of PBS subsidy data provided by Services Australia, expenditure was estimated to have been reduced by $69.93 million during the 2017–18 financial year, $67,635 short of our target of $70 million. This shortfall in savings is due to the inability to estimate the 2017–18 FY financial impact of the 2016 Type 2 diabetes program. There was an unprecedented amount of environmental change post-intervention, including medicine shortages and the release of revised RACGP guidelines, which could not be separated from the impact of the diabetes program. Future evaluation of the financial impact of this program may require analysis using MedicineInsight data. The total estimated PBS savings from NPS MedicineWise programs for 2015–16 ($73.65M), 2016–17 ($71.62M) and 2017–18 ($69.93M) is $215.20 million, exceeding our contract expectation of $210 million of cost savings during this period.

NPS MedicineWise quality use of medicines programs assessed and their calculated savings for the 2017–18 financial year are summarised in Table 2.

TABLE 2: SUMMARY OF PBS EXPENDITURE SAVINGS FOR THE 2017–18 FINANCIAL YEAR ARISING FROM QUM PROGRAMS

Program	Date of launch	Expected outcome	PBS savings (95% CI)
Reducing antibiotic resistance	Nov 2014 (initial launch Feb 2012)	Reduction in volume of selected antibiotics prescribed for respiratory tract infections	$25,830,956 ($19,030,631–$32,631,282)
Exploring inhaled medicines use and asthma control	Jul 2014	Reduction in volume of combination therapy; inhaled corticosteroid and long-acting beta$_2$ agonist (ICS/LABA medicines) Increase in volume of single ingredient therapies; inhaled corticosteroids (ICS single ingredient), montelukast (for children)	$9,249,200 ($1,994,217–$16,499,007)
Blood pressure: Measure, manage and monitor	Feb 2015	Reduction in volume of combination therapies Increase in volume of single ingredient therapies	$3,565,027 ($1,666,436–$5,463,617)
Proton pump inhibitors: Too much of a good thing?	Apr 2015	Reduction in volume of proton pump inhibitors (PPI) medicines; high strength and low strength	$9,696,354 ($5,443,055–$13,949,684)
Chronic pain: Opioids and beyond	Jul 2015	Reduction in volume of opioid medicines	$11,195,737 ($4,657,125–$17,734,341)
Depression: Re-examining the options	Feb 2016	Reduction in volume of antidepressants in favour of non-pharmacological therapies; serotonin-norepinephrine reuptake inhibitors (SNRIs) and selective serotonin reuptake inhibitors (SSRIs) Increase in volume in fluoxetine (adolescents), mirtazapine	$10,395,092 ($3,713,668–$6,681,415)
Type 2 diabetes: What's next after metformin?	Jul 2016	Reduction in volume of combination therapies not containing sulfonylureas Increase in volume of single ingredient therapy (metformin, sulfonylureas) and combination therapy of metformin and sulfonylureas	Unable to be assessed
		Total measured financial impact for FY 2017–18	**$69,932,365**

Reducing antibiotic resistance

Over the past 20 years, NPS MedicineWise has delivered a set of programs that have improved the quality of antibiotic prescribing in primary care. In 2012, NPS MedicineWise increased its efforts to improve antibiotic use with the launch of a more intensive set of QUM programs, rolled out over 5 years, with the aim of reducing antibiotic dispensing by 25% by the end of 2017. The programs launched between 2012 and 2017 comprised educational activities, social-norm feedback for GPs and educational media for consumers. The activities were specifically tailored to focus on improving the quality of GP prescribing of antibiotics for upper respiratory tract infections (URTIs). Based on the programs' key messages, we expected an overall reduction in antibiotics most commonly prescribed for URTIs.

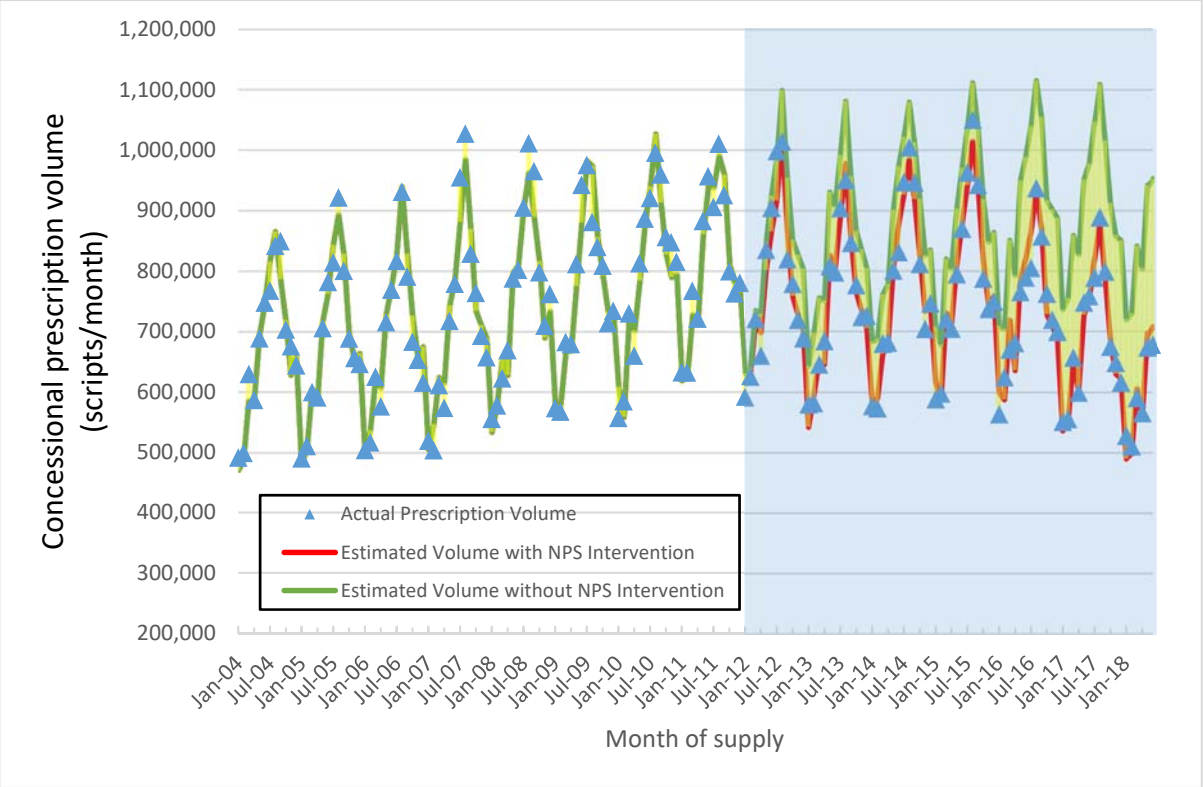
As with each of the time series analyses described here, we performed an environmental scan to identify external events in the health and political environment which may have impacted on GP prescribing behaviour. Any relevant major events that occurred during the post-intervention period to June 2018 were included as non-intervention terms in the modelling process.

The impact of the program on dispensing of antibiotic medicines was estimated using an intervention term for 2012, and an additional intervention term for the program's relaunch of products from 2015. The combination of the intervention terms with a variable either 'Trend' or 'Trendsqrt' was tested to model the increasing trend of dispensing pre-intervention, in addition to an intercept.

The cost savings estimate modelled for the intervention using non-decay terms was not affected by external environmental factors. However, these external factors were significant when decay terms were used. Modelling with decaying terms reduces the estimated effect of the NPS MedicineWise intervention over time, increasing the effect of other external factors to the prescribing of antibiotics. We used an average of the results of the decay and non-decay models in our evaluation of the impact of the NPS MedicineWise *Reducing antibiotic resistance* program.

Following the initial launch of the program in 2012, and continued reinforcement of program messaging over a 5-year period, there was a statistically significant decline in the volume of antibiotic dispensing by GPs to concessional beneficiaries. Figure 1 shows the modelled number of dispensed prescriptions (red line) juxtaposed against the number of prescriptions that would have occurred had the program not taken place (green line).

FIGURE 1: IMPACT OF THE NPS MEDICINEWISE REDUCING ANTIBIOTIC RESISTANCE PROGRAM ON PBS DISPENSING VOLUME OF ANTIBIOTICS



Using the coefficient estimates as output from time series analysis and multiplying by the cost formula for concessional beneficiaries, the total combined financial impact of the 2012–2017 NPS MedicineWise program *Reducing antibiotic resistance* was a reduction of $25,830,956 for the 2017–18 financial year (Table 3).

TABLE 3: FINANCIAL IMPACT TO THE PBS, 2012–17 REDUCING ANTIBIOTIC RESISTANCE PROGRAM

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
Non-decay	3,022,453 (2,182,144–3,862,762)	27.51% (21.51%–32.66%)	$26,843,913 ($19,381,041–$34,306,784)

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
Decay	2,792,643 (2,102,088–3,483,198)	25.92% (20.84%–30.38%)	$24,817,999 ($18,680,220–$30,955,779)
		Average	$25,830,956 ($19,030,631–$32,631,282)

Exploring inhaled medicines use and asthma control

In 2014, NPS MedicineWise launched the *Exploring inhaled medicines use and asthma control program* (Asthma program). The program was selected to address QUM issues related to the management of asthma in the Australian community including:

- overprescribing of inhaled corticosteroids and long-acting beta$_2$ agonists (ICS/LABA) combination medicines
- prescribing of ICS/LABA combination medicines in children aged less than 6 years
- patients' adherence to preventer medicines
- inhaler technique
- ownership of written asthma action plans.

By addressing these issues, the program aimed to improve GP practice in line with Australian clinical guidelines, improve asthma control for people with asthma and reduce unnecessary costs to the PBS.

Given the key messages of the program and an understanding of current prescribing practice, we expected a decrease in the number of ICS/LABA combination medicines dispensed following the launch of the program. As a result of this reduction, patients may have been stepped down or switched to other medicines in line with clinical guidelines launched in 2014 by Asthma Australia.

In order to evaluate the effect of patient demographics on GP dispensing of asthma medicines, we performed separate time series analyses using the following age groups:

- children aged 0 to 14 years
- adolescents and adults aged 15 to 49 years
- adults aged 50 years and over.

As it was difficult to determine whether guideline changes during the program were driving changes in prescribing behaviour, we fitted decaying cumulative GP participation (CUMGP) terms of 1% to our models. These decay terms did not produce a good fitting model for the 50 years and over age group so we did not use the decay model for the financial impact calculation for this age group.

Following the initial launch of the program in 2014, there was a statistically significant decline in the volume of ICS/LABA dispensing by GPs. Figures 2 to 4 show the modelled number of dispensed prescriptions (red line) juxtaposed against the number of prescriptions that would have occurred had the program not taken place (green line) for each age group.

Using the coefficient estimates as output from time series analysis and multiplying by the cost formula for concessional and general beneficiaries, the estimated financial impact of the 2014 NPS MedicineWise Asthma program was a total combined reduction of $9,249,200 for the 2017–18 financial year. Tables 4 to 6 present the summary results of the financial impact by age group.

TABLE 4: FINANCIAL IMPACT TO THE PBS, 2014 ASTHMA PROGRAM, 0–14 YEAR AGE GROUP

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
0–14 years Non-decay	42,888 (14,694–71,082)	29.50% (12.54%–40.95%)	$1,071,324 ($367,041–$1,775,598)

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
0–14 years Decay	28,896 (4,726–53,067)	29.50% (4,41%–34.11%)	$722,651 ($118,186–$1,327,128)
		Average	$896,988

TABLE 5: FINANCIAL IMPACT TO THE PBS, 2014 ASTHMA PROGRAM, 15–49 YEAR AGE GROUP

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
15–49 years Non-decay	58,039 (3,501–112,572)	4.74% (0.30%–8.80%)	$1,867,086 ($112,626–$3,621,373)
15–49 years Decay	35,772 (2,469–69,075)	2.97% (0.21%–5.59%)	$1,156,096 ($79,780–$2,232,416)
		Average	$1,511,591

TABLE 6: FINANCIAL IMPACT TO THE PBS, 2014 ASTHMA PROGRAM, 50 YEARS AND OVER AGE GROUP

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
50 years and over Non-decay	144,674 (35,011–254,230)	4.40% (1.10%–7.49%)	$6,840,621 ($1,655,400–$12,020,749)

FIGURE 2: IMPACT OF NPS MEDICINEWISE ASTHMA PROGRAM ON PBS DISPENSING VOLUME OF ICS/LABA MEDICINES, 0–14 YEAR AGE GROUP

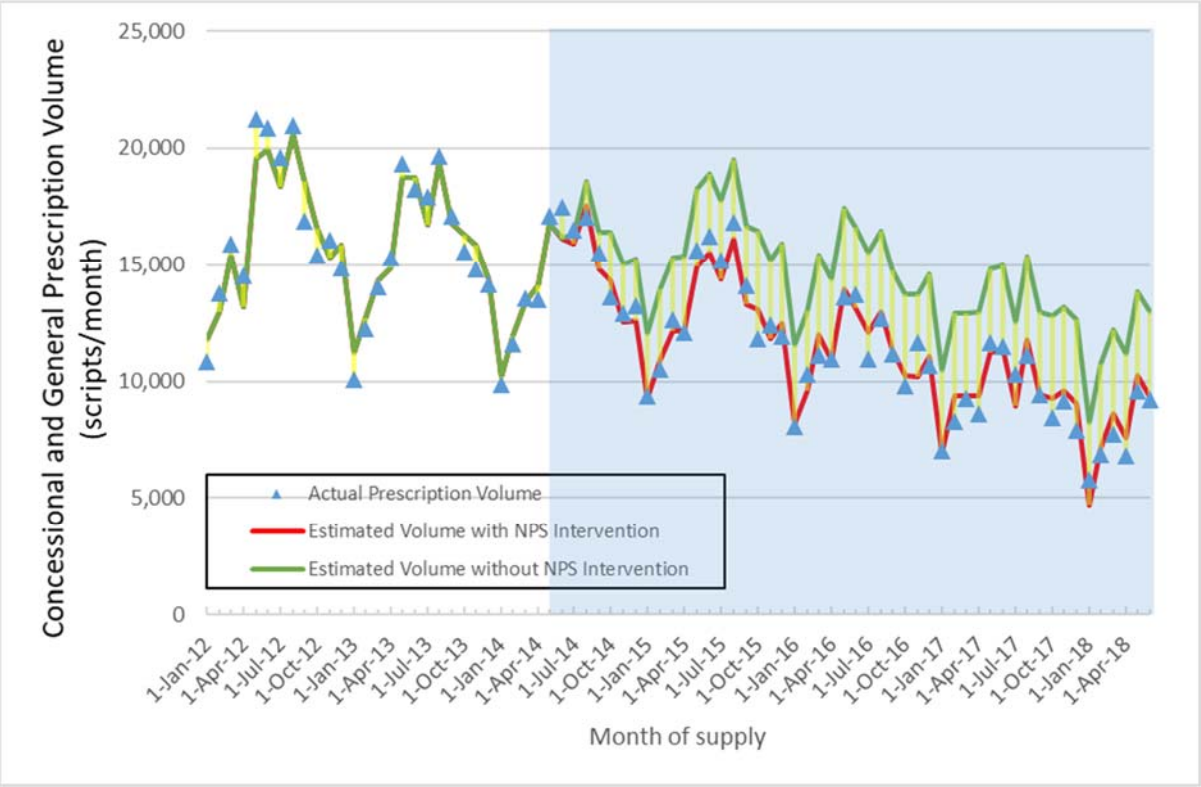


FIGURE 3: IMPACT OF NPS MEDICINEWISE ASTHMA PROGRAM ON PBS DISPENSING VOLUME OF ICS/LABA MEDICINES, 15–49 YEAR AGE GROUP

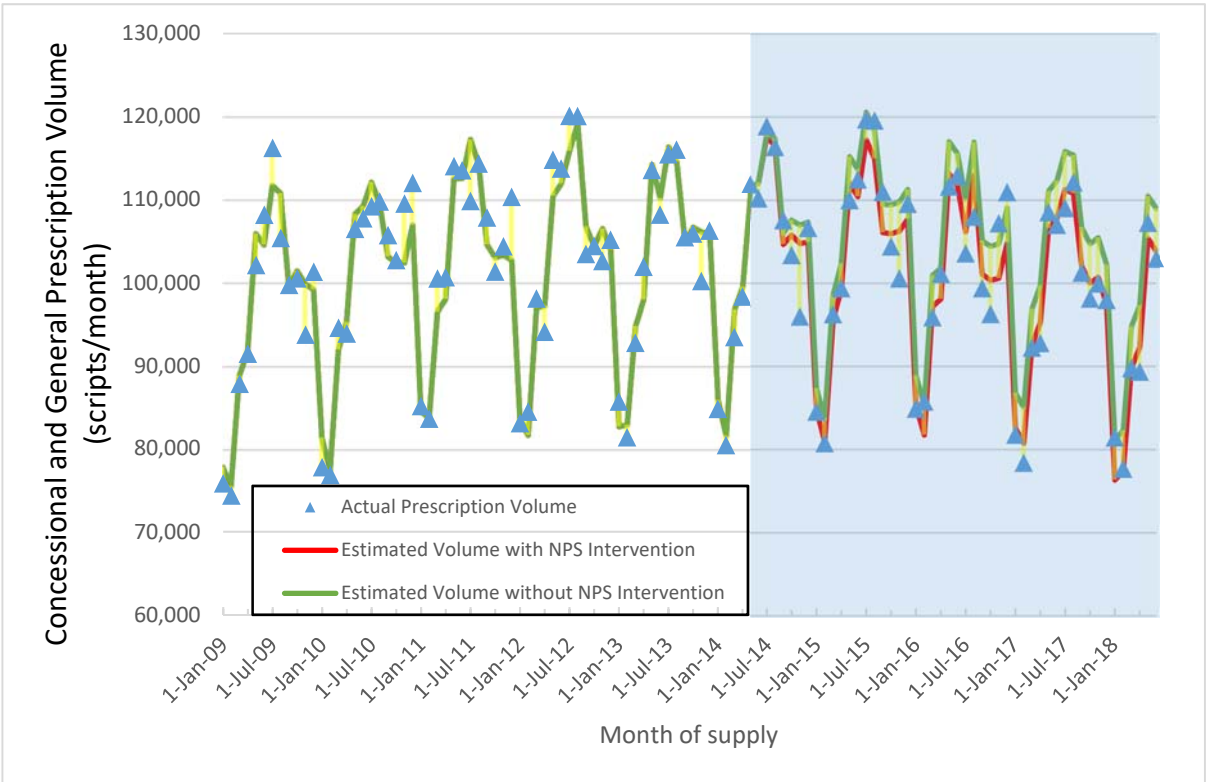
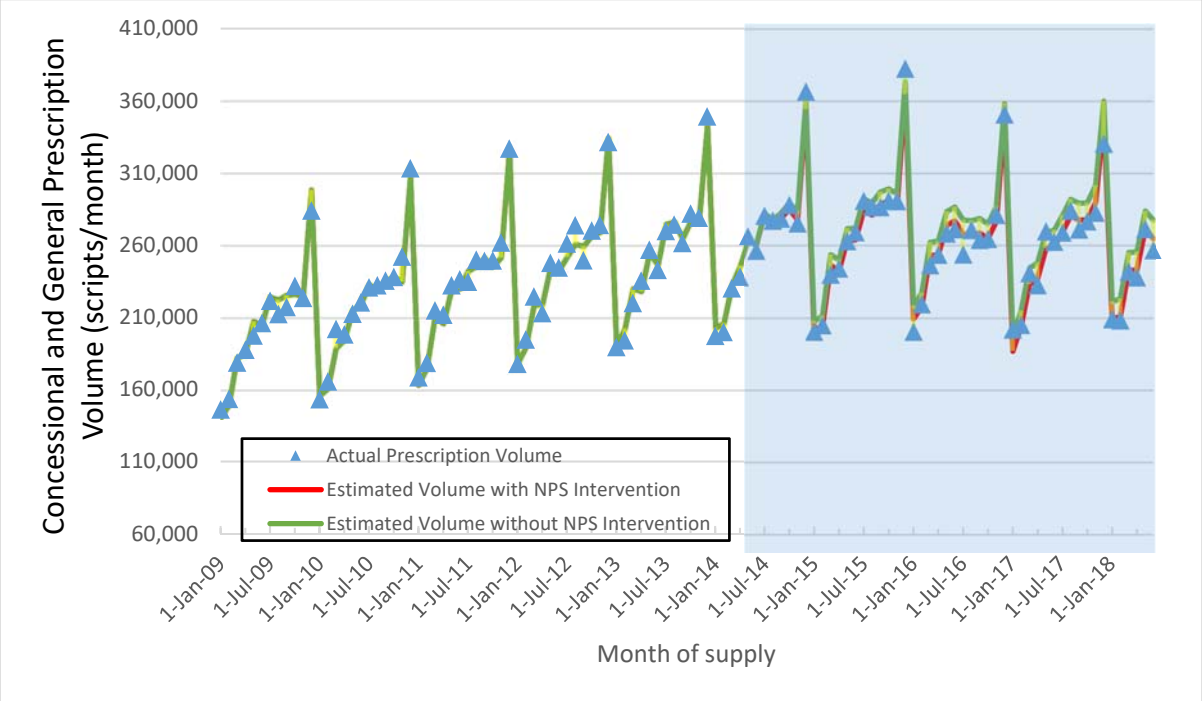


FIGURE 4: IMPACT OF NPS MEDICINEWISE ASTHMA PROGRAM ON PBS DISPENSING VOLUME OF ICS/LABA MEDICINES, 50 YEARS AND OVER AGE GROUP



Blood pressure: Measure, manage and monitor

In March 2015, NPS MedicineWise launched a nationwide program to improve the quality use of antihypertensive medicines in primary care. The program encouraged GPs to assess the management of patients with a history of hypertension. It encouraged the use of single-agent antihypertensive medicines in preference to fixed-dose combinations (FDC) and emphasised the risks of FDCs when used as first-line treatment.

Given the key messages of the program, we expected the dispensing of FDC antihypertensive medicines to decline after the launch of the program. Detailed assessment of patient CV risk was expected to reduce the likelihood of GPs prescribing FDC products to patients at low risk of cardiovascular complication. Improvements to patient lifestyle factors were expected to mitigate hypertension and reduce the demand for second-line FDC therapies. Encouraging practitioners to use a monotherapy as the initial treatment was expected to reduce the number of GPs prescribing FDC products as first-line treatment.

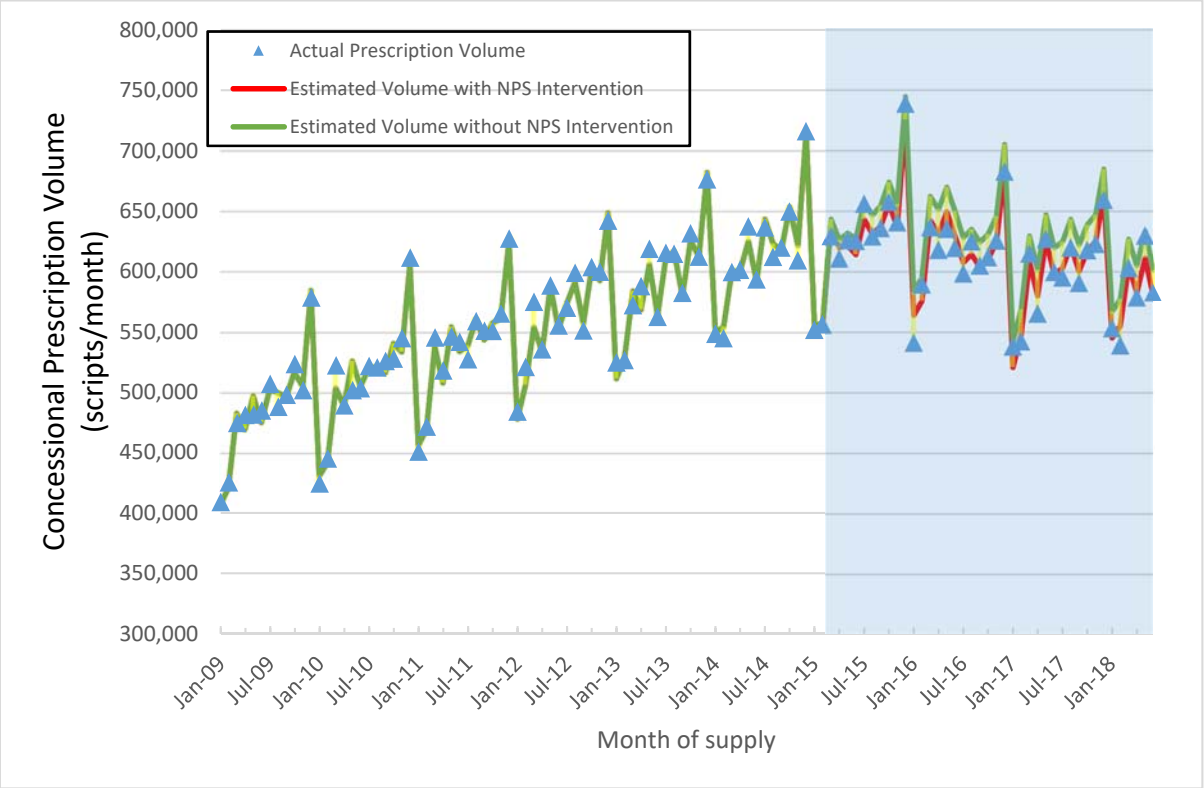
The impact of the program on the dispensing of combination antihypertensive medicines was estimated using the CUMGP intervention term. The decay model was not a good fit to the data and was not used in our calculation of the financial impact of the program.

Using the coefficient estimates as output from time series analysis and multiplying by the cost formula for concessional beneficiaries only, the estimated financial impact of the 2015 NPS MedicineWise Blood pressure program was a total combined reduction of $3,565,027 for the 2017–18 financial year (Table 7 and Figure 5).

TABLE 7: FINANCIAL IMPACT TO THE PBS, 2015 BLOOD PRESSURE PROGRAM, COMBINATION MEDICINES

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
Non-decay	262,954 (122,915–402,993)	3.52% (1.60%–5.55%)	$3,565,027 ($1,666,436–$5,463,617)

FIGURE 5: IMPACT OF NPS MEDICINEWISE BLOOD PRESSURE PROGRAM ON PBS DISPENSING VOLUME OF ANTIHYPERTENSIVE MEDICINES, COMBINATIONS



Proton pump inhibitors: Too much of a good thing?

Since 2004, NPS MedicineWise has implemented four programs to optimise the use of PPIs in the treatment of gastro-oesophageal reflux disease (GORD). Building on the success of these previous NPS MedicineWise programs, the goal of the *Proton pump inhibitors: too much of a good thing* program launched in April 2015 was to reduce prescribing of high and low strength PPIs by GPs in primary care. This was the first NPS MedicineWise program that was also associated with a Choosing Wisely Australia recommendation.

The goals were to provide a multifaceted program that:

- encouraged and embedded the regular review of using PPIs
- provided support and information to overcome barriers to reducing PPI use
- raised awareness of the safety concerns around PPI usage and management in line with evidence-based guidelines.

Based upon these key messages and an understanding of current prescribing practice, it was expected that promoting a step-down approach would result in a reduction in GPs' prescribing of high, standard and low strength PPIs. For the purpose of this analysis, PPIs were assigned to either high strength or low strength categories and the two were modelled separately.

The environmental scan identified external, non-intervention events that occurred during the program launch and the post-intervention period. Time series analysis is unable to distinguish the individual impacts of these events, and they are potentially captured in the post-intervention decline in dispensing. Changes to scheduling were not found to have a significant impact on the high strength PPI model. Over-the-counter (OTC) PPI medicines are the same price as prescription PPIs for concessional beneficiaries and, without access to OTC sales or pharmacy dispensing data, it was difficult to assess the effect of the down-scheduling of PPI medicines on dispensing to concessional beneficiaries. However, we found the down-scheduling to have a significant impact on low strength PPI dispensing, as a step change, in early 2016.

Sharp pricing reductions as a result of the introduction of generics listed on the PBS were modelled as a step change from 2013, and this was only found to have a significant impact to the low strength PPI model. It was also difficult to fully isolate the impact of the 2015 program, or to fully discount any residual impact from the 2009 PPIs program.

The non-decay model was used in estimating the financial impact for both the high and low strength models, as these were the best fit in our sensitivity analyses. The intervention is best modelled as a step or trend change, as the rate is flat post-intervention, and a decaying intervention has a curvilinear slope which did not fit the data well.

Following the launch of the PPIs program in 2015 there was a statistically significant decline in the volume of high strength PPI medicine dispensing by GPs to concessional beneficiaries and a statistically significant increase in the volume of low strength PPI medicine dispensing by GPs to concessional beneficiaries. Figures 6 (high strength) and 7 (low strength) show the modelled number of dispensed prescriptions (red line) juxtaposed against the number of prescriptions that would have occurred had the program not taken place (green line).

FIGURE 6: IMPACT OF NPS MEDICINEWISE PPI PROGRAM ON PBS DISPENSING VOLUME OF PPI MEDICINES, HIGH STRENGTH

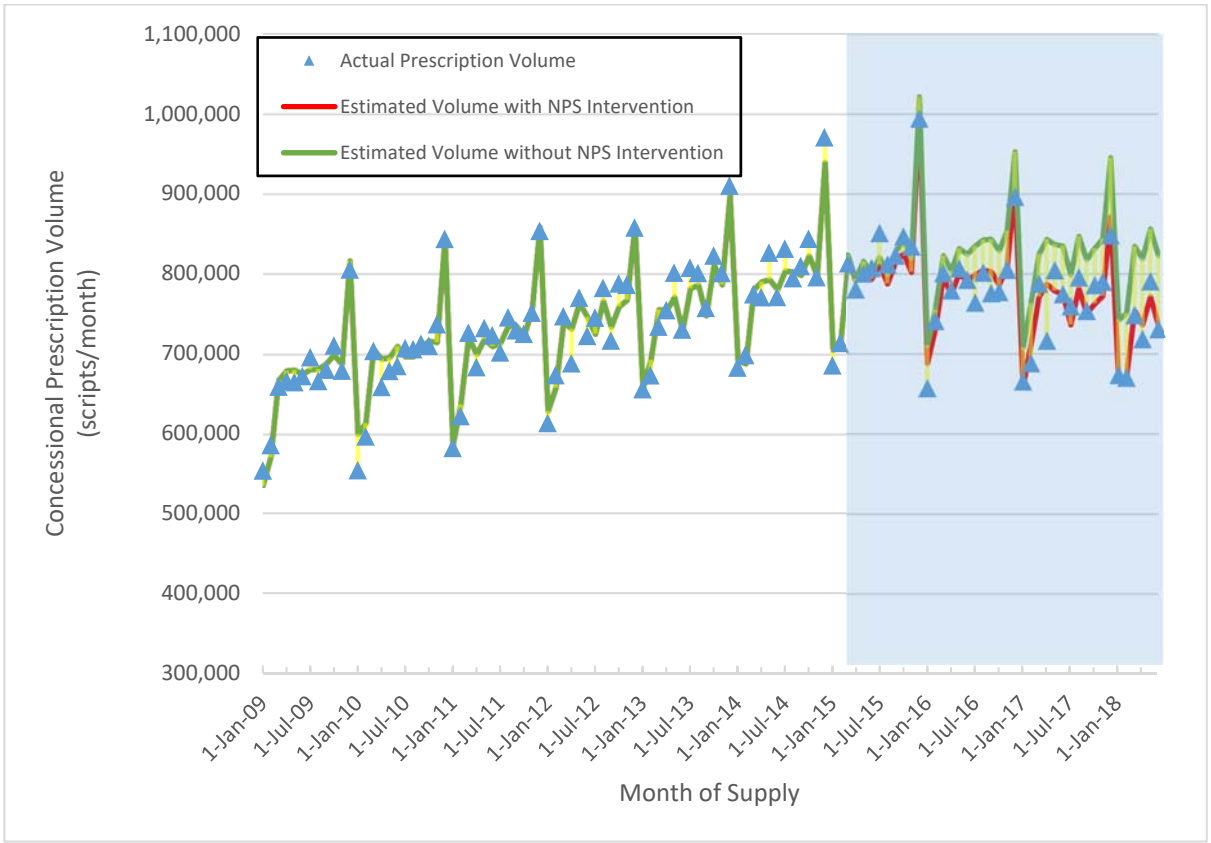
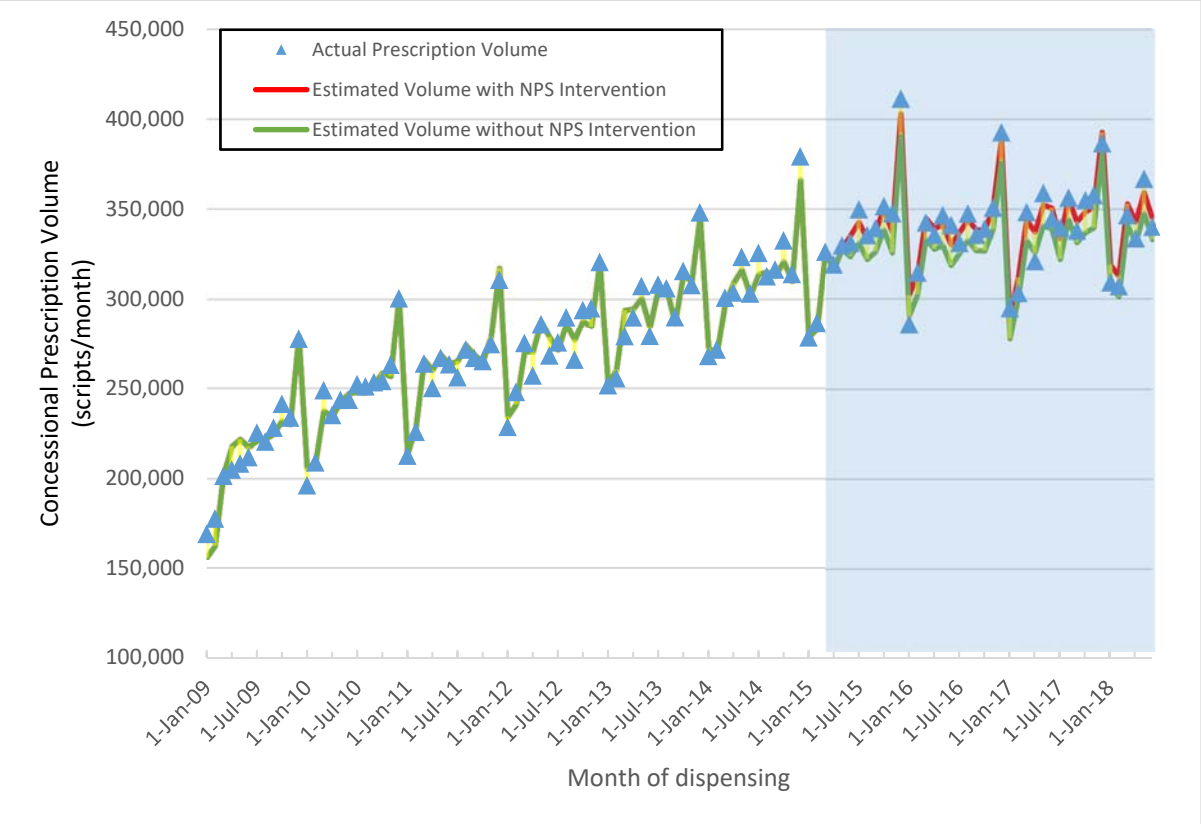


FIGURE 7: IMPACT OF NPS MEDICINEWISE PPI PROGRAM ON PBS DISPENSING VOLUME OF PPI MEDICINES, LOW-STRENGTH



Following the launch of the PPIs program in 2015 there was a statistically significant decline in the volume of high strength PPI medicine dispensing by GPs to concessional beneficiaries and a statistically significant increase in the volume of low strength PPI medicine dispensing by GPs to concessional beneficiaries. The total combined financial impact to the PBS of the 2015 NPS MedicineWise PPIs program was a saving of $9.7 million. This represents $11.6 million saved on high strength PPIs, offset by $1.9 million extra spent on low strength PPIs, which is likely to have been the result of patients stepping down to reduced strength medicines, in line with the program messaging (Table 8).

TABLE 8: FINANCIAL IMPACT TO THE PBS, 2015 PPI PROGRAM, HIGH STRENGTH AND LOW STRENGTH MEDICINES

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
High-strength PPIs	899,180 (514,338–1,284,028)	9.02% (5.37%–12.40%)	$11,583,549 ($6,625,838–$16,541,291)
Low-strength PPIs	138,613 (86,874–190,351)	3.47% (2.14%–4.82%)	$1,887,195 ($1,182,783–$2,591,607)

Chronic pain: Opioids and beyond

In July 2015, NPS MedicineWise launched a nationwide program to reduce unnecessary or excessive prescribing of opioid medicines in primary care. The goal of the 2015 *Chronic pain: Opioids and beyond* program focused on the assessment and management of chronic non-cancer pain, particularly the use of opioids in primary care. The program encouraged non-opioid options for the long-term treatment of chronic pain and promoted continual assessment and management of pain using non-opioid options where feasible.

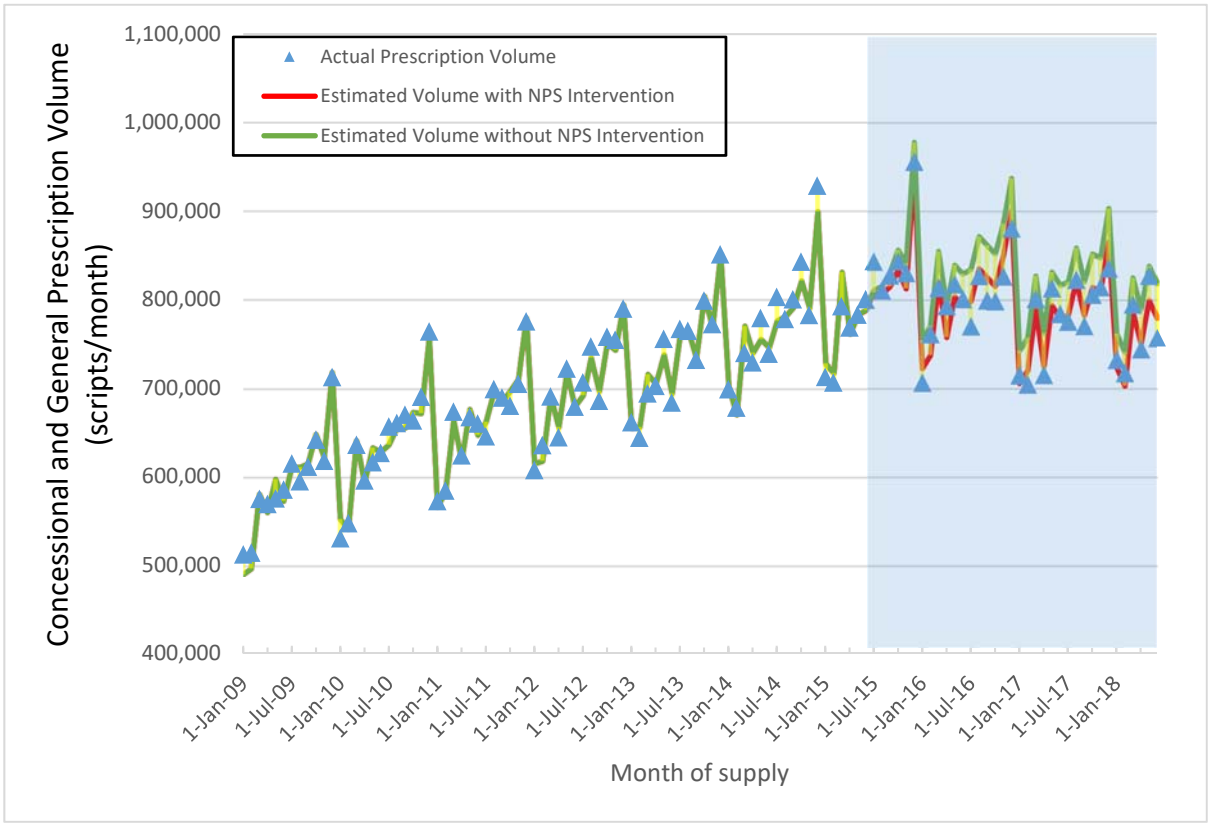
The program targeted opioid medicines commonly prescribed by GPs in Australia: opium alkaloids (hydromorphone, morphine, oxycodone, codeine) and phenylpiperidine derivatives (fentanyl). Based on the key messages of the program, we expected fewer opioid medicines to be dispensed by GPs following the launch of the program.

The impact of the Chronic pain program on opioid medicine prescribing was estimated using the CUMGP in combination with a trend term ('CUMGPTrend') to incorporate the initial targeting and growing participation of GPs as the dispensing of opioid medicines declined. We expected that the up-scheduling of codeine (from 1 February 2018) would lead to a concomitant increase in GP prescribing of codeine. However, this event did not have a significant impact on our modelling, and GP prescribing rates of codeine remained relatively constant following the up-scheduling.

Both decay and non-decay models have been used in the estimation of the financial impact of the program, as both models showed a good fit to the data.

Following the launch of the Chronic pain program in 2015 there was a statistically significant decline in the volume of opioid dispensing by GPs to concessional and general beneficiaries. Figure 8 shows the modelled number of dispensed prescriptions (red line) juxtaposed against the number of prescriptions that would have occurred had the program not taken place (green line).

FIGURE 8: IMPACT OF NPS MEDICINEWISE CHRONIC PAIN PROGRAM ON PBS DISPENSING VOLUME OF OPIOID MEDICINES



Using the coefficient estimates as output from time series analysis and multiplying by the cost formula for concessional and general beneficiaries, the estimated financial impact of the 2015 NPS MedicineWise Chronic pain program was a reduction of $11,195,737 for the 2017–18 financial year (Table 9).

TABLE 9: FINANCIAL IMPACT TO THE PBS, 2015 CHRONIC PAIN PROGRAM

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
Non-decay	457,294 (196,554–718,033)	4.64% (2.05%–7.10%)	$12,639,265 ($5,432,605–$19,845,912)
Decay	352,430 (140,277–564,583)	3.61% (1.47%–5.67%)	$9,752,208 ($3,881,645–$15,622,770)
		Average	$11,195,737

Managing depression: Re-examining the options

In the last decade there has been an increase in management of patients with depression by GPs. Antidepressant dispensing has doubled, [1,21,2] and it is likely there is underuse of non-pharmacological approaches in the clinical management of depression. While there may be overuse of antidepressants for people experiencing mild depression, there is also evidence that those who may benefit from antidepressants (people with moderate or severe depression) often stop these medicines prematurely, and treatment strategies may not be well-monitored or managed. With the goal of improving clinical management of people with depression in primary care, the program *Managing depression: Re-examining the options* focused on QUM and the evidence for a range of non-pharmacological strategies.

Based upon these key messages and an understanding of current prescribing practice, we expected: decreased prescribing of serotonin and norepinephrine reuptake inhibitors (SNRIs) and selective serotonin reuptake inhibitors (SSRIs; with the exception of fluoxetine for adolescents) and of tricyclic and other antidepressants; and increased prescribing of mirtazapine where appropriate. We modelled SNRIs and SSRIs separately, and also examined whether there was an increase in prescribing of other classes of antidepressant medicines.

The impact of the program on SNRI medicines was estimated using the trend change intervention term in combination with a trend term (‘Trendsqrt’) to incorporate the trend of dispensing pre-intervention in a non-decay model. We first tested all SSRIs in combination with TCA and 'other' antidepressants to understand whether GPs were switching patients to other antidepressants as a result of the program. This analysis resulted in an estimated cost savings of $6.5 million (Table 10). Decay models were not a good fit for either SNRIs or SSRIs. We then performed separate analyses on two active ingredients for antidepressants, fluoxetine and mirtazapine. In each case, there was no significant impact seen in our modelling. As expected, trends of fluoxetine and mirtazapine dispensing increased throughout the study period.

Following the launch of the program in 2016 there was a statistically significant decline in the volume of SSRI and SNRI dispensing by GPs to concessional beneficiaries. Figures 9 and 10 show the modelled number of dispensed prescriptions (red line) juxtaposed against the number of prescriptions that would have occurred had the program not taken place (green line).

FIGURE 9: IMPACT OF NPS MEDICINEWISE DEPRESSION PROGRAM ON PBS DISPENSING VOLUME OF SNRI MEDICINES

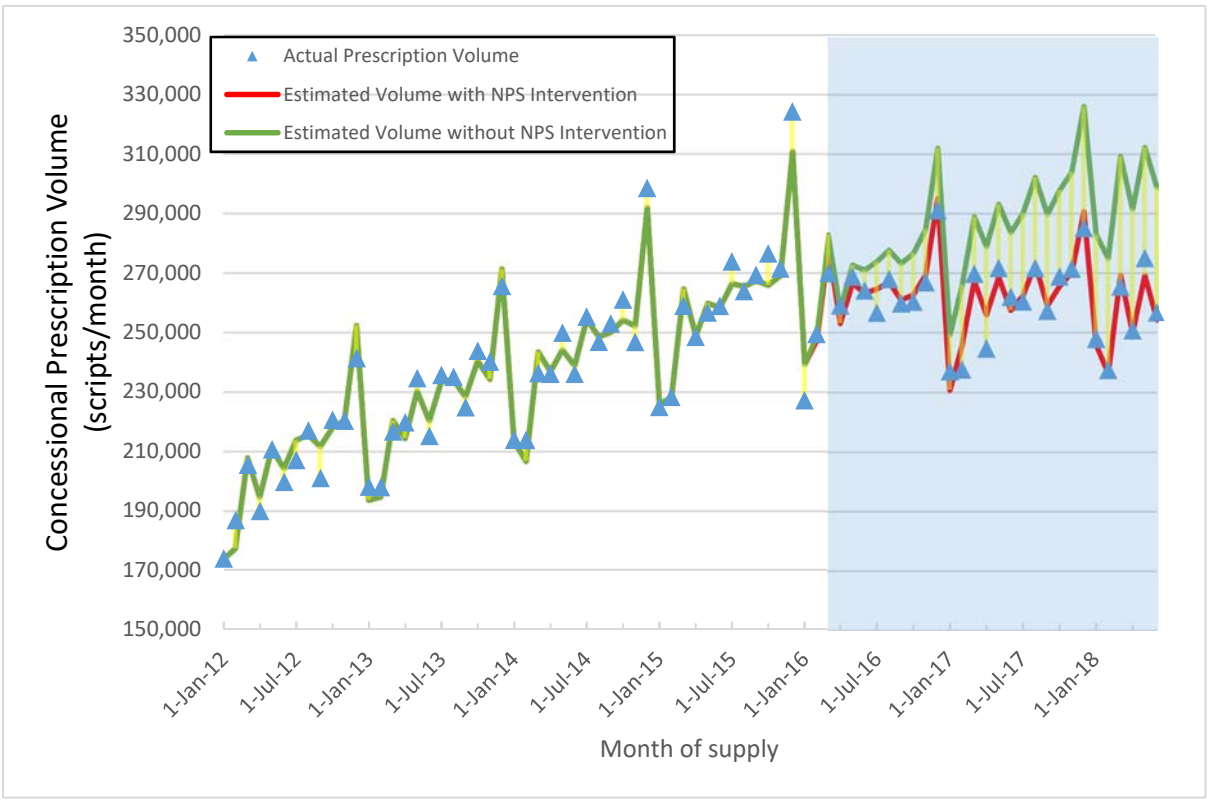
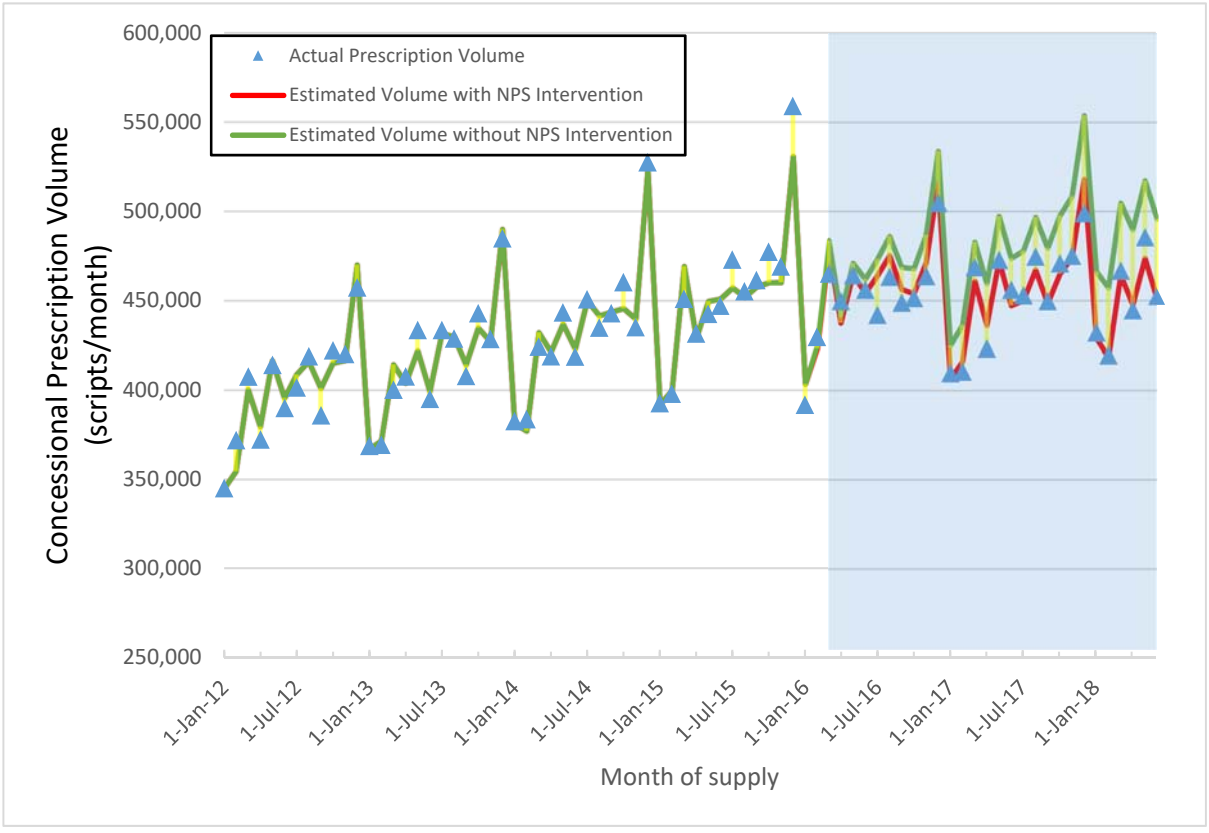


FIGURE 10: IMPACT OF NPS MEDICINEWISE DEPRESSION PROGRAM ON PBS DISPENSING VOLUME OF SSRI MEDICINES



The estimated financial impact of the 2016 NPS MedicineWise Depression program was a cost saving of $10,395,092 for the 2017–18 financial year (Table 10).

TABLE 10: FINANCIAL IMPACT TO THE PBS, 2016 DEPRESSION PROGRAM

Model	No. of scripts saved (95% CI)	Percentage of scripts saved (95% CI)	Cost savings estimate (95% CI)
SNRI	433,178 (348,372–517,983)	12.09% (9.96%–14.13%)	$6,533,908 ($5,254,719–$7,813,086)
SSRI	437,981 (246,444–629,517)	7.35% (4.27%–10.23%)	$3,861,184 ($2,172,617–$5,549,743)
		Combined	**$10,395,092**

Type 2 diabetes: What's next after metformin?

In July 2016, NPS MedicineWise launched the *Type 2 diabetes: What's next after metformin* program with the goal of improving the quality use of medicines for diabetic patients being treated in primary care. The program encouraged GPs to examine management of patients with a history of type 2 diabetes with a view to increasing their adherence to metformin (if on a first-line therapy) or prescribing metformin and sulfonylureas, as the preferred second-line therapy.

Based on the program, which recommended a stepped approach to prescribing and provided a defined treatment algorithm, we anticipated that there would be an overall reduction in prescribing of oral glucose-lowering medications (including fixed-dose combinations [FDC], sodium-glucose co-transporter-2 [SGLT-2] inhibitors and dipeptidyl peptidase-4 [DPP-4] inhibitors), and an overall increase in prescribing of metformin, sulfonylureas and metformin in combination with sulfonylureas.

A number of external events significantly impacted upon the dispensing of single ingredient metformin, including medicine shortages and the release of revised RACGP guidelines. Interrupted time series analysis cannot reliably measure the impact of an intervention where external environmental events have significantly changed the time series during and post-intervention. One of the key assumptions of time series analysis is that the previous trend is predictive of what would have happened if the program had not occurred. This assumption was not met for diabetes medicines.

We observed an unprecedented amount of environmental change post-intervention, which could not be separated from the impact of the diabetes program. We were unable to estimate the 2017–18 FY financial impact of the 2016 Type 2 diabetes program. Future evaluation of the financial impact of this program may require using MedicineInsight data.

MBS savings

NPS MedicineWise is funded by the Australian Government Department of Health to deliver programs that improve the quality use of diagnostic medical tests, particularly in domains of primary care where the use of these tests may be outside recommendations provided in evidence-based guidelines. The goal of these quality use of diagnostics (QUD) programs is to reduce unnecessary harm and health care expenditures that may arise from these practices.

NPS MedicineWise's QUD programs are provided in accordance with the terms of its funding agreement with the Australian Government Department of Health. Under the agreement, which covers the time period for this report, one of the evaluation requirements was for NPS MedicineWise to demonstrate the dollar value of our QUD programs**,** in terms of reduced government expenditure on MBS subsidies**,** by at least $13 million in 2018.

Introduction

The *Imaging for abdominal pain* program aimed to reduce the inappropriate use of ultrasounds and computed tomography (CT) scans in the investigation of abdominal pain. CT scans and ultrasounds can be an important part of diagnosing the cause of abdominal pain when there are red-flags for using these tests. Evidence suggests that the increasing use of CT scans and ultrasounds to investigate abdominal pain is driven by a tendency for practitioners to use these tests even when specific indicators (or 'red-flags') are absent. During formative research consultations prior to the program launch, NPS MedicineWise's diagnostics advisory panel suggested that such improper use is most likely a result of practitioners being unaware of the guidelines and limitations of diagnostic imaging.

In June 2015, NPS MedicineWise launched a national program to improve the quality with which diagnostic imaging tests were used in the investigation of abdominal pain. The program had a specific focus on improving the use of abdominal CT scans among GPs in primary care. It encouraged GPs to examine their patient's medical history, undertake a thorough physical examination of their patient and understand the guidelines for the use of diagnostic tests before making a request for an abdominal CT scan or ultrasound.

Methods

Interrupted time series analysis, also known as intervention modelling, is the gold standard approach for assessing impact with population-level intervention programs in public health. Interrupted time series analysis is a quantitative, statistical method in which multiple repeated observations are made at regular intervals before and after an intervention (the 'interruption' in the time series). Statistical analysis is performed to determine whether there is a change in the observations, or trend of observations, following an intervention.

Modelling from actual (observed) data trends, interrupted time series analysis estimates the volume of services provided over time, comparing the estimated effect of the NPS MedicineWise intervention with the estimated trend if the intervention had not occurred. The two series are then compared to obtain a monthly series of differences in the number of services.

The estimated number of prevented CT scans and ultrasounds in each month between January and December 2018 was multiplied by their respective average subsidy to obtain an estimate of expenditure savings in each month. This was then summed to obtain an estimate of total expenditure savings over the period of interest (January to December 2018).

Results

Summary

For the time period January to December 2018, using non-decay models, we found a significant reduction in both the number of abdominal CT scans and the number of abdominal ultrasounds during 2018. There was no significant change in the number of abdominal X-rays during 2018.

The intervention terms for the decay models were not significant for CT scans. Although the intervention terms for ultrasounds were significant for the decay models for ultrasounds, we have used non-decay, as this was a better fitting model, and it also provided the most conservative estimate of cost savings.

We were able to show $21,565,401 in cost savings to the MBS, which was significantly associated with the NPS MedicineWise abdominal imaging program. We did not see a significant increase in the estimated volume of abdominal X-rays, which were not the focus of the program messaging and activities, suggesting that GPs were not switching imaging modalities as a result of the NPS MedicineWise program (Table 11).

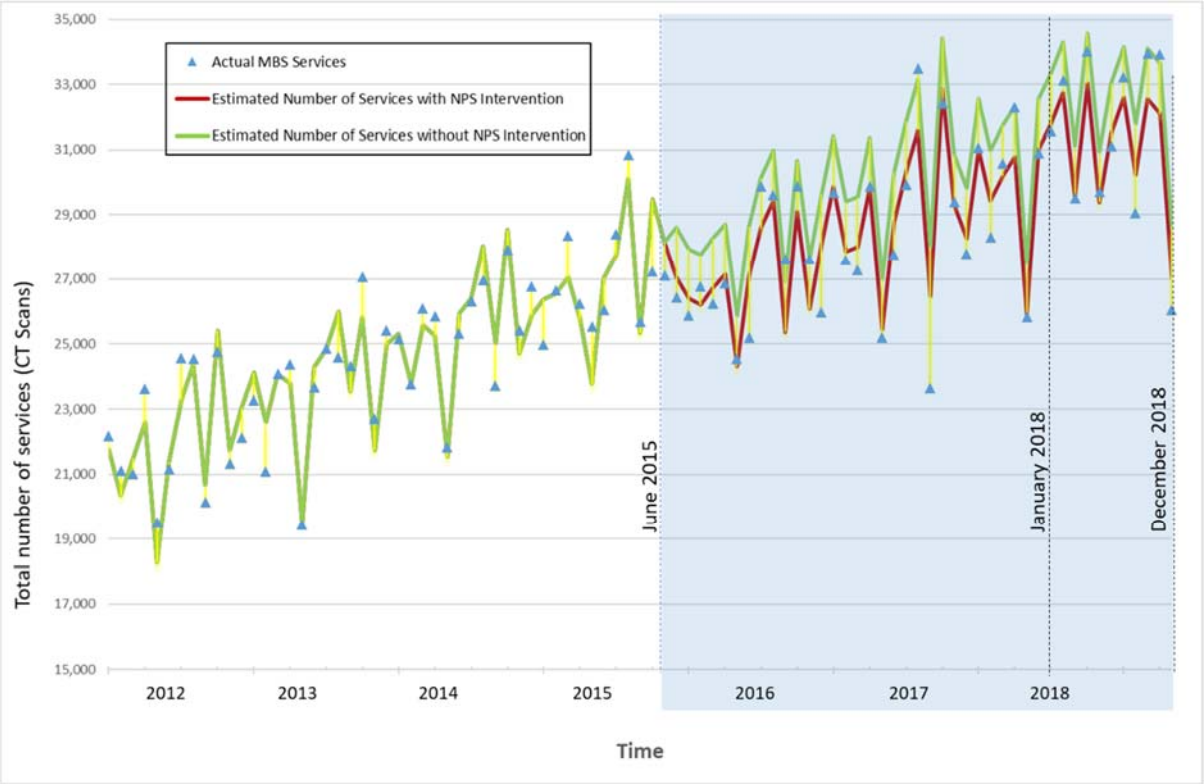
TABLE 11: SUMMARY OF MBS EXPENDITURE SAVINGS

Service	Cost savings Jan – Dec 2018	95% Confidence Intervals
Abdominal CT scans	$7,735,086	$4.65M–$10.82M
Abdominal ultrasounds	$13,830,315	$7.94M–$19.72M
Abdominal X-rays	No significant change	NA
Total	$21,565,401	$12.59M–$30.54M

CT scans

We found a total reduction of 18,618 abdominal CT scans between January and December 2018, compared to the expected number of CT scans if the intervention had not occurred. This equates to an average of 1,551 fewer CT scans per month. The cost savings estimate associated with this reduction in services is $7,735,086 (95% CI $4.65M to $10.82M) over the 12-month period ($644,591 per month), assuming an average subsidy of $415.50 per service (Figure 11).

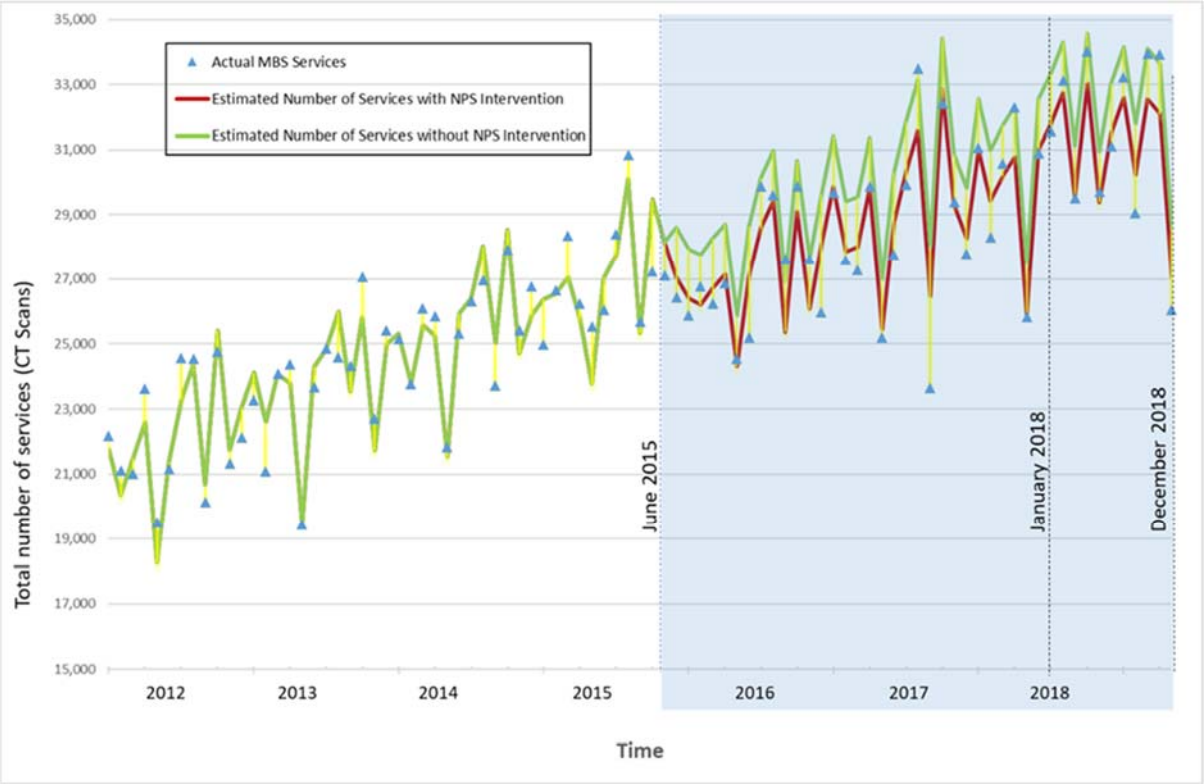
FIGURE 11: IMPACT OF NPS MEDICINEWISE ABDOMINAL IMAGING PROGRAMS ON CT SCAN SERVICES



Ultrasounds

There were an estimated 140,763 fewer abdominal ultrasounds between January and December 2018. This is a reduction of 11,730 services on average per month, compared to the expected number of ultrasounds if the intervention had not occurred. Assuming an average subsidy of $98.25 per service, this is equivalent to a saved expenditure of $13,830,315 (95% CI $7.94M to $19.72M) over the 12-month period, January to December 2018 (Figure 12).

FIGURE 12: IMPACT OF NPS MEDICINEWISE ABDOMINAL IMAGING PROGRAMS ON ULTRASOUND SERVICES



X-rays

We were unable to find a significant change in the number of X-ray services provided (predicted compared to observed), which suggests that X-rays were not being used in place of CT scans or ultrasounds for abdominal imaging following the NPS MedicineWise intervention, in line with program messaging.

ECONOMIC EVALUATION OF THE 2015 CHRONIC PAIN PROGRAM

Introduction

In 2015 NPS MedicineWise launched the *Chronic pain: opioids and beyond* visiting program. The overarching goal of the *Chronic Pain* program was to improve well-being for patients with chronic non-cancer pain who are managed in primary care.

The primary objectives of the NPS MedicineWise 2015 Chronic Pain program were to improve knowledge and practice of health professionals and consumers in line with program key messages.

The key messages for health professionals were:

- For assessment and management of chronic non-cancer pain, take a planned approach, consider comorbidities and address physical and psychological factors
- Opioids have limited value in chronic non-cancer pain: assess for discontinuation at each review.

The key messages for consumers were:

- By working together with your doctor and health care team, you can achieve your pain management goals
- Opioids may have short-term benefits but often have side effects and are usually not effective for long-term pain management
- There are many strategies available to help you manage your pain. Using a combination of these is more likely to help than using a single strategy.

The national Chronic Pain visiting program was targeted primarily at health professionals and was delivered by NPS MedicineWise Educational Visitors from June 2015. The main activities and interventions for the Chronic Pain program are shown in Table 12.

TABLE 12: INTERVENTION AND ACTIVITIES SUITE FOR THE NPS MEDICINEWISE 2015 CHRONIC PAIN PROGRAM

Health professionals (interactive)	Health professionals (other)	Consumer
One-to-one educational visits	Health professional hub (website)	Consumer hub (website)
Small group meetings	MedicineWise news	Chronic pain communication tool
Clinical e-Audit	PBS feedback with Prescribing Practice Review	Chronic pain videos
Case study	NPS Direct	My pain diary
Pharmacy practice review	NPS for Nurses	Chronic pain fact sheet
Online learning module	GP & Pharmacist Update	Social media posts

Based on key messages, educational materials, and current prescribing and patient management patterns the expected outcomes of the program were:

- Reduce the number of opioid prescriptions for the patients with chronic non-cancer pain
- Reduce the number of patients with chronic non-cancer pain inappropriately prescribed opioids
- Improve pain management for patients with chronic non-cancer pain.

The objective of this economic evaluation was to identify, in monetary terms, the costs and benefits of the implementation and achievement of outcomes for the Chronic Pain program from the perspective of the Australian Government Department of Health.

Study one: Population-level cost benefit analysis

Methods

Estimating the benefits

De-identified, provider-level PBS administrative claims data were sourced from Services Australia. Only claims data for opioid medicines used in the management of chronic pain in general practice and supplied by GPs were used in this analysis. The timeframe for the evaluation of program effectiveness and benefit was the 24 months post-program, July 2015 to June 2017.

Time series analysis was applied to measure the change in volume of selected opioid medicines. Intervention, seasonal, autocorrelation and external event terms were fitted to the GP volume of opioid dispensing and the intervention was modelled as an interaction term between the monthly cumulative number of participating GPs and the dispensing trend over time.

From the final model specification, the time series of the forecasted volume of supplied opioid medicines ('counterfactual') was output and compared to the actual volume of supplied opioid medicines ('actual'). The difference between the counterfactual and actual series is the volume of prescriptions averted, ie the benefit. The number of prescriptions averted is multiplied by the average benefit of these prescriptions to calculate the net benefit in monetary terms.

Estimating the costs

Program costs occurred from the 2013–14 financial year and were sourced internally from NPS MedicineWise finance and timesheet systems. A discounting rate of 5% per year was applied to all costs, benefits and effects that occurred after this year. All program costs were adjusted to 2016–17 currency using the Australian Consumer Price Index (CPI) published by the Australian Bureau of Statistics (ABS). Infrastructure and support services were additional costs, calculated as 25% of staff costs.

For Study 2, we divided the estimated total program cost (including lower estimate and upper estimate) by the number of participating GPs to perform the economic evaluation. The number of participating GPs was derived from internal systems, totalling 7,533 interactive GPs.

Cost-benefit analysis

A cost-benefit analysis was conducted to quantify the net cost to benefit ratio to the Australian Government Department of Health. Values higher than zero indicate that the benefits exceed costs.

Sensitivity analysis

Scenarios for sensitivity analysis were calculated for both studies, using the following limits.

- Base case: point estimates of the program cost and benefits
- Maximum: upper estimate of total program cost, upper 95% confidence limit of benefits
- Minimum: lower estimate of total program cost, lower 95% confidence limit of benefits
- Least favourable: upper estimate of total program cost, lower 95% confidence limit of the benefits
- Most favourable: lower estimate of total program cost, upper 95% confidence limit of the benefits.

Results

Estimating the benefits

The benefit of the program was estimated as the number of scripts averted using time series analysis. Table 13 presents the final model specification for the non-decay and decay models incorporating the following terms: intervention, non-intervention, seasonal and autocorrelation. Table 15 summarises the

key model fitting criteria and results from residual diagnostics. Non-intervention terms account for major external events that have impacted the trend of dispensing over time and are not associated with the intervention.

TABLE 13: TIME SERIES MODELLING RESULTS, DECAY AND NON-DECAY FINAL MODEL SPECIFICATION

	Non-decay intervention model			Decay intervention model		
Final model specification	Estimate	SE	P value	Estimate	SE	P value
Intercept	491048.4	3168.2	< .0001	491001.5	3171.6	< .0001
Trend	2904	43.85772	< .0001	2905.5	44.0268	< .0001
Intervention – CUMGPTrend	-0.22964	0.1049	0.0286	-0.26718	0.12365	0.0307
Non–Intervention – January 2017 step change	-19224.8	9723.2	0.048	-20863.7	9237.3	0.0239
Non–intervention – January 2016 step change	-11641	9699.8	0.2301	-10670.1	10180.7	0.2946
Non–intervention – July 2015 outlier	29393.7	11931.7	0.0138	29097.7	11953	0.0149
Non–intervention – April 2016 outlier	46717.8	12178.5	0.0001	47248.1	12177.8	0.0001
Non–intervention – December 2016 outlier	-42058.2	14687.8	0.0042	-42976.1	14620.2	0.0033
Non–intervention – February 2013 outlier	-28063.2	11983	0.0192	-28164	11988.1	0.0188
Non–intervention – April 2011 outlier	24716.1	11965.1	0.0389	24789.8	11972.3	0.0384
Seasonal – January	-80406.8	4746.7	< .0001	-80388.4	4749.3	< .0001
Seasonal – February	-82657.4	3901.3	< .0001	-82590.8	3899.1	< .0001
Seasonal – April	-54689.7	4549.1	< .0001	-54785.2	4555.5	< .0001
Seasonal – October	28272.5	4230.2	< .0001	28259.7	4232.8	< .0001
Seasonal – December	75144.9	8061.7	< .0001	74977.8	8072.5	< .0001
Seasonal – June trend	-247.454	44.26782	< .0001	-248.972	44.27932	< .0001
Seasonal – December trend	403.8618	108.153	0.0002	407.4788	108.4846	0.0002
AR 1	-0.38315	0.06632	< .0001	-0.38294	0.06633	< .0001
AR 3	0.55101	0.06652	< .0001	0.55077	0.06654	< .0001

TABLE 14: SUMMARY OF MODEL FITTING CRITERIA, RESIDUAL DIAGNOSTICS, CHRONIC PAIN PROGRAM

Model	AIC	SBC	Standard error	Normality (p value) Shapiro-Wilk	Autocorrelation (p value) Lags 6, 12, 18, 24
Decay	3041.082	3096.7	13773.8	0.6422	0.4257, 0.0386, 0.0510, 0.0188
Non-decay	3040.948	3096.566	13767.01	0.6298	0.4210, 0.0376, 0.0508, 0.0182

Using the average between the decay and non-decay model, the program was associated with 501,898 (95% CI: 44,903 to 958,893) fewer opioid prescriptions dispensed than expected had the program not occurred (Table 15). This is a discounted, adjusted benefit from averted opioid dispensing of $12,053,870 (95% CI: $1,078,375 to $23,029,365).

TABLE 15: SUMMARY OF TIME SERIES ANALYSIS FOR INPUT INTO ECONOMIC EVALUATION

	Non-decay intervention model	Decay intervention model	Average
Number of scripts averted	509,155	494,640	501,898
% decrease in volume	2.59%	2.52%	2.56%
Cost savings ($)	13,934,907	13,527,448	13,731,177

Estimating the costs

Cost data for the 2015 Chronic Pain program was collected from NPS MedicineWise finance and timesheet systems (Table 16). Using the cost from four similar programs, previously implemented by NPS MedicineWise, a standard deviation for the program cost was estimated and multiplied to the base cost of the 2015 Chronic Pain program to produce a lower and upper estimate of the program's cost.

TABLE 16: ESTIMATED COSTS FOR 2015 CHRONIC PAIN PROGRAM, ADJUSTED AND DISCOUNTED

Cost	Base case	Standard deviation	Lower estimate of variation	Upper estimate of variation
Invoice costs ($)	206,727	65,300.71	141,426	272,028
Staff costs (plus 25% infrastructure / support services) ($)	855,780+285,260 = 1,141,040	31,413.82	824,366+274,788 = 1,099,155	887,194+295,731 = 1,182,925
Delivery of face-to-face visits ($)	1,934,128	33.06 per 6924 face-to-face occurrences	1,705,221	2,163,036
Total cost, $ AUD	3,281,895		2,945,802	3,617,989

Cost-benefit analysis

Table 17 presents the results of the cost-benefit analysis of the program. The value of 3.67 indicates that for every dollar spent on the program, $3.67 was gained in monetary benefit.

TABLE 17: SUMMARY OF COST-BENEFIT ANALYSIS OF NPS MEDICINEWISE 2015 CHRONIC PAIN PROGRAM, USING PBS DATA

Benefit:	Cost:		
Savings from opioid dispensing averted	Estimated	Net benefit	Benefit to cost ratio
$12,053,870	$3,281,895	$12,053,870 – $3,281,895 = $8,771,975	$12,053,870 / $3,281,895 = 3.67

Sensitivity analysis

Sensitivity analysis demonstrated that the estimates of the program's cost and benefit and resulting benefit to cost ratio were highly dependent on the uncertainty in the estimate of impact on the PBS from the time-series analysis. Table 18 presents the resulting benefit to cost ratio ranged from 0.30 (costs exceed benefit) to 7.82 (benefits exceed costs).

TABLE 18: RESULTS OF SENSITIVITY ANALYSIS – BASE-CASE AND FOUR SCENARIOS

	Base-case	Maximum	Minimum	Least favourable	Most favourable
Cost: Estimated ($)	3,281,895	3,617,989	2,945,802	3,617,989	2,945,802

	Base-case	Maximum	Minimum	Least favourable	Most favourable
Benefit: averted opioid dispensing	12,053,870	23,029,365	1,078,375	1,078,375	23,029,365
Benefit to cost ratio	3.67	6.37	0.37	0.30	7.82

Study two: GP behaviour-level cost benefit analysis

Methods

Estimating the benefits

The benefits of the program were measured using MedicineInsight data for the following expected outcomes:

- Averted scripts: change in volume of opioid medicines prescribed by GPs for adult patients with chronic non-cancer pain, measured using time series analysis
- Averted GP encounters: change in the number of encounters with a GP for adult patients with chronic non-cancer pain, measured using time series analysis
- Averted opioid initiations: change in the proportion of adult patients with chronic non-cancer pain newly prescribed an opioid medicine, measured using a generalised linear model.

A counterfactual time series was constructed for the intervention group on what the outcome of interest would have been had this group not actively participated in the Chronic Pain program, where the intervention time point was defined as June 2015. The timeframe for the estimation of the benefit was 36 months post-program, June 2015 to May 2018. A generalised linear model was used to estimate the expected average ratio of patients initiated on an opioid medicine.

Data were extracted from the MedicineInsight database between 1 June 2010 and 31 May 2018 for analysis. NPS MedicineWise participation data were used to identify if MedicineInsight GPs participated in one or more Chronic Pain program 'interactive' interventions.

This study defined a cohort of patients and prescribers for inclusion in analysis using MedicineInsight data (Table 19). Chronic non-cancer pain was defined as a patient ever being diagnosed with chronic pain; or having a reason for encounter or reason for prescription of chronic pain; or having multiple records of neuropathic pain or back pain suggesting that the pain was chronic, defined as pain mentioned for periods longer than three months.

The demographic and practice profile of each GP group was consistent over the two periods, although there were some differences between groups. The GP control group were more likely to practise in NSW (2014: 51% vs 30%; 2016: 49% vs 30%) and to have worked at practices in major cities compared to the GP intervention group (2014: 74.5% vs 58.1%; 2016: 74.4% vs 61.4%). The practices of the GP intervention group were more likely to be in socio-economically disadvantaged areas and have more patients with chronic non-cancer pain than the GP control group. Overall patients' age and gender were similar between the two groups for both periods.

TABLE 19: FINAL SAMPLE OF ELIGIBLE PATIENTS AND PRESCRIBERS FOR ANALYSIS, INTERVENTION AND CONTROL GROUPS

	Inclusions	Exclusions	Final sample
Patients	Have chronic non-cancer pain Over 18 at date of first encounter for chronic non-cancer pain Had at least one encounter with an eligible prescriber Prescribed an opioid by an eligible prescriber	Cancer and/or palliative care	Intervention: n = 103,797 Control: n = 13,516

	Inclusions	Exclusions	Final sample
Prescribers	Classified as a doctor Had valid provider / prescriber numbers Had at least one encounter with an eligible patient Prescribed an opioid to an eligible patient Not practising at a blacklisted site	If they had not participated in any interactive programs but had worked at a practice where other GPs had participated in these programs	Intervention: n = 1,899 Control: n = 586

Estimating the costs

As for Study 1, program costs incurred for the 2013–14 financial year were sourced internally from NPS MedicineWise finance and timesheet systems. A discounting rate of 5% per year was applied to all costs, benefits and effects that occurred after this year. All program costs were adjusted to 2016–17 currency using the Australian Consumer Price Index (CPI) published by the Australian Bureau of Statistics (ABS). Infrastructure and support services were additional costs, calculated as 25% of staff costs.

For Study 2, we divided the estimated total program cost (including lower estimate and upper estimate) by the number of participating GPs to perform the economic evaluation. The number of participating GPs was derived from internal systems, totalling 7,533 interactive GPs.

Results

The volumes of prescriptions and GP encounters were significantly lower for the GP intervention group compared to the GP control group in the post-intervention period (Table 20). There was no significant difference between the GP intervention and GP control groups at each of the four time periods in measuring opioid initiations. Therefore, this outcome was excluded as a benefit from cost-benefit analysis.

TABLE 20: RESULTS OF ESTIMATING BENEFITS FROM 2015 CHRONIC PAIN PROGRAM, MEDICINEINSIGHT DATA

Measured outcome	Method	Estimated benefit
Measuring volume of prescriptions prescribed to patients with chronic non-cancer pain	Bayesian structural time series analysis	Overall reduction in the post-intervention period of 34,575 prescriptions (95% BCI: -56,138, -12,815)
Measuring volume of GP encounters with patients with chronic non-cancer pain	Bayesian structural time series analysis	Overall reduction in the post-intervention period of 107,938 encounters (95% BCI: -164,117, -52,438)
Measuring proportion of patients with chronic non-cancer pain initiated on opioid medicines	Generalised linear model	Nil estimated benefit

As MedicineInsight data does not contain information on the individual PBS item numbers nor the costing and concession status at the time of prescribing for opioid prescriptions, we estimated the benefit of an opioid prescription averted using the average cost to the PBS for dispensing an opioid. We used the cost of MBS item code 23 (standard consultation with a GP) at June 2017, $37.05, to estimate the benefit of a GP encounter averted over the study period. This is discounted to $32.01.

Estimating the costs

The cost per participating GP is $435.67, with lower and upper cost per participating GP estimate of $391.05 and $480.28, respectively.

Cost-benefit analysis

Table 21 presents the results from the cost benefit analysis of the 2015 Chronic pain program. The total net benefit and benefit to cost ratio are used to compare the cost of the program to the benefit gained from the averted opioid prescriptions and GP encounters per intervention GP. The value of 5.32 indicates that for every dollar spent on the program, $5.32 was gained in monetary benefit to the Australian Government Department of Health.

TABLE 21: COST-BENEFIT ANALYSIS RESULTS OF THE 2015 CHRONIC PAIN PROGRAM

Outcome	Total outcomes 2015/16-2017–18 (95% CI)	Outcome per intervention GP (95% CI)	Benefit per intervention GP (95% CI)
Number of opioid prescription items prescribed averted	34,575 (12,815–56,138)	34,575/1,899 = **18.21** (95% CI: 6.75–29.56)	18.21 x $27.36 = $**498.14** ($184.63–$808.81)
Number of GP encounters averted	107,938 (52,438–164,117)	107,938/1,899 = **56.84** (95% CI: 27.61–86.42)	56.84 x $32.01 = **$1,819.16** ($883.77–$2,123.34)
Total benefit per intervention GP			**$2,317.30** ($1,068.41–$3,574.79)
Program cost per intervention GP			$435.67
Net benefit per intervention GP			**$1,881.53** ($632.74–$3,139.12)
Benefit to cost ratio (benefit/program cost)			**5.32** (2.45–8.21)

Sensitivity analysis

A multivariate sensitivity analysis was performed to estimate the combination of changes in the effect and cost of prescriptions and encounters compared to program costs (Table 22). This produced a range of the benefit to cost ratio from 2.19 to 10.62.

A tolerance limit of an increase and/or decrease in 10% to the average cost incurred to the PBS for dispensed opioid medicines was applied in this sensitivity analysis. The cost of a GP encounter was tested using prescribing and encounter behaviour of the GP intervention group from MedicineInsight data. Site billing data in MedicineInsight was used to estimate the proportion of the type of GP encounters billed to patients with chronic non-cancer pain with participating GPs; MBS services for encounters are costed differently. This sensitivity analysis used the weighted average cost of a GP encounter derived from the estimated proportion of GP encounters multiplied by the MBS benefit of the MBS item as at June 2017. This was calculated as $37.77 (discounted).

TABLE 22: SENSITIVITY ANALYSIS - BENEFIT TO COST RATIO

	Base-case	Maximum	Minimum	Least favourable	Most favourable
Cost of program variation per intervention GP	$435.67	$480.29	$391.05	$480.29	$391.05

	Base-case	Maximum	Minimum	Least favourable	Most favourable
Effect: averted opioid dispensing variation per intervention GP	18.21	29.56	6.75	6.75	29.56
Benefit: savings from averted opioid dispensing variation per intervention GP	$498.14	$889.756	$166.19	$166.19	$889.76
Effect: averted encounters per intervention GP	56.84	86.42	27.61	27.61	86.42
Benefit: savings from averted opioid dispensing variation per intervention GP	$1,819.16	$3,264.08	$883.80	$883.80	$3,264.08
Net benefit	$1,881.53	$3,673.55	$658.93	$569.69	$3,762.79
Benefit to cost ratio	5.32	8.65	2.69	2.19	10.62

Discussion

A cost-benefit analysis relies on the benefits of the program to be quantifiable and expressed in monetary terms. With complex and multifaceted behaviour change programs, quantifying and estimating benefits is not achievable for many health outcomes associated with a program.

The economic evaluation of the national NPS MedicineWise 2015 Chronic pain program found that:

- At a population level, from the perspective of the Australian Government Department of Health, the Chronic pain program had a benefit to cost ratio of 3.67 and a net benefit of $8,771,975
- For each participating GP, from the perspective of the Australian Government Department of Health, the Chronic pain program had a benefit to cost ratio of 5.32 and a net benefit of $1,881.53 per participating GP.

The interactive component of the Chronic pain program was effective at reducing GP prescribing of opioids by 7.5% (n = 12,780 prescriptions) and reducing GP encounters by 6.3% (n = 47,761 encounters).

The strengths of cost-benefit analysis include the quality of the data sources used and the ability of the time series method to accurately estimate the attributable effect of the interactive components of the Chronic pain program. There are also limitations associated with this methodology as we cannot control for all confounding variables. Although the age and gender distribution of patients was similar for both the GP intervention and GP control groups, there were significant differences in socio-demographic distribution, and the average number of encounters and patients with chronic pain per GP. GPs who participated in the MedicineInsight data collection program are also a self-selected group and may have limited generalisability to the total GP population.

In the future, consideration of other statistical techniques such as propensity score matching (PSM) could be applied to estimate and account for potential confounding between the GP intervention and GP control groups, ultimately assisting in accounting for self-selection bias in an observational study. PSM attempts to estimate the effect of an intervention by accounting for the covariates that predict receiving the treatment. Weighting the control series to ensure similar characteristics between the two groups can also be considered. An assessment of the feasibility and appropriateness of using these statistical techniques with MedicineInsight data would need to be undertaken.

IMPACT OF THE 2016 TYPE 2 DIABETES PROGRAM ON PATIENT ADHERENCE TO METFORMIN

Introduction

Approximately 1.7 million Australians have diabetes, with type 2 diabetes mellitus (T2DM) accounting for 85% of cases. This includes an estimated 500,000 people with undiagnosed diabetes.[3] Diabetes was the sixth most common cause of death in 2011 and was associated with 220,000 hospitalisations in 2010–11. The total annual cost impact of diabetes in Australia is estimated at $14.6 billion.

Medicines used to treat diabetes are among the fastest growing PBS-subsidised medicines, both in volume and cost to government. Metformin and the sulfonylureas are the most commonly prescribed blood glucose-lowering medicines. While the number of scripts for metformin has doubled from around 2.3 million in 2000 to around 5.0 million in 2013, the use of sulfonylureas has remained steady and may reflect prescribers moving away from these medicines in favour of newer and more costly blood glucose-lowering agents.[4]

In July 2016, NPS MedicineWise launched the visiting program *Type 2 diabetes: what's next after metformin?* (Type 2 diabetes program). The program's goal was to reduce the occurrence of diabetes-related complications in people with T2DM managed in primary care. Improving adherence to metformin was one of the key messages of the program, in addition to reinforcing the use of sulfonylureas as second-line therapy and revisiting the use of a stepped approach with all diabetes medicines to achieve patient blood glucose targets.

The program ran from 1 July 2016 to 30 June 2017. The program activities included one-to-one educational visits, small group meetings (including MedicineInsight practices), a Clinical e-Audit, a pharmacy practice review, a clinical case study, PBS practice review, print publications, online resources and consumer-directed decision aids and fact sheets.

A total of 9,761 GPs participated in a one-to-one educational visit or a small group meeting. Additionally, 639 GPs completed a Clinical e-Audit, 346 GPs completed a clinical case study and the Lifestyle and metformin patient decision aid PDF was downloaded 1,134 times. A total of 29,750 prescribers received the PBS practice review.

Methods

We used the 10% PBS data sample, supplied by Services Australia, to evaluate adherence to metformin-containing medicines before and after the NPS MedicineWise Type 2 diabetes program. The 10% PBS data contains a longitudinal cohort of 10% of Australians randomly sampled from the Medicare Australia database, which tracks medication records among the cohort.

The overall study timeframe was from 1 July 2014 to 31 March 2019. The study population was restricted to those patients who were alive throughout the study period and who were aged 40 years and over at the index date. The sample included two cohorts of patients: patients newly initiated on metformin-containing medicines, single ingredient or fixed dose combinations (FDCs), between 1 July 2014 and 1 July 2015 (the before cohort); and patients newly initiated on metformin-containing medicines between 1 July 2017 and 31 March 2018 (the after cohort). The sample also required at least 12 months of follow-up data available either prior to the intervention commencement date (the before cohort) or 12 months of follow-up data before the end of the study period (the after cohort).

Initiation of metformin was defined as where there were no PBS prescriptions for any metformin-containing medicines of any formulation dispensed in the 24 months prior to the date of the initial prescription. The index date was calculated based on the supply date of the second metformin

prescription after initiation. The second prescription dispensing date was selected rather than the first, due to the use of a titration period for people newly initiated on metformin.

Adherence was measured using a modified version of the proportion of days covered (PDC) for prescriptions dispensed within 12 months of initiating metformin for both cohorts. PDC was calculated as the sum of the intended duration of each prescription within the 12-month follow-up period, divided by 365. Long duration estimates were used as these are more consistent with reported rates of metformin adherence in the literature.[5-7] The PDC ranges from 0% to 100%, and we used a cut-off threshold of 80%, which is commonly used in diabetes medication adherence studies, to distinguish between adequate adherence (PDC ≥ 80%) and non-adherence (PDC < 80%).[5-7]

Due to limitations of the PBS data, the outcome measures were estimated or derived, and we performed a number of additional analyses to evaluate the appropriateness of our model. We assessed different estimations of PDC by calculating the shortest, longest and median durations that a prescription pack of metformin-containing medicines could potentially be used for.

We used multivariable logistic regression to examine the association between the time period of the program (before/after) and the likelihood (risk) that patients achieved adequate adherence (PDC ≥ 80%), controlling for potential confounders, such as patient's age, gender, state of residency, concessional status, use of combination or single ingredient metformin formulation, total number of other non-diabetic medicines dispensed, and metformin strength at initiation. The significance of the variables in the model was assessed using the likelihood ratio test and determination of odds ratios (ORs) with associated 95% confidence intervals, based on the final logistic model fitting. P-values less than or equal to 0.05 were considered statistically significant.

Results

The 'before' cohort consisted of 4,564 patients with a median age of 60 years (SD 11.7 years, range 40-96 years). The 'after' cohort consisted of 3,294 patients, with a median age of 60 years (SD 11.9 years, range 40-98 years). The sociodemographic distribution was similar between the two cohorts, with more male than female patients (55.2% and 56.2% male in the before and after cohorts, respectively). More than three-quarters of patients in both cohorts were aged between 40 and 69 years of age.

There were 30,665 dispensing records for metformin-containing medicines in the 'before' cohort, and 22,201 records for the 'after' cohort, with an average of 6.7 dispensing records for metformin medicines per patient, both before and after the intervention. The frequency distribution of number of dispensing records per patient was very similar between both cohorts. Most patients in both the before and after cohorts used metformin single-ingredient therapy (84.2% and 81.4% of patients, respectively), although slightly fewer patients in the 'before' cohort used FDCs or switched between single ingredient therapy and FDC formulations.

We found no significant difference in the mean PDC between the before and after cohorts. The mean PDC for the 'before' cohort was 74.1% (95% CI 73.2 to 74.9, range 7.7–100), and the mean PDC for the 'after' cohort was 74.4% (95% CI 73.4 to 75.4, range 7.7–100).

The proportion of patients who were adequately adherent (PDC ≥ 80%) to metformin-containing medicines did not change significantly (p = 0.73) in the 'after' cohort compared to the 'before' cohort, with both cohorts showing adherence rates of around 57% (Table 23). These rates were not affected by adjusting for age, sex, concessional status or state. The adjusted odds ratio was 1.02 (95% CI 0.93 to 1.11, p = 0.73).

TABLE 23: ADHERENCE RATES TO METFORMIN-CONTAINING MEDICINES BEFORE AND AFTER THE TYPE 2 DIABETES PROGRAM

	Before Type 2 diabetes program		After Type 2 diabetes program	
	n	%	n	%
Adequate adherence to metformin-containing medicines (PDC ≥ 80%)	2,601	57.0%	1,890	57.4%
Non-adherence to metformin-containing medicines (PDC < 80%)	1,963	43.0%	1,404	42.6%

Decreasing the duration estimate that a prescription pack of metformin-containing medicines could potentially be used for also decreased the adherence rate (Table 14), with the short duration estimate resulting in an adherence rate of 18.6% in the 'before' cohort, and 19.2% in the 'after' cohort. We used the long duration estimate in this report, as it gives a similar adherence rate to metformin as has been reported in the literature (between 60% and 70%).[5-7]

TABLE 24: SENSITIVITY ANALYSIS OF LONG, MEDIUM AND SHORT DURATION ESTIMATES FOR PDC

	Before Type 2 diabetes program		After Type 2 diabetes program	
	n	%	n	%
Long duration: Adequate adherence to metformin-containing medicines (PDC ≥ 80%)	2,601	57.0%	1,890	57.4%
Medium duration: Adequate adherence to metformin-containing medicines (PDC ≥ 80%)	1,358	29.8%	984	29.9%
Short duration: Adequate adherence to metformin-containing medicines (PDC ≥ 80%)	847	18.6%	631	19.2%

Discussion

This retrospective study evaluated adherence to newly initiated metformin medicines in two cohorts of patients, before and after the NPS MedicineWise 2016 Type 2 diabetes program.

Overall, adherence to metformin-containing medicines over a 12-month follow-up period was low, and there was no improvement in adequate adherence in the 'after' cohort compared to the 'before' cohort. Only 57% of patients were adequately adherent (based on a PDC of ≥ 80%) in both cohorts, using the longer estimates of pack duration. If we applied the shortest pack duration criteria to the analysis, adherence rates were only 18.6% and 19.2% in the before and after cohorts, respectively. This is much lower than has been typically reported for metformin adherence in the literature and suggests that the short duration criteria are too stringent as an estimate of PDC. In clinical practice, management of diabetes follows an individualised, stepped approach, particularly for newly diagnosed patients, and metformin prescribing patterns are further complicated by the broad range of different fixed-dose and single-ingredient regimens.

Several factors may have influenced our ability to demonstrate improvement in adherence following the Type 2 diabetes program. Adherence was only one of several key messages delivered through the program and the primary audience of this message was the clinician, rather than the consumer. Adherence behaviour ultimately relies on each patient complying with their doctor's advice. The impact of the program on GPs may not be transferred through to patients, especially when the program was delivered in 'real-world' conditions rather than through a randomised controlled trial. The 10% PBS sample includes a random selection of GPs in Australia, and we cannot compare GPs or practices who participated in the Type 2 diabetes program with those who did not.

There were some further limitations with the current study. PBS data only contains data on medications and does not contain data on patient diagnoses or conditions. Therefore, one of the study assumptions was that the selected cohorts of patients were newly initiated on metformin-containing medicines, as a proxy for patients who were newly diagnosed with T2DM. Without knowing the actual diagnosis, we cannot fully separate patients with other conditions, or those who had been diagnosed previously, from the data.

In addition, as in other drug utilisation studies using administrative data, the measure of adherence used in this study only related to filled scripts, and whether patients took the medications could not be determined. Alternative instructions or use may also lead to an underestimate of adherence rates. The presence of comorbidities, including depression and anxiety, may also impact on a patient's capacity for medication adherence. Poor patient adherence rates for metformin-containing medicines are well-documented in the literature[8] and are recognised as the result of several different disease-related, cognitive and psychological, and provider-related factors.[9]

Future evaluation of interventions that aim to improve quality use of medicines via clinical practice could investigate changes specifically in provider prescribing patterns using linked PBS dispensing data and MedicineInsight data as MedicineInsight contains patient information on conditions, diagnoses and medication dosage instructions. This may enable a more robust analysis of adherence.

STATINS: OPTIMISING THERAPY, ADDRESSING INTOLERANCE

Introduction

Dyslipidaemia is abnormal levels of plasma cholesterol, triglycerides, or both, that contribute to the development of atherosclerosis. Around 8.5 million Australian adults have dyslipidaemia, which is a major risk factor for cardiovascular disease. Dyslipidaemia is most often managed by GPs, where one in three encounters are related to this.[10] Evidence indicates that Australian GPs continue to prescribe statins for people with elevated cholesterol levels but at low absolute CV risk and that there is underuse of statins for people at high absolute CV risk.[11-13] One of the RACGP Choosing Wisely Australia recommendations is to avoid commencing therapy for hyperlipidaemia without first assessing the absolute risk of a CV event. The Pharmaceutical Benefits Advisory Committee (PBAC) has expressed concern that the PBS listing of ezetimibe with statin co-packs and combination products may be directing use away from recommended dose titration of statins. PBS data also indicates that prescribing of ezetimibe and ezetimibe combinations increased between 2005 and 2015.

In July 2017, NPS MedicineWise launched the visiting program *Statins: Optimising therapy, addressing intolerance* (Statins program) to address these quality use of medicine issues and facilitate improved patient care. The main goal of the program was to reduce the risk of CV events for Australians managed in primary care.

Program objectives

The program objectives were to:

- Increase by 15% the proportion of GPs who use the Australian absolute CV disease risk calculator to inform the prescribing of lipid-lowering medicines
- Decrease GP prescribing of a) ezetimibe by 10% and b) ezetimibe FDC products by 10% for people who have not adequately trialled statin therapy 18 months after the start of the program
- Increase by 5% the proportion of people who adhere to prescribed lipid-lowering medicines 18 months after the start of the program.

Key messages

- Assess absolute cardiovascular risk before prescribing lipid-lowering medicines
- Optimise LDL lowering by adequately trialling statin therapy before adding a second agent
- Use a systematic approach to assess suspected statin intolerance

Program activities

The program activities included one-to-one educational visits, small group meetings (including MedicineInsight practices), a Clinical e-Audit, Pharmacy Practice Review, online case study, PBS Practice Review, print publications and online resources. Additionally, as part of this topic, a management algorithm for statin associated muscle symptoms (SAMS) was developed with 11 experts. This part of the educational visiting resources was subsequently published in the CV Therapeutic Guidelines and Australian Medicines Handbook.

A total of 9,275 unique GPs participated in an activity for the Statins program; including 4,552 GPs who participated in a one-to-one educational visit, 4,188 in small group meetings, 855 in the Clinical e-Audit and 363 in the online case study. Other participating health professionals included pharmacists, nurses, medical specialists and medical students. A total of 30,000 prescribers received the PBS practice review.

Methods

The evaluation sought to assess whether the Statins program had a measurable impact on GP knowledge and practice in line with its key objectives and messages.

GP survey

A retrospective pre-test (RPT) survey of GPs was the primary method to measure the impact of the Statins program on GP knowledge, attitudes and practice.[14] The survey was a self-completion, paper-based questionnaire sent to two random samples of GPs:

- Participant survey – a retrospective pre-test (RPT) survey of 1200 GPs who had participated in a 'Statins' one-to-one visit or small group meeting. The RPT questionnaire asked GPs to indicate their knowledge and practice 'now' and to reflect on their level of knowledge and practice 'before' participating in the Statins program.
- Control survey – a control sample of 800 GPs who had not participated in an active Statins program activity but were known to NPS MedicineWise through participation in previous programs. Control GPs were sent a standard paper-based questionnaire for comparison.

The survey questions related to the program objectives and key messages that were used in active program interventions such as the one-to-one and small group educational visits.

The survey was conducted in February 2018 and was open for 6 weeks, with two reminders sent at 2-week intervals. The response rates for the participant and control surveys were 19% and 21% respectively.

The participant survey data were analysed to identify any changes in GP knowledge or practice following exposure to a Statins program educational activity. The participant post ('now') data were compared with the control data to determine differences and if these could be associated with the Statins program.

All data were analysed using SPSS version 23. The McNemar and Wilcoxon signed-rank tests were used for the paired participant data. Chi-square and the Mann-Whitney tests were used for participant and control data comparison. The significance level was set at 0.05. The z-test (comparison of proportions) was used to investigate associations between respondent characteristics (eg, years practicing, gender) and knowledge or practice.

Clinical e-Audit

To assess changes in GP practice, Clinical e-Audit data were analysed against six clinical indicators specified within the audit. Data were extracted for the Clinical e-Audit between July 2017 and June 2018. Each GP who participated in the Clinical e-Audit assessed the same 10 patients in two phases, the initial phase and the review phase. The analysis involved comparing review phase data with initial phase data for each participating GP. The outcome measure is the number of patients satisfying each of the six best practice clinical indicators included in the activity. For each indicator, a generalised linear model with a Poisson distribution, log link function and an offset (logarithm of the number of patients) was used to estimate the percentage change in the number of patients meeting the indicator. The analyses were conducted using the GENMOD procedure in SAS v9.3.

Results

Improvement in GP knowledge

GP respondents were presented with knowledge statements that aligned with program key messages and objectives and asked to indicate their level of agreement or disagreement with each. The desired response for each of the knowledge statements was to 'strongly agree' or 'agree'.

Compared to control GPs, significant increases in knowledge were seen for GPs after participating in a Statins program educational visit about: CV risk as the most effective approach for lipid

management; adding a second lipid modifying medicine only for patients who have adequately trialled statin therapy; and about knowing that up to 90% of patients who cannot tolerate a statin will be able to tolerate an alternate statin (Table 25).

TABLE 25: GP RESPONDENTS WHO GAVE DESIRED RESPONSE TO KNOWLEDGE STATEMENTS

Statement	Participant BEFORE, % (n)	Participant NOW, % (n)	Control, % (n)	Significance
Using the absolute CV risk enables the most effective approach to lipid management.	79% (170)	94% (210)	85% (125)	+15%, p ≤ 0.001 (before/now) +9%, p ≤ 0.005 (control/now)
Addition of a second lipid-modifying medicine should be reserved for patients who have adequately trialled statin therapy.	86% (183)	96% (215)	88% (130)	+10%, p ≤ 0.001 (before/now) +8%, p ≤ 0.01 (control/now)
Up to 90% of patients who cannot tolerate a statin will be able to tolerate an alternate statin.	34% (73)	57% (127)	39% (57)	+23%, p ≤ 0.001 (before/now) +18%, p ≤ 0.001 (control/now)

Improvement in GP practice

GP survey

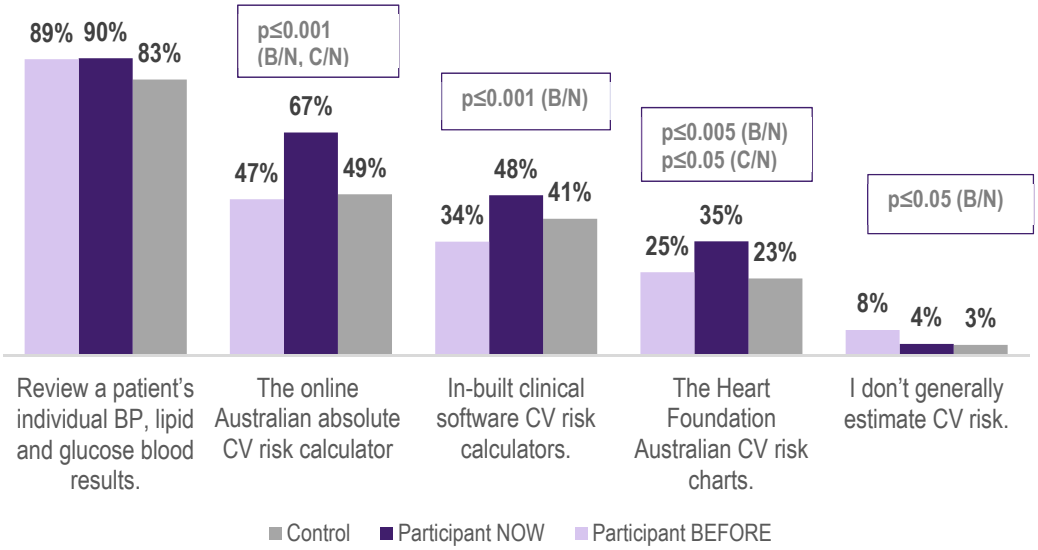
Survey question:

When considering prescribing a lipid-modifying medicine, which of the following strategies do you use to estimate CV risk in patients aged 45–74 years?

1. Review a patient's individual BP, lipid and glucose blood results
2. **The online Australian absolute CV risk calculator (cvdcheck.org.au)**
3. **The Heart Foundation Australian CV risk charts**
4. **In-built clinical software CV risk calculators**
5. I don't generally estimate CV risk

Of the options that were presented to GPs, the desired options (2, 3 and 4) are all Australian based risk calculators. One of the program objectives was to increase the proportion of GPs who use an Australian absolute CV risk calculator before prescribing a lipid-modifying medicine by 15%. There was a significant increase of 18% in the proportion of participant GPs who would use one or more of the Australian CV risk calculators after taking part in an educational visit, and a significant 8% difference between participant and control GPs overall (Figure 13).

FIGURE 13: GP CHOICE OF STRATEGIES TO ESTIMATE CV RISK; B/N = BEFORE VS NOW; C/N = CONTROL VS NOW



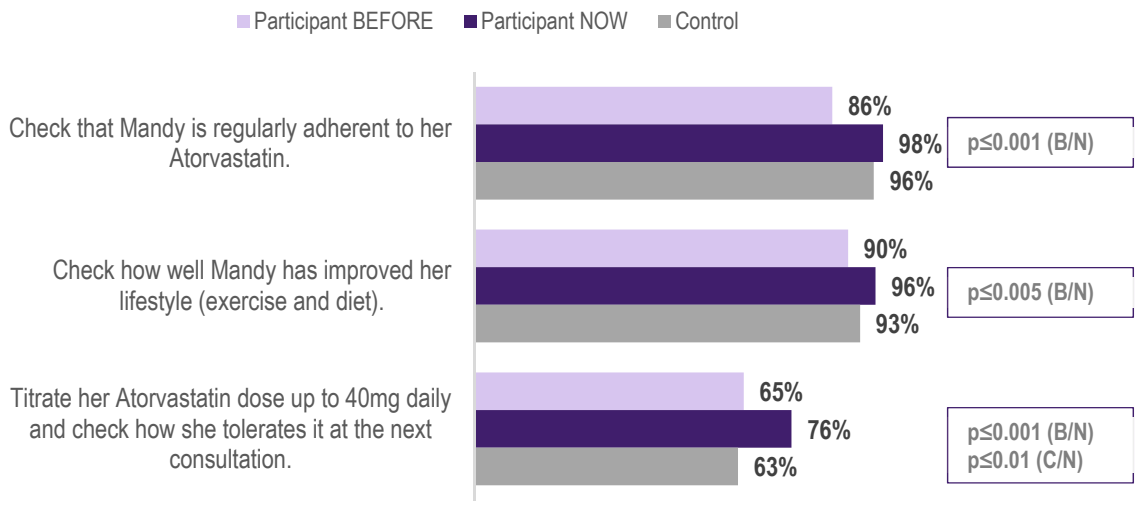
Survey question

GPs were asked to review the following case scenario about fictional patient Mandy to understand how they would manage a patient already on a statin who has not achieved their target LDL-C:

Mandy is a 58-year-old patient at high absolute CV risk of 27% in the next 5 years, with diabetes, dyslipidaemia and a 30 pack/year history of smoking. You advised Mandy to quit smoking, provided appropriate resources and suggested she improve her lifestyle. She agreed to start atorvastatin 20 mg daily. 12 weeks later you order non-fasting lipid tests and her LDL-C is still not at target (LDL-C 2.7 mmol/L, ~40% reduction from baseline). How would you address this?

Based on best practice guidelines, the desired approach is for GPs to 1) check that Mandy is regularly adherent to her atorvastatin, 2) check how well Mandy has improved her lifestyle (exercise and diet) and 3) titrate her atorvastatin dose up to 40 mg daily and check how she tolerates it at the next consultation (Figure 14).

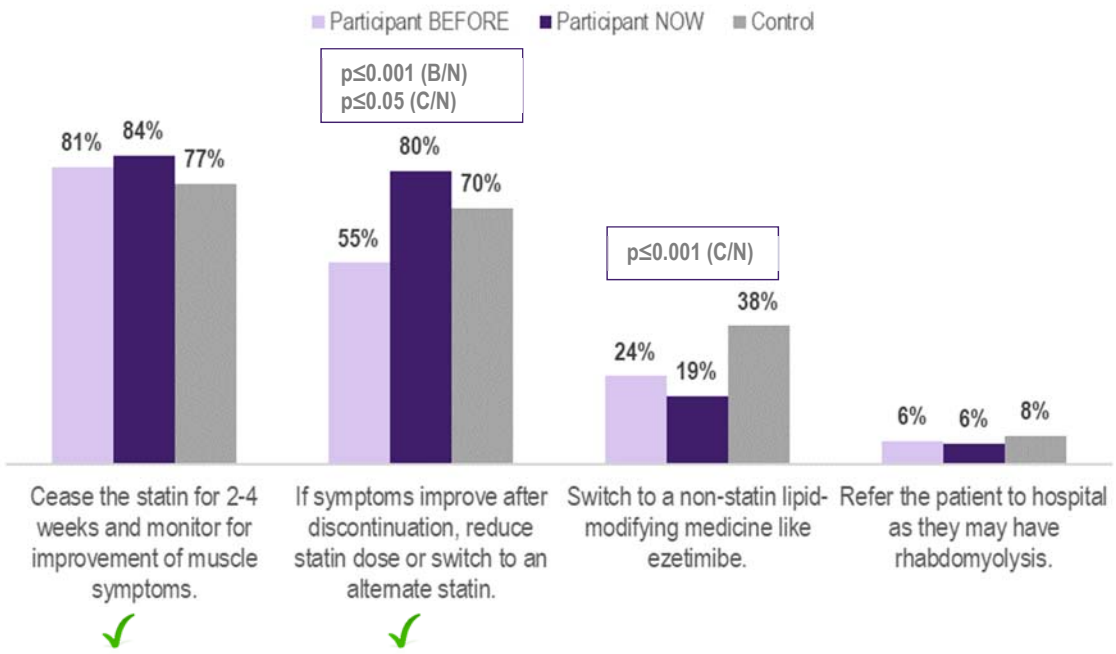
FIGURE 14: GP PRACTICE FOR ADEQUATELY TRIALLING STATIN THERAPY; B/N = BEFORE VS NOW; C/N = CONTROL VS NOW



A significantly greater proportion of participant than control GPs selected all three desired options only (43% vs 29%, $p \leq 0.01$). After program participation, there was a significant increase in GPs selecting all desired options according to best practice (+14%, $p \leq 0.001$). The largest difference between participant and control GPs (and before and after program participation) was observed for GPs who said that they would titrate Mandy's atorvastatin dose up to 40 mg daily and check how she tolerates it at the next consultation. This is a positive indication of the impact of the program on GP practice around adequately trialling statin therapy.

GPs were encouraged to use a systematic approach to assess suspected statin intolerance, which often has a lower true incidence than is commonly reported. During the educational visit, participant GPs were given the SAMS management algorithm which highlights the steps to take if a patient has suspected SAMS. Surveyed GPs were asked how they would manage a patient on a statin with muscle soreness and a CK level of 3 times the upper limit of normal. Four options were provided for the GP to consider, 2 of which were the desired responses (Figure 15). Overall there was a significant positive difference between the practice of participant and control GPs with a greater proportion of participant GPs selecting the 2 desired options (53% vs 32%, $p \leq 0.001$) and a significant positive increase in the proportion of participant GPs selecting these options after program participation (+15%, $p \leq 0.001$). There was a decrease in the proportion of participant GPs who would switch to a non-statin medicine such as ezetimibe, a practice that the program hoped to discourage, in line with the program objective to decrease ezetimibe prescribing and significantly less participant than control GPs also selected this option (19% vs 38%, $p \leq 0.001$).

FIGURE 15: GP APPROACH TO SUSPECTED STATIN INTOLERANCE B/N = BEFORE VS NOW; C/N = CONTROL VS NOW



Clinical e-Audit

GPs participating in the Clinical e-audit were asked to reflect on their management of 10 patients against the specified indicators.

There was a statistically significant increase of 59% ($p \leq 0.0001$) in the number of patients whose LDL-C target had been measured and achieved in the last 12 months (Table 26). There was a significant increase of 32% in the number of patients for whom GPs had assessed and documented CV risk and 27% for whom adherence to lifestyle modifications had been assessed.

TABLE 26: PERCENTAGE OF PATIENTS SATISFYING CLINICAL INDICATORS AT INITIAL AND REVIEW PHASES

Clinical indicator	Initial audit phase, %	Review audit phase, %	% change (95% CI)
Assessed and documented CV risk	72.9%	96.3%	32.0 (29.1–35.1)*
Use of blood pressure-lowering medicine(s) in patients at high CV risk	84.9%	91.1%	7.3 (6.4–8.3)*
Assessed adherence to lipid-modifying medicines	89.4%	98.6%	10.3 (8.9–11.7)*
Assessed adherence to lifestyle modifications	76.4%	96.8%	26.8 (24.1–29.5)*
Measured lipid levels in the last 12 months	90.6%	97.1%	7.1 (6.3–8.0)*
Achieved LDL-C target and measured in the last 12 months	48.6%	77.4%	59.3 (55.0–63.8)*

*$p \leq 0.0001$

Discussion

The Statins program attracted over 9,000 GPs who were satisfied with each of the activities they participated in and found the activities entirely relevant to their practice. The Educational Visitors, who delivered the program to GPs, were praised for their knowledge and presentation of the topic.

Overall, GP participation in the program prompted significant improvements in knowledge and practice in key areas of dyslipidaemia management.

GPs were more likely to assess CV risk and use an Australian CV risk calculator to inform their prescribing of lipid-lowering medicines, and the target for the related program objective was exceeded.

The program message on adequately trialling statin therapy before adding a second agent saw an increase in GPs who were aware that adding a second lipid-modifying medicine should only be done for patients who have adequately trialled statin therapy. This includes titrating up a patient's statin dose before adding anything else and checking for adherence to the statin therapy. Similarly, the messaging on addressing and managing statin intolerance, which also introduced the SAMS management algorithm, was well received by GPs. GP practice improved in relation to the appropriate management of SAMS, including a decrease in GPs who would switch a patient to ezetimibe.

Program objectives appear to have been achieved in the short term, with the objective about use of the Australian absolute CV disease risk calculator exceeded. However, the longer-term objectives related to GP prescribing of ezetimibe and adherence to lipid-lowering medicines will be more fully measured in future evaluations. Given the significant increases observed in GP knowledge and practice in the short term, it is anticipated that the 2017 Statins program will contribute to a positive impact on longer term prescribing of lipid-lowering medicines and improved patient adherence due to improved management of statin intolerance.

NEUROPATHIC PAIN: TOUCHPOINTS FOR EFFECTIVE DIAGNOSIS AND MANAGEMENT

Introduction

Neuropathic pain has a significant impact on the lives of those affected. It interferes with basic activities, self-care, leisure and physical activities, mobility, sleep, social life and work, often leading to feelings of helplessness, frustration and social isolation. Neuropathic pain is a condition that is encountered frequently in general practice with a prevalence of 5.2%, and of these patients, 1.8% have neuropathic pain only and 3.4% have both neuropathic and nociceptive pain.[15]

NPS MedicineWise recognised an opportunity, through its relationship with GPs, to contribute to improving quality of life for people with neuropathic pain treated in the primary care setting. To this end, *Neuropathic pain: touchpoints for effective diagnosis and management* was designed and implemented as an educational program for health professionals and consumers. The overarching goal of the program was to improve quality of life for people with neuropathic pain who are managed in primary care.

Health professionals and consumers were targeted with the aim of improving knowledge and practice in line with key messages. The program commenced in February 2018 and ran for 12 months.

Program objectives

The program objectives included the following:

- Increase by 10% the proportion of GPs who a) take a targeted pain history; and b) perform a targeted physical examination including sensory testing and motor assessment, to inform diagnosis of neuropathic pain
- Decrease by 5% GP prescribing of pregabalin a) first line in adults diagnosed with neuropathic pain; and b) for non-neuropathic pain in adults, approximately 18 months after the start of the program
- Increase by 10% the proportion of GPs who a) start patients on a low dose; and b) trial for 6–8 weeks, when prescribing amitriptyline for patients with neuropathic pain.

Key messages were disseminated through activities and information for health professionals and consumers over the life of the program.

Key messages

- A targeted history and physical exam are required for diagnosing neuropathic pain
- Consider low-dose amitriptyline as a first-line agent for neuropathic pain
- Medicines will often have limited efficacy for your patient and non-pharmacological strategies play a key role in coping with neuropathic pain

Program activities

The program activities included one-to-one educational visits, small group meetings (including MedicineInsight practices), a Clinical e-Audit, PBS Practice Review, Diagnostic Sensory Toolkit, print publications and online resources.

A total of 8,433 unique GPs participated in an activity for the Neuropathic pain program between 1 February 2018 and 22 February 2019; including 4,063 GPs who participated in a one-to-one educational visit, 3,163 in small group meetings, 996 in MedicineInsight group meetings and 480 in the Clinical e-Audit. Other participating health professionals included pharmacists, nurses, medical specialists and medical students. A total of 30,795 prescribers received the PBS practice review.

Methods

The evaluation sought to assess whether the Neuropathic pain program had a measurable impact on GP knowledge and practice in line with its key objectives and messages.

The short to intermediate term impact of the Neuropathic pain program was measured using the following methods.

Survey of GPs

- Participant survey – a retrospective pre-test (RPT) survey of a random sample of GPs who had participated in a Neuropathic pain program one-to-one or small group visit
- Control survey – a control sample of GPs who had not participated in an active Neuropathic pain program educational activity was randomly selected for comparison from the NPS MedicineWise database.

Paper-based self-completion questionnaires were developed for the participant and control GP samples, based on the program objectives and key messages. The RPT questionnaire for participant GPs included several questions that asked respondents to provide an answer for two different time periods. The first period (now) referred to their current attitudes, knowledge and practice. The second period (before) referred to their attitudes, knowledge and practice before participating in the program.

The surveys were conducted in September 2018, approximately 8 months after program launch, and were open for a period of 10 weeks. Two reminders were mailed at 3-week intervals. The response rates for the participant and control surveys were 15% and 16% respectively.

The participant survey data was analysed to identify any self-reported changes in GP knowledge or practice following exposure to a Neuropathic pain program educational activity. The participant 'now' data was also compared with the control data to determine whether there was a difference between the two groups. The data was analysed using SPSS version 23. The McNemar test was used for the paired participant data, and Chi-square for the participant and control data comparison (95% CI, significant if $p < 0.05$).

Clinical e-audit analysis

GPs participated in a clinical audit examining eight key indicators related to the management of neuropathic pain. Data were collected at two time points on this single sample of GPs concerning the number of patients who met each indicator.

Eight indicators were analysed. Each indicator was assessed in the initial (pre) and review (post) phases, with 372 GPs participating in the initial phase. For each indicator, a generalised linear model with a Poisson distribution, log link function and an offset (logarithm of the number of patients) was used to estimate the percentage change in the number of patients meeting the indicator. The analyses were conducted using the GENMOD procedure in SAS v. 9.3.

Results

Improvement in GP knowledge

GP survey respondents were presented with a series of knowledge statements about diagnosing and prescribing for neuropathic pain and asked to indicate their level of agreement or disagreement with each. The preferred response, based on current evidence and guidelines, for each of the six knowledge statements was for GPs to 'strongly agree' or 'agree'.

Significant increases in GP knowledge after participating in the educational visit were observed with regard to: sensory loss at the site of maximal pain being a key diagnostic feature of neuropathic pain; targeted history and physical examinations being necessary to establish diagnoses of probable neuropathic pain; and low-dose amitriptyline being a first-line option for neuropathic pain, unless contraindicated (Table 27).

As part of the Choosing Wisely Australia initiative, the Faculty of Pain Management (ANZCA) published a recommendation on prescribing for neuropathic pain (Statement d, Table 27). The educational visit prompted an 11% increase (p = 0.003) in the proportion of GPs who agreed with the recommendation to avoid prescribing pregabalin or gabapentin for non-neuropathic pain.

TABLE 27: COMPARISON OF GP RESPONDENTS (%) WHO GAVE THE DESIRED RESPONSE TO KNOWLEDGE STATEMENTS

	Participant GP BEFORE, % (n)	Participant GP NOW, % (n)	Control GP, % (n)	Significant differences
a) Sensory loss at the site of maximal pain is a key diagnostic feature of neuropathic pain	33% (54)	57% (95)	24% (27)	Before vs. Now; +24%, p < 0.001 Now vs. Control; +33%, p < 0.001
b) Low-dose amitriptyline is a recommended first-line option for neuropathic pain, unless contra-indicated	78% (124)	92% (153)	83% (95)	Before vs. Now; +14%, p < 0.001
c) A targeted history and physical examination, including sensory testing, are necessary to establish a diagnosis of probable neuropathic pain	86% (138)	96% (162)	92% (106)	Before vs. Now; +10%, p < 0.001
d) Prescribing of pregabalin or gabapentin should be avoided for pain which does not fulfil the criteria for neuropathic pain	81% (129)	92% (154)	81% (93)	Before vs. Now; +11%, p = 0.003 Now vs. Control; +11%, p = 0.010

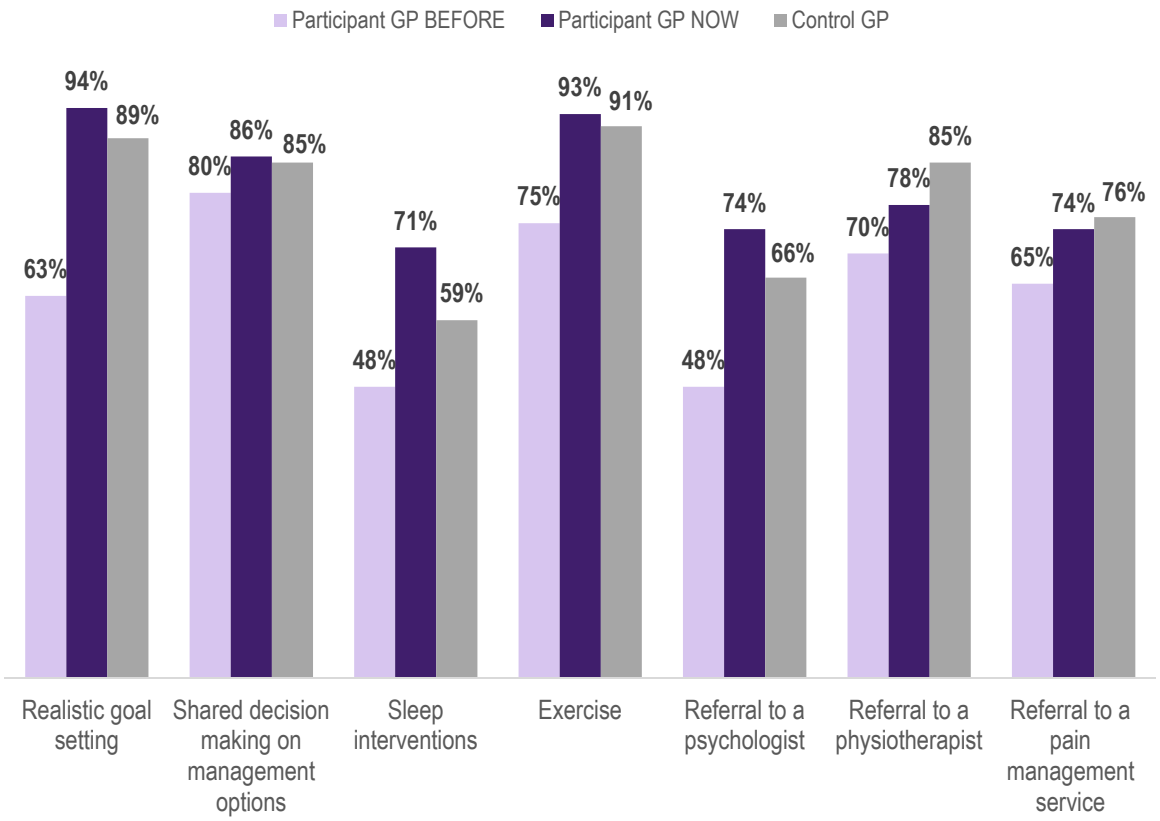
Improvement in GP practice

GP survey

The Neuropathic pain program encouraged health professionals to initiate discussions with patients about non-pharmacological strategies for improved function and pain relief (Figure 16).

Significant increases in the proportion of participant GPs discussing each of the specified non-pharmacological strategies were observed after participating in an educational visit. In particular, the proportion of participant GPs discussing ‘realistic goal setting’ with patients increased by 31% (p < 0.001). Before participating in an educational visit, less than half of the participant GPs had reportedly discussed ‘sleep interventions’ or ‘referral to a psychologist’ with their patients and this proportion increased significantly (p < 0.001) after participating in a visit.

FIGURE 16: COMPARISON OF GP RESPONDENT (% YES) DISCUSSION TOPICS



GP respondents were asked to indicate what actions they would take during the diagnosis of neuropathic pain. Most GP respondents would take a targeted patient history, assess pain distribution and conduct a motor assessment. The use of a validated screening tool and simple tools to conduct sensory testing was quite low before participating in an educational visit but increased significantly after the visit.

Just over half of the participant GPs reported ‘rarely or never’ prescribing pregabalin to confirm a diagnosis of neuropathic pain, which increased to 68% (+11%, p = 0.014) after participating in the educational visit.

TABLE 28: COMPARISON OF GP RESPONDENTS (% DESIRED RESPONSE) ACTIONS DURING DIAGNOSIS

Statement, *desired response*	Participant GP before, % (n)	Participant GP now, % (n)	Control GP, % (n)	Significant differences
Take a targeted patient history to identify possible neurological lesion or disease, *always/often*	87% (143)	95% (160)	99% (115)	Before vs. Now; +8% p = 0.001
Assess whether pain distribution reflects a suspected neurological lesion or disease, *always/often*	90% (148)	97% (161)	97% (113)	Before vs. Now; +7% p = 0.002
Use a validated screening tool, such as the DN4 questionnaire, *always/often*	11% (19)	38% (64)	9% (11)	Before vs. Now; +27% p < 0.001 Now vs. Control; +29% p < 0.001
Conduct sensory testing with simple tools, *always/often*	44% (71)	71% (117)	56% (65)	Before vs. Now; +27% p < 0.001 Now vs. Control; +15% p = 0.016
Conduct a motor assessment, *always/often*	79% (128)	92% (154)	85% (98)	Before vs. Now; +13% p < 0.001
Prescribe pregabalin to confirm a diagnosis, *rarely/never*	57% (94)	68% (113)	70% (81)	Before vs. Now; +11% p = 0.014

Survey question:

GP respondents were asked to review the following case scenario about fictional patient Jason and determine the type of pain he is most likely experiencing:

Jason is a 48-year-old patient who presents with low back pain radiating to his lower leg. He describes the pain as burning, shooting and sometimes tingling, especially below the knee. These symptoms seemed to have developed 4 weeks ago after Jason twisted his back playing indoor cricket and have been affecting Jason's sleep. After performing a physical examination you identify sensory abnormalities in the lower leg.

GP respondents were then asked to indicate the action that they would take based on their diagnosis.

For a diagnosis of radicular (neuropathic) pain, the guidelines indicate that the correct response would be to initiate amitriptyline at a low dose and to trial amitriptyline for a period of 6–8 weeks at a tolerated dose before reviewing treatment goals.

Only about one-quarter of participant GPs would have initiated amitriptyline at a low dose before participating in an educational visit, which increased to over 50% after participating in a visit ($p < 0.001$). Even fewer participant GPs would have trialled amitriptyline for 6–8 weeks at a tolerated dose, which increased by 33% ($p < 0.001$) after participation in a visit (Table 29).

TABLE 29: COMPARISON OF GP RESPONDENTS (% YES, N) ACTIONS AT PRESENTATION

	Participant GP before, % (n)	Participant GP now, % (n)	Control GP, % (n)	Significant differences
Initiate amitriptyline at a low dose (< 25 mg) (Desired response)	26% (44)	58% (96)	34% (39)	Before vs. Now; +32% p < 0.001 Now vs. Control; +24%, p < 0.001
Trial amitriptyline for 6–8 weeks at a tolerated dose before reviewing treatment goals (Desired response)	16% (27)	49% (82)	10% (12)	Before vs. Now; +33% p < 0.001 Now vs. Control; +39%, p < 0.001
Recommend non-pharmacological strategies and provide self-management advice to help Jason cope with the pain	64% (61)	80% (133)	57% (65)	Before vs. Now; +16% p < 0.001 Now vs. Control; +23%, p < 0.001
Initiate a first-line neuropathic pain medicine based on the pain descriptors provided	42% (70)	49% (81)	27% (31)	Now vs. Control; +22%, p < 0.001
Other action	16% (26)	15% (25)	17% (20)	-

Clinical e-Audit

The clinical e-audit was an activity within the Neuropathic pain program where the 372 participating GPs were asked to review the management of five relevant patients against eight indicators. The percentage of patients who met each of the clinical indicators was varied at baseline.

The clinical e-audit intervention was successful in prompting significant changes in GP practice in five of the indicators analysed. Out of the eight indicators, no review phase data was presented for clinical indicators 2,3 and 4, so outcome was measured in the initial phase only for these indicators (Table 30).

There was a significant relative increase of 53% ($p < 0.0001$) in the proportion of patients who were assessed for adherence to medicines at their last consultation, indicator five. A significant relative increase of 56% was also observed in the proportion of patients whose toleration of their medicines was assessed at their last consultation, indicator six. There was a significant relative increase of 67% ($p < 0.0001$) in the proportion of patients who were assessed for pain relief and quality of life at their last consultation, indicator eight.

TABLE 30: CHANGES IN GP PRACTICE AGAINST CLINICAL INDICATORS

	% of patients (n)		
Clinical indicators	Initial audit phase	Review audit phase	Relative difference
1.Performed a targeted history and a physical examination (including sensory testing) to diagnose neuropathic pain	75.3% (1,861)	94.5% (1,655)	25.1% p < 0.0001
2. Established probable or definite diagnosis of neuropathic pain before starting treatment with pregabalin	63.9% (1,861)	-	-
3. Started amitriptyline at a low dose	92.6% (1,861)	-	-
4. Started pregabalin at a low dose	82.3% (1,861)	-	-
5. Assessed adherence to medicines at the last consultation	64.0% (1,638)	97.9% (1,439)	53.0% p < 0.0001
6. Assessed tolerability of medicine at the last consultation	62.7% (1,638)	97.9% (1,440)	56.2% p < 0.0001
7. Agreed on, and documented a pain management plan, outlining realistic treatment goals with the patient	65.7% (1,861)	93.7% (1,653)	42.5% p < 0.001
8. Assessed pain relief and improvement in quality of life at the last consultation	58.2% (1,698)	97.4% (1,488)	67.2% p < 0.0001

Discussion

Overall, the 2018 program *Neuropathic pain: touchpoints for effective diagnosis and management* achieved its short-to-intermediate-term objectives and succeeded in significantly improving GP knowledge and practice in key areas of the program.

GPs who participated in the clinical e-audit were prompted to reflect on or change their practice in areas such as diagnosing the condition through a combination of targeted history and physical examination and developing a comprehensive pain management plan with patients.

The educational visits encouraged GPs to have discussions with patients about non-pharmacological strategies. GPs were prompted to increase discussions about sleep interventions, setting realistic goals for pain management and referral to a psychologist if needed. Discussing these strategies with patients for improved function and pain relief was a message that appeared to ‘strike a chord’ with GPs.

The program succeeded in significantly increasing the proportion of GPs who take a targeted pain history and perform physical examination with sensory testing and motor assessment. All actions which are recognised as best practice in the diagnosis of neuropathic pain.

Only about one-quarter of participant GPs would have initiated amitriptyline at a low dose before participating in an educational visit, but this increased to over 50% after participating in a visit. Even fewer participant GPs would have trialled amitriptyline for 6–8 weeks at a tolerated dose as per the guidelines, which increased by 33% after participation in a visit.

The short-to-intermediate-term program objective regarding GPs taking a targeted pain history was substantively met. The objectives in relation to sensory testing, motor assessment and prescribing of amitriptyline were both exceeded. The longer-term program objective of decreasing GP prescribing of pregabalin will be measured in a future evaluation.

These findings demonstrate that educational visiting and the clinical e-audit were effective at delivering messages about diagnosing and prescribing for neuropathic pain. Continued education in the diagnosis and management of neuropathic pain is needed to reinforce and maintain best practice in this area.

STARTING, STEPPING DOWN AND STOPPING MEDICINES

Introduction

Proton pump inhibitors (PPIs) are among the most commonly used medications in Australia. They are effective at relieving upper gastrointestinal symptoms of gastro-oesophageal reflux disease (GORD) and healing oesophagitis but are often only needed for a short period of time.[16] They are, however, increasingly being used for long periods and often without a proper indication for their use. Data suggests that some patients prescribed a PPI may be using PPIs continuously for many years. In a UK study, almost 50% of patients receiving long-term PPI therapy had no clear indication for its continuation and almost 60% of long-term PPI users did not experience any attempt by their GPs to discontinue or step down their PPIs.[17]

In recent years, there has been a marked increase in prescribing of PPIs in Australia and in 2015–16, there were 16.2 million prescriptions for PPIs at a cost to government of $282.6 million. While the number of prescriptions for PPIs has increased over the last decade (mainly esomeprazole and pantoprazole), total expenditure has fallen due to price decreases. There is also evidence of overprescribing of PPIs as health professionals overestimate benefits and underestimate harms associated with substantial costs to healthcare providers.

For some people, doses can be safely lowered, or the medication used only when needed for symptom relief. For most patients, the aim of therapy is symptom control.

In July 2018, NPS MedicineWise launched the educational program *Starting, stepping down and stopping medicines* to address these quality use of medicine issues and facilitate improved patient care. The main goal of the program was to reduce unnecessary prescribing of PPIs for patients managed in primary care.

Program objectives

1. Increase the proportion of GPs who initiate PPI treatment for 4–8 weeks (ie, 1–2 prescriptions) only in patients who have symptoms of GORD, 12 months after program launch.
2. Increase by 25% the proportion of GPs who use a plan when initiating PPIs for their patients. 12 months after program launch.
3. Increase by 10% the proportion of GPs who initiate withdrawal trials with patients for whom PPIs may no longer be necessary. 12 months after program launch.
4. Increase GP awareness by 5% about the RACGP PPI recommendations from the Choosing Wisely initiative. 12 months after program launch.

Key messages

- Only start PPI treatment for 4–8 weeks (ie, 1–2 scripts) in those who have symptoms of GORD
- Regularly review patients on PPIs, with the aim of reducing or ceasing altogether

Program activities

The program activities included one-to-one educational visits, small group meetings (including MedicineInsight), a Clinical e-Audit, Pharmacy Practice Review, online case study, PBS Practice Review, print publications and online resources.

A total of 7,253 unique GPs participated in an activity for this program; including 3,424 GPs who participated in a one-to-one educational visit, 3,415 in small group meetings, 407 in the Clinical e-Audit and 296 in the online case study. Other participating health professionals included pharmacists,

nurses, medical specialists and medical students. A total of 30,748 prescribers received the PBS practice review.

Methods

The evaluation sought to assess whether the Starting, stepping down and stopping medicines program had a measurable impact on GP knowledge and practice in line with its key objectives and messages.

GP survey

A retrospective pre-test (RPT) survey of GPs was the primary method to measure the impact of the program on GP knowledge, attitudes and practice.[14] The survey was a self-completion, paper-based questionnaire sent to two random samples of GPs:

- Participant survey – a retrospective pre-test (RPT) survey of GPs (n = 1,200) who had participated in a one-to-one visit or small group meeting for this program. The RPT questionnaire asked GPs to indicate their knowledge and practice 'now' and also to reflect on their level of knowledge and practice 'before' participating in the program.
- Control survey – a control sample of GPs (n = 800) who had not participated in an active program activity but were known to NPS MedicineWise through participation in previous programs. Control GPs were sent a standard paper-based questionnaire for comparison.

The survey questions related to the program objectives and key messages that were used in active program interventions such as the one-to-one and small group educational visits.

The survey was conducted in February 2019 and was open for 8 weeks, with two reminders. The response rates for the participant and control surveys were 15% and 17% respectively.

The participant survey data were analysed to identify any changes in GP knowledge or practice following exposure to an educational activity. The participant post ('now') data were compared with the control data to determine differences and if these could be associated with the Starting, stepping down and stopping medicines program.

All data were analysed using SPSS version 23. The McNemar and Wilcoxon signed-rank tests were used for the paired participant data. Chi-square and the Mann-Whitney tests were used for participant and control data comparison. The significance level was set at 0.05. The z-test (comparison of proportions) was used to investigate associations between respondent characteristics (eg, years practicing, gender) and knowledge or practice.

Clinical e-Audit

To assess changes in GP practice, Clinical e-Audit data were analysed against four clinical indicators specified within the audit. Data were extracted for the Clinical e-Audit between September 2018 and June 2019. Each GP who participated in the Clinical e-Audit assessed the same 10 patients in two phases, the initial phase and the review phase. The analysis involved comparing review phase data with initial phase data for each participating GP. The outcome measure is the number of patients satisfying each of the six best practice clinical indicators included in the activity. For each indicator, a generalised linear model with a Poisson distribution, log link function and an offset (logarithm of the number of patients) was used to estimate the percentage change in the number of patients meeting the indicator. The analyses were conducted using the GENMOD procedure in SAS v9.3.

Results

Improvement in GP knowledge

GP respondents were presented with knowledge statements that aligned with program key messages and objectives and asked to indicate their level of agreement or disagreement with each.

Significant increases in knowledge were seen for GPs after participating in an educational visit about understanding that a high-dose PPI is not appropriate for the initial treatment of GORD and that it is important to review patients within 4–8 weeks of starting PPI treatment for GORD to determine how well their symptoms are controlled (Table 31). In line with the Choosing Wisely Australia recommendation from the Royal Australian College of General Practitioners, there was an increase in the proportion of GPs who agreed that using PPIs long term for patients with uncomplicated disease without regular attempts at reducing dose or ceasing is not recommended.

TABLE 31: GP AGREEMENT WITH STARTING, STEPPING DOWN AND STOPPING MEDICINES PROGRAM KNOWLEDGE STATEMENTS

Statement, *desired response*	**Participant BEFORE, % (n)**	**Participant NOW, % (n)**	**Control, % (n)**	**Significance**
A high-dose PPI is appropriate for the initial treatment of GORD *Disagree/strongly disagree*	36% (62)	50% (87)	48% (61)	+14%, p ≤ 0.001 (before/now)
It is important to review patients within 4–8 weeks of starting PPI treatment for GORD to determine how well their symptoms are controlled *Agree/strongly agree*	80% (139)	96% (166)	98% (124)	+16%, p ≤ 0.001 (before/now)
Using PPIs long term for patients with uncomplicated disease without regular attempts at reducing dose or ceasing is not recommended *Agree/strongly agree*	67% (114)	80% (136)	80% (101)	+13%, p ≤ 0.001 (before/now)

Improvement in GP practice

GP survey

GP practice in line with the program's key messages improved after participating in the program. GPs were asked about their frequency of recommended actions when initiating a patient with GORD on a PPI, as per the program's key messages and objectives (Table 32). Significant increases in the proportion of GPs 'always' or 'often' conducting the listed actions were seen after they participated in an educational visit, with a 33% increase in limiting the number of repeats to one and a 36% increase in GPs who would agree on an individualised plan with each patient. A greater proportion of participant than control GPs also stated they would 'always' or 'often' limit the number of repeats to one for the prescribed PPI.

TABLE 32: GPS ANSWERING ALWAYS OR OFTEN TO STATEMENTS RELATED TO INITIATION OF PPIS FOR GORD

Statement	**Participant BEFORE, % (n)**	**Participant NOW, % (n)**	**Control, % (n)**	**Significance**
Limit the number of repeats to 1 repeat for the prescribed PPI	50% (85)	83% (141)	74% (94)	+33%, p ≤ 0.001 (before/now) +9%, p = 0.062 (now/control)
Agree on an individualised plan with the patient that includes a review point, information about stepping down and lifestyle modifications.	51% (88)	87% (150)	84% (107)	+36%, p ≤ 0.001 (before/now)

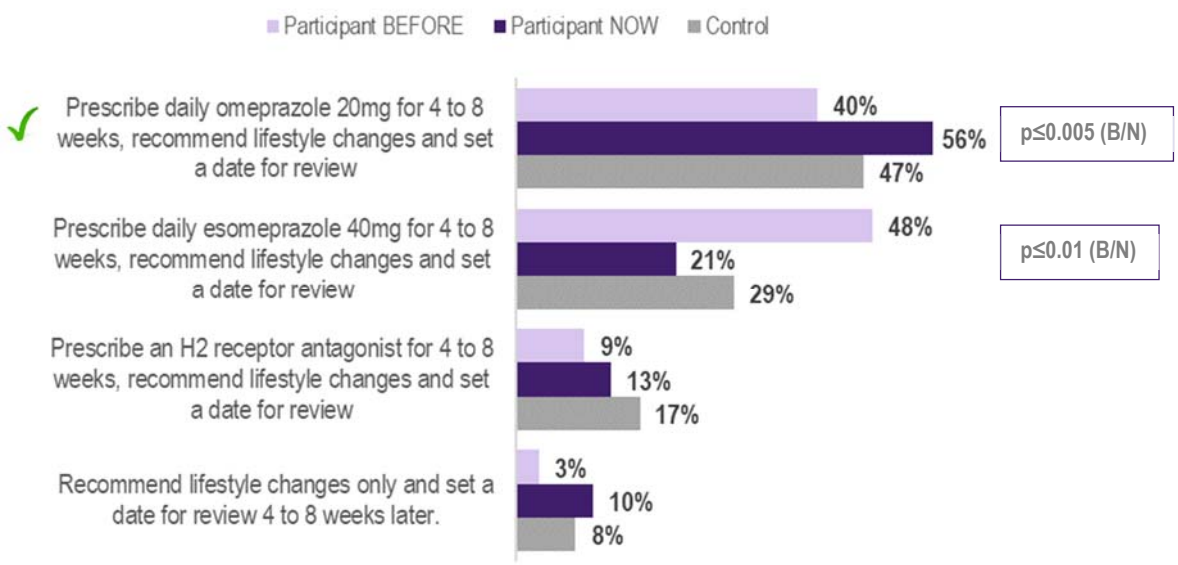
To understand how GPs would manage a new patient with GORD they were presented with a case scenario.

Survey question:

Jessica is a 36-year-old patient with reflux symptoms that interfere with her sleep and occur at least twice a week. She had to take a day off work yesterday because of her symptoms the night before. There are no red flags. What management option would you recommend for Jessica?

The appropriate management is for the GP to prescribe Jessica daily omeprazole 20 mg for 4 to 8 weeks, recommend lifestyle changes and set a date for review (Figure 17). There was a significant increase of 16% in the proportion of participant GPs who selected this option after participating in the program, in line with the program's messages. A greater proportion of participant than control GPs also selected this option (+10%). There was also a significant decrease in the proportion of participant GPs who would inappropriately prescribe daily omeprazole 40 mg.

FIGURE 17: GP PRACTICE IN RELATION TO MANAGING A NEW PATIENT WITH GORD; B/N = BEFORE VS NOW



Clinical e-Audit

GPs participating in the Clinical e-Audit were asked to reflect on their management of 10 patients against the specified indicators. Table 33 highlights changes in the four clinical indicators that were measured in both the initial and review phases. The number of patients included in the audit at baseline varied by indicator and was dependent on the number of patients meeting each indicator.

There was a statistically significant decrease of 56% ($p \leq 0.0001$) in the proportions of patients who were not on a standard or high dose PPI for more than 8 weeks where symptoms were controlled. There was a significant increase of 36% for the proportion of patients with whom GPs had discussed management expectations and developed a plan.

TABLE 33: PERCENTAGE OF PATIENTS SATISFYING CLINICAL INDICATORS AT INITIAL AND REVIEW PHASES

Clinical indicator	Initial audit phase, %	Review audit phase, %	% change (95% CI)
Discussed management expectations and developed a plan with the patient	71.1%	96.5%	35.8% (30.6–41.3)*
Provided lifestyle advice to the patient	90.9%	98.3%	8.1% (6.3–9.8)*
Use of a regular standard/high dose with adequate symptom control for patients using a PPI for more than 8 weeks (not recommended)	51.1%	22.6%	-55.8% (-59.4, -51.8)*
Reviewed the need for medicines that may worsen GORD symptoms	85.4%	99.2%	16.2% (12.8–19.8)*

*p ≤ 0.0001

Discussion

The Starting, stepping down and stopping medicines program attracted over 6,500 GPs who were satisfied with each of the activities they participated in and found the activities entirely relevant to their practice. The program was well received by GPs who positively highlighted the knowledge of the Educational Visitors and their ability to clearly present the clinical information.

Overall, GP participation in the program prompted significant improvements in knowledge and practice in key areas of managing a patient with GORD. Surveyed GPs had increased knowledge after participating in the program about the importance of reviewing patients within 4–8 weeks of starting PPI treatment for GORD, that a high dose PPI is not appropriate for the initial treatment of GORD, and of the RACGP Choosing Wisely Australia recommendation about using PPIs long term for patients with uncomplicated disease.

After participating in the program surveyed GPs were more likely to appropriately manage a new patient with GORD, in line with the program's messages. GPs participating in the Clinical e-Audit also demonstrated improvements in reducing the proportions of patients on a PPI for more than 8 weeks.

There were no statistically significant differences in practice between participant and control GPs. In August 2018 Veterans' MATES released a therapeutic brief on PPIs for health professionals and veterans which was distributed to GPs across Australia. This brief contained the same messages as the NPS MedicineWise program and control GPs may have been exposed to this and other passive NPS MedicineWise online program resources. Additionally, PPIs are commonly prescribed medicines and their use has been in the media over recent years. These could all contribute to the high levels of knowledge and practice, in line with program's key messages, also seen for control GPs.

For those GPs taking part in the program, all the objectives were achieved in the short term, although it is acknowledged that there were limited differences in knowledge and practice between control and participant GPs for surveyed GPs.

AUSTRALIAN PRESCRIBER PODCAST

Introduction

Australian Prescriber (AP) podcasts were launched in July 2017. Podcasts are released fortnightly and run for between 10 and 15 minutes. As of March 2019, 14,003 AP podcast email subscribers had received an email alert each time a new episode was released.

Data in December 2018 showed that each new episode receives an average of 2,600 downloads after one month. The average number of downloads over 12 months is 8,000 and there is an increasing trend for people to download podcasts from a phone app rather than a web browser. These data do not provide information on who the podcast listeners are, their listening behaviour or what they think about the podcasts.

An evaluation of the AP podcasts was conducted to generate this information and inform the ongoing development and quality improvement of the podcasts based on listeners' feedback and podcast listening behaviour.

Aims

The evaluation aimed to determine:

- the demographics of listeners
- the acceptability and usefulness of podcast content
- the appropriate frequency and length of the podcasts
- what listeners liked about the podcasts
- how the podcasts could be improved or changed.

Methods

An online cross-sectional survey was used to determine who the podcast listeners are, how and when they listen to AP podcasts, listeners' perceptions of podcast quality, what works well and what can be improved.

The questionnaire was open from late March 2019 to 30 April 2019. It was distributed via email, using the SurveyGizmo platform, to the 14,003 AP podcast subscribers. Two reminders were sent to those who had not responded after 1.5 and 3 weeks. The survey was also promoted via several NPS MedicineWise Electronic Direct Mails (EDMs), including a link to the questionnaire, multiple times in April 2019. These EDMS were sent to subscribers of the AP podcast email alert, AP new issue alert and MedicineWise Update.

The data were analysed using SPSS version 25. The Chi-square and Kruskall Wallis tests were used to investigate associations between responses. The z-test (comparison of proportions) was used to investigate associations between respondent characteristics and survey responses. The significance level was set at 0.05.

Content analysis was used for the free text responses.

Results

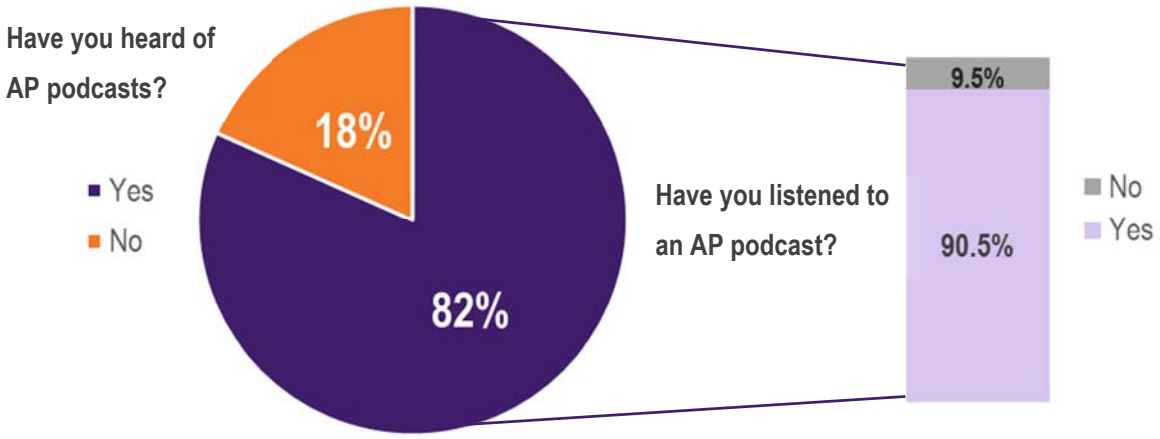
The survey received 1,396 responses. Over half of the respondents were female (57%) and approximately three-quarters were 45 years old and above. The most common professions represented were pharmacists (27%) and GPs (26%) followed by nurses (13%) and medical specialists (13%).

Podcast awareness and access

A total of 73% (n = 1,014) of the survey respondents stated that they listen to podcasts for health professionals.

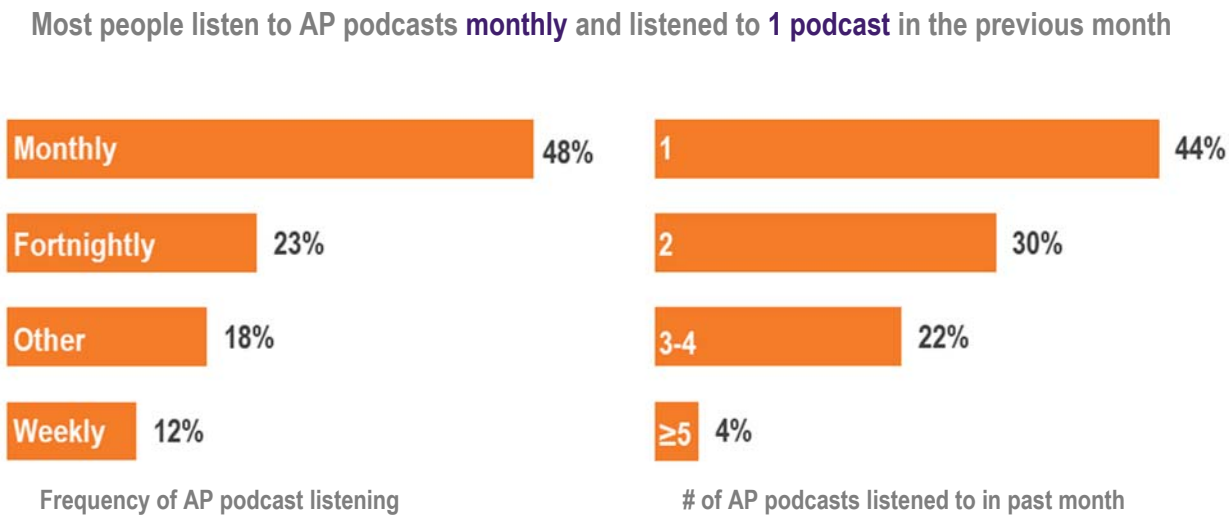
Most HP podcast listeners had heard of AP podcasts (82%, n = 828). Of those, 749 (91%) stated they had listened to an AP podcast (Figure 18).

FIGURE 18: AWARENESS OF AP PODCASTS



For the 79 respondents who had never listened to an AP podcast, 34 (44%) stated that they generally read the AP article only, and 10 (13%) did not have the time. Close to half the respondents who listen to AP podcasts do so monthly and had listened to 1 AP podcast in the previous month (Figure 19).

FIGURE 19: AP PODCAST LISTENING FREQUENCY



Most AP podcast listeners only listen to the podcasts that are of interest to them and one-third stated that they try and listen to all the AP podcasts. The main reasons respondents listen to AP podcasts are for their professional development, interest in work-related topics and for personal interest.

Podcast content and quality

Most listeners felt that the content is at the right level for their needs and agreed or strongly agreed that the podcasts meet their needs, are engaging, relevant and interesting.

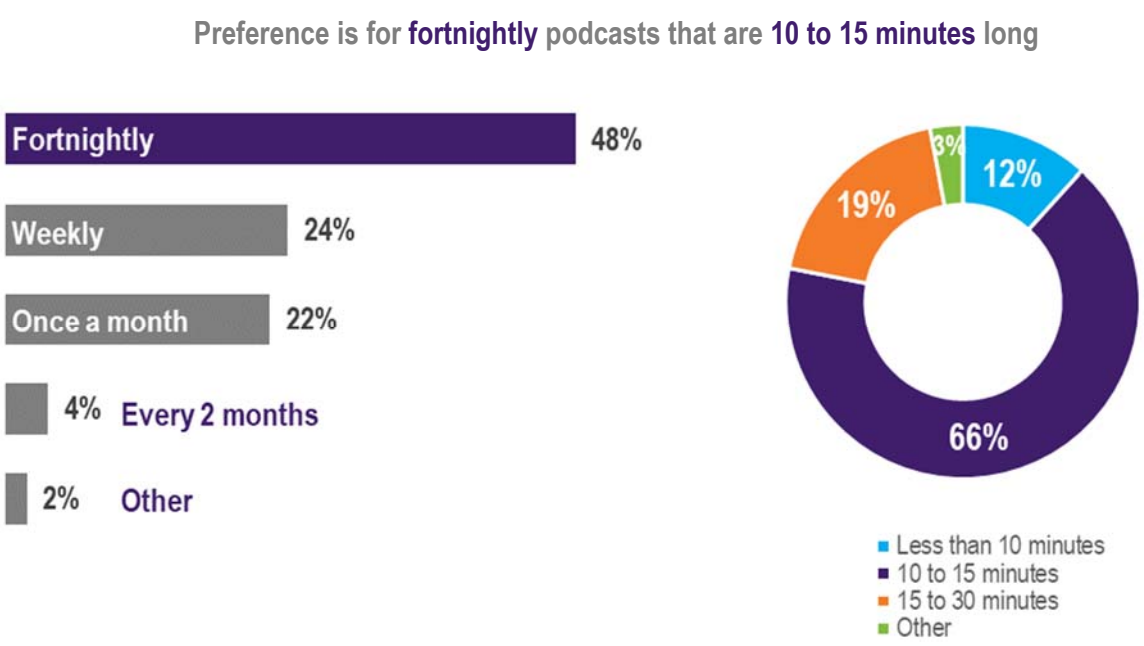
Listeners mostly rated the overall quality of the AP podcasts as good or very good. Similarly, sound, host and interviewee quality were also rated as good or very good by most listeners, although some suggested that the sound and the quality of the host could be improved. Hosts were perceived by many listeners as being knowledgeable, professional, engaging and concise. Some listeners felt that the quality of the hosts varied, preferring some over others in terms of how they conducted the interview and interacted with the interviewee.

"For all the podcasts I've listened to, it is clear that the interviewer has read the original article and has been able to ask pertinent questions that don't just repeat back the content of the article, but go further."

Podcasts moving forward

The current AP podcast frequency (fortnightly) and length (10 to 15 minutes) were the preferences selected by most listeners for future AP podcasts (Figure 20).

FIGURE 20: LISTENERS' PREFERENCE FOR PODCAST FREQUENCY AND LENGTH



AP podcast listeners were positive about and appreciated many aspects of the podcasts:

- The podcasts are concise and succinct
- The podcasts are an effective mode of communicating information
- Podcast content is relevant, interesting, useful, informative, engaging and current
- Podcast content is Australian, reputable and evidence-based.
- The podcasts provide listeners with new information.

"They are Australian so local content which is very relevant"

"It is either a taster for more detailed reading or something that hadn't crossed my radar eg, recent one on home detox"

Approximately half of the AP podcast listeners provided suggestions for improvement. The most common suggestions were related to the topic scope, content detail and sound quality.

- Broaden the scope of topics discussed
- Increase the level of detail
- Improve the sound quality
- Improve the hosting and interviewing skills of the presenters
- Provide podcasts that are succinct for those only seeking a short update
- Provide podcasts with a wider range of experts (eg international experts, allied health, other prescribers) that meet the needs of different clinical groups.

"The podcasts are relatively short (often around 10 mins or so) so the discussion and amount of information has to be brief and canvass the most salient points only. I feel that the AP does this well for bite-sized information it provides but longer formats would also have their place for more in-depth discussion of topics."

Discussion

Three-quarters of survey respondents listened to HP podcasts and 82% were aware of AP podcasts. Most of those aware of AP podcasts had listened to an AP podcast. AP podcast listeners generally listen to the podcasts monthly, to single episodes at once and to those of interest to them. There is a smaller group of listeners who do listen more frequently and like to listen to all the podcasts. Listeners are generally happy with the level of detail provided in the podcasts, their relevance and ability to meet their needs. Listeners value the wide range of topics available that are up to date, insightful, evidence-based and topical to their work/practice.

The overall quality of the podcasts is thought to be good or very good by most listeners, although some are less satisfied with the sound and host quality. Most are happy with the interviewee quality and value the interviewees being real clinicians who are knowledgeable and leaders/experts in their field.

The current frequency and length of podcasts (fortnightly and 10 to 15 minutes long) are appropriate for half the listeners. This is consistent with many listeners saying they liked the concise and succinct nature of the podcasts. Contrary to this, listeners also requested podcasts with a greater level of detail for some topics, which would result in longer podcasts. Additional improvements suggested by listeners included a broader scope of topics, improved sound quality and improved interviewing skills of hosts.

These findings highlight the value of the AP podcasts to listeners and areas for further development and quality improvement of the AP podcasts.

CHOOSING WISELY – THE FOURTH YEAR

Introduction

Choosing Wisely Australia® is an initiative that encourages clinicians and consumers to start a conversation about appropriateness of care by challenging the notion that more is always better.

This initiative is industry-led and facilitated by NPS MedicineWise. Participating medical colleges and societies have developed lists of recommendations of the tests, treatments, and procedures that clinicians and consumers should question, based on the best available evidence. Many of the participating colleges, societies, associations and health services have developed resources and implemented projects in support of the Choosing Wisely Australia objectives.

Choosing Wisely Australia objectives

The objectives of Choosing Wisely Australia are to:

- encourage consumers and clinicians to engage in conversations about the overuse of tests, treatments and medical procedures
- support consumers to make informed choices, in consultation with their clinicians, about getting the right care while limiting exposure to unnecessary tests, treatments and medical procedures
- cultivate a culture of responsible stewardship of health care resources among clinicians, from those in medical schools to those in professional practice
- engender public dialogue on the issue ‘more is not always better’, when it comes to medical tests, treatments and procedures
- engage health system and non-medical stakeholders, at state/territorial and national levels, in the implementation of Choosing Wisely Australia®.

Key messages of the initiative were disseminated through activities and information for health professionals and consumers during 2018–19.

Key messages

- Choosing Wisely Australia is enabling clinicians, consumers and healthcare stakeholders to start important conversations about tests, treatments and procedures where evidence shows they provide no benefit and, in some cases, lead to harm.
- Focused on high quality care, the initiative is being led by Australia's medical colleges and societies and facilitated by NPS MedicineWise.
- Choosing Wisely Australia is empowering consumers and health professionals to initiate frank discussions about what care is truly needed.
- Not all tests, treatments and procedures are in the consumer’s best interest. The right choice should be based on the best available evidence and discussion between the consumer and clinician.
- Unnecessary practices are a diversion from high quality care. They can lead to more frequent and invasive investigations that can expose consumers to undue risk of harm, emotional stress and financial cost. We all need to understand the evidence and appropriateness in ordering tests, treatments and procedures.
- The medical community is coming together, speciality by speciality, to develop recommendations, lists of tests, treatments and procedures to question.
- Choosing Wisely Australia is changing the culture to one where more is not always better when it comes to medical tests, treatments and procedures.
- Choosing Wisely Australia enables the medical community to take a leadership role in the responsible management and fair distribution of finite healthcare resources.

Methods

The primary methods used to measure the impact of key Choosing Wisely Australia activities were as follows.

NPS MedicineWise program evaluation

GP knowledge associated with Choosing Wisely Australia recommendations was assessed via the inclusion of a question in the Neuropathic pain program GP survey, and the Starting, stepping down and stopping medicines program GP survey.

For the Neuropathic pain program, a retrospective pre-test (RPT) questionnaire was distributed to a random sample of 1,200 GPs who had participated in a one-to-one or small group visit. The questionnaire was also distributed to a control sample of 800 GPs who had not participated in an active Neuropathic pain educational activity, for comparison. The survey was conducted in September 2018, approximately 8 months after the program launch, and was open for a period of approximately 10 weeks, with two reminders. The data was analysed using SPSS version 23.

For the Starting, stepping down and stopping medicines program, a retrospective pre-test (RPT) questionnaire was mailed to 1,200 GPs who had participated in an educational visit. A control questionnaire was mailed to 800 GPs who had not participated in an educational visit for comparison. The questionnaire was administered in paper and online formats. The surveys were conducted in February 2019 and were in field for eight weeks with two reminders. All data were analysed using SPSS version 25.

Health Services surveys

The NPS MedicineWise clinician questionnaire was provided to member Health Services on request. During year 4, assistance was provided to the Wide Bay Hospital and Health Service to analyse and report on the survey administered to clinicians in their hospital setting.

Online survey platform, Survey Gizmo, was used to host the clinician survey. A link was created for the survey and distributed by the Health Service. A total of 141 health professionals completed the survey, giving a response rate of 4%. This is comparable to other studies conducted by NPS MedicineWise surveying specialists.

National Meeting 2019

An online evaluation form was developed to identify the opinions and perceptions of conference delegates. The survey link was distributed by email to participants on the day of the National Meeting, at the event's conclusion. A week later, a follow-up reminder email was sent to participants who had not completed the survey. The survey closed two weeks after the event date.

A total of 120 evaluation forms were completed and returned out of 232 conference delegates, giving a response rate of 52%.

Results

Engagement

Choosing Wisely Australia's membership has reached 45 health professional colleges, societies or associations, which is 80% of Australian medical colleges/societies. This achievement meets the membership requirements set by the Department of Health. Membership has also extended to 34 Champion Health Services and nine consumer organisations and other supporters. The diversity of

supporter membership has grown this year to include private hospitals, state health departments and consumer groups.

There are currently 193 Choosing Wisely Australia recommendations published on the website and being promoted to health professionals and consumers alike. The initiative also had an influence on health policy during its fourth year, with the MBS review taskforce recommendations reflecting Choosing Wisely Australia recommendations, the implementation of a Choosing Wisely scaling project across 11 Victorian health services (funded by Better Care Victoria) and inclusion in the Queensland clinical senate workshops throughout the year as an enabling initiative for improving quality of care.

NPS MedicineWise actively promoted the Choosing Wisely Australia initiative across a wide range of media channels. Coverage of Choosing Wisely Australia in the media exceeded targets for the fourth year, with 69 articles (⇧38%) and 1,070 stories (⇧7%) published.

Knowledge change among GPs

The Neuropathic pain program was designed and implemented as an educational program for health professionals and consumers. The overarching goal was to improve quality of life for people with neuropathic pain who are managed in primary care.

As part of the Choosing Wisely Australia initiative, the Faculty of Pain Management (ANZCA) published a recommendation on prescribing for neuropathic pain. A statement was included in the survey to identify whether GPs agreed with this recommendation.

Most GP respondents agreed with the recommendation and agreement increased significantly (+11%, p = 0.003) among participant GPs after an educational visit (Table 34).

TABLE 34: COMPARISON OF GP AGREEMENT WITH KNOWLEDGE STATEMENTS (% STRONGLY AGREE/AGREE)

	Participant GP Before	Participant GP Now	Control GP	Significance
Prescribing of pregabalin or gabapentin should be avoided for pain which does not fulfil the criteria for neuropathic pain	81% (129)	92% (154)	81% (93)	Before vs. Now; +11%, p = 0.003 Now vs. Control; +11%, p = 0.010

The *Starting, stepping down and stopping medicines* program used PPIs as an example of how to deprescribe medicines. Relevant to this message was the RACGP Choosing Wisely Australia recommendation to avoid the use of PPIs long term in patients with uncomplicated disease without regular attempts at reducing dose or ceasing.

After participating in an educational visit for this program, a significant increase of 13% was observed in the proportion of participant GPs who agreed or strongly agreed that long term use of PPIs is generally not recommended (p ≤ 0.001; Table 35).

TABLE 35: GPS' AGREEMENT WITH KNOWLEDGE STATEMENT

	Participant GP Before	Participant GP Now	Control GP	Significance
Using PPIs long term for patients with uncomplicated disease without regular attempts at reducing dose or ceasing is not recommended	67% (114)	80% (136)	80% (101)	Before vs. Now; +13%, p ≤ 0.001

Clinician awareness and knowledge

Wide Bay Hospital and Health Service is one of the health services working in collaboration with NPS MedicineWise as part of Choosing Wisely Australia to implement initiatives for clinicians and consumers that are aligned with Choosing Wisely principles.

Just under half of the respondents (45%) were aware of Choosing Wisely Australia before completing the survey, with a significantly higher proportion of medical staff than nursing staff having heard of the initiative ($p \leq 0.05$). Those who were aware had heard about Choosing Wisely Australia from colleagues (49%), local or internal health service projects (32%) and professional colleges, societies or associations (29%).

Over three-quarters (77%) of the clinicians who responded to the survey 'agreed' or 'strongly agreed' that there is a problem with the use of unnecessary tests, treatments and procedures in medical practice. The main areas perceived as problematic were pathology, radiology/imaging and medications. Positively, 96% 'agreed' or 'strongly agreed' that health professionals have a responsibility to help reduce the inappropriate use of tests, treatments and procedures.

Respondents commonly received requests several times a week from both patients and colleagues. Requests for unnecessary medical tests, treatments or procedures from colleagues were perceived to occur more often than from patients (Table 36).

TABLE 36: PERCEIVED FREQUENCY OF REQUESTS FOR UNNCESSARY MEDICAL TESTS, TREATMENTS AND PROCEDURES

	Every day	Several times a week	Once a week	Less than once a week	Less than once a month	Unsure	Not applicable
How often do patients ask for a test, treatment or procedure that you think is unnecessary? N = 141	11% (15)	14% (20)	8% (11)	13% (18)	15% (21)	13% (18)	27% (38)
How often do your colleagues or supervisors ask for a test, treatment or procedure that you think is unnecessary? N = 141	18% (25)	20% (28)	11% (16)	9% (12)	11% (15)	10% (14)	22% (31)

In response to a request for an unnecessary medical test, treatment or procedure approximately one-quarter of respondents (26%) highlighted that they 'always / often' discouraged patients. The main factors that influenced health professionals' decisions to request unnecessary medical tests, treatments and procedures were: uncertainty around the diagnosis (42%), patient expectations (40%) and difficulty accessing information from other settings (32%).

Satisfaction with the National Meeting

The annual Choosing Wisely National Meeting was held on 30 May 2019 and attracted delegates from a wide range of roles, including clinicians, policy makers and consumer advocates.

Common motivations for attending the National Meeting included interest in the program (60%), perceptions of the event as a networking opportunity (49%) and interest in a particular topic or speaker (28%).

Overall, 92% of respondents were very satisfied or satisfied with the National Meeting, and about three-quarters (77%) indicated that their expectations had been met or exceeded. Respondents were particularly positive about the event

"Really enjoyed the panel conversations. It supports what Choosing Wisely is all about – creating and holding a dialogue"

coordination, venue, presenters and the networking opportunities provided. Most respondents were likely to attend the next meeting in 2020.

Suggestions made by respondents to improve future events included:

- provide more opportunities for networking, with NPS MedicineWise perhaps facilitating introductions between parties who could work together
- provide more interactive activities, particularly post-lunch, to improve concentration and engagement
- include a broader range of topics, ranging from more specialised sessions for special interest groups to focussing on initiatives happening in Australian states.

Discussion

The Choosing Wisely Australia initiative has experienced a successful fourth year. Membership has increased and diversified, and media engagement with the initiative and its key messaging has exceeded expectations. Choosing Wisely Australia is also beginning to have an influence on health policy across Australia.

The inclusion of Choosing Wisely Australia messages and recommendations in NPS MedicineWise educational programs continues to show positive impacts on GP knowledge. The Neuropathic pain program showed an increase in the proportion of GPs who agreed to avoid prescribing pregabalin or gabapentin for non-neuropathic pain. The Starting, stepping down and stopping medicines program showed a significant increase in the proportion of GPs who knew not to recommend PPIs for long-term use. It is anticipated that these significant changes in knowledge will translate into positive changes in GP practice.

The Health Service survey effectively gauged the level of clinician awareness and knowledge of the Choosing Wisely Australia initiative in a hospital setting.

The National Meeting held in May 2019 was perceived to be a successful event, with delegates appreciating the opportunities for networking, indicating a high level of satisfaction with most aspects of the event. Delegates were keen to attend the next National Meeting to be held in 2020.

Choosing Wisely Australia is going from strength to strength as it progresses from starting a conversation about appropriateness of care to fostering the implementation of interventions by professional members with the aim of creating change in the Australian health care system.

REFERENCES

1. Britt H, Miller GC, Henderson J, et al. General practice activity in Australia 2015–16. Sydney, 2016
2. Stephenson CP, Karanges E, McGregor IS. Trends in the utilisation of psychotropic medications in Australia from 2000 to 2011. Aust N Z J Psychiatry 2013;47(1):74-87.
3. Diabetes Australia. Diabetes in Australia. Canberra: Diabetes Australia, 2019. https://www.diabetesaustralia.com.au/diabetes-in-australia (accessed 10/09/2019).
4. Drug Utilisation Sub-Committee. Type 2 Diabetes, October 2012 and February 2013. Canberra: Department of Health, 2014. https://m.pbs.gov.au/industry/listing/participants/public-release-docs/diabetes-drugs/dusc-diabetes-analysis-02-2013.docx (accessed 16/01/2020).
5. Burudpakdee C, Khan ZM, Gala S, et al. Impact of patient programs on adherence and persistence in inflammatory and immunologic diseases: a meta-analysis. Patient Prefer Adherence 2015;9:435-48.
6. Huber CA, Rapold R, Brüngger B, et al. One-year adherence to oral antihyperglycemic medication and risk prediction of patient outcomes for adults with diabetes mellitus: An observational study. Medicine 2016;95(26):e3994-e.
7. Lin L-K, Sun Y, Heng BH, et al. Medication adherence and glycemic control among newly diagnosed diabetes patients. BMJ open diabetes research & care 2017;5(1):e000429-e.
8. Cramer JA. A systematic review of adherence with medications for diabetes. Diabetes care 2004;27(5):1218-24.
9. Yu Y, Luo D, Chen X, et al. Medication adherence to antiretroviral therapy among newly treated people living with HIV. BMC Public Health 2018;18(1):825.
10. Britt H, Miller G, Henderson J, et al. General practice activity in Australia 2014–15. Sydney, 2015
11. Banks E, Crouch SR, Korda RJ, et al. Absolute risk of cardiovascular disease events, and blood pressure- and lipid-lowering therapy in Australia. Med J Aust 2016;204(8):320.
12. Jansen J, Bonner C, McKinn S, et al. General practitioners' use of absolute risk versus individual risk factors in cardiovascular disease prevention: an experimental study. BMJ Open 2014;4(5).
13. Simons LA, Chung E. Are high coronary risk patients missing out on lipid-lowering drugs in Australia? Med J Aust 2014;201(4):213-6.
14. Pratt CC, McGuigan WM, Katzev AR. Measuring program outcomes: Using retrospective pretest methodology. American Journal of Evaluation 2000;21(3):341-9.
15. Family Medicine Research Centre. SAND abstract No. 234 from the BEACH program: Chronic musculoskeletal/nerve pain in general practice patients. Sydney: University of Sydney, 2015
16. Primary Health Tasmania. A guide to deprescribing proton pump inhibitors. Tasmania: Primary Health Tasmania, 2016. https://www.primaryhealthtas.com.au/wp-content/uploads/2018/09/A-Guide-to-Deprescribing-Proton-Pump-Inhibitors-2019.pdf (accessed 15 July 2019).
17. Othman F, Card TR, Crooks CJ. Proton pump inhibitor prescribing patterns in the UK: a primary care database study. Pharmacoepidemiology and Drug Safety 2016;25(9):1079-87.