ANNUAL EVALUATION REPORT 2017

NPS MEDICINEWISE PROGRAM EVALUATION

DECEMBER 2017

NPS MEDICINEWISE

Suggested citation

NPS MedicineWise Evaluation Report 2017. Sydney: National Prescribing Service Limited, 2018.

Acknowledgments

This report was prepared by the NPS MedicineWise Evaluation Team.

We acknowledge the Australian Government Department of Human Services for provision of the Medicare Benefits Schedule and Pharmaceutical Benefits Scheme data used for NPS MedicineWise evaluations.

CONTENTS

FOREWORD

I am proud to present this 20th NPS MedicineWise Annual Evaluation Report to you. Since its inception NPS MedicineWise has had a strong commitment to measuring the impact of its work for the health system and its users. Evaluation has informed innovation, quality improvement, new product development and program refinement throughout our history. It has also provided the evidence and reassurance that we are an accountable and responsible organisation delivering value to our customers. This report is no exception and I am especially pleased to share with you the economic analyses showing excellent results for our work in asthma, cardiovascular disease, depression, chronic pain and osteoporosis. It is no coincidence that these topic areas reflect national health priorities, consistent with our goal to ensure we work where we can make the most difference.

The quantitative methods used in this report to measure changes in prescribing and test ordering continue to evolve and remain at the forefront of pharmacoepidemiological science. Isolating the impact of NPS MedicineWise programs from other environmental factors is challenging but—wherever possible and known—we recognise potential confounders in our analyses so changes can be attributed with confidence.

Qualitative evaluation, as always, adds a depth and richness of understanding to our work in the quality use of medicines and medical tests. We listen carefully to the health professionals and consumers who use our products so we can ensure these meet their needs and remain relevant and useful.

Innovation remains central to our work. It is exciting to see results from initiatives like Choosing Wisely Australia in this report. Outcomes from the randomised controlled trial of the New Medicines Support Service are expected in 2018, and MedicineInsight is allowing us to explore new evaluation methods and specific questions.

As always, this Evaluation Report will inform our continuous improvement and innovation at NPS MedicineWise. I commend the report to you.

Dr Lynn Weekes

Chief Executive Officer

EXECUTIVE SUMMARY

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

- Economic evaluations confirm the value of NPS MedicineWise educational programs with cost savings to the Australian Government and positive cost benefits to the community.
- Evaluations this year found improved GP knowledge after therapeutic programs addressing blood pressure, depression, chronic pain, osteoporosis and proton pump inhibitors (PPIs).
- MedicineInsight data has been used to better understand changes in utilisation of medicines.
- The Choosing Wisely initiative, which NPS MedicineWise facilitates, has continued to grow more rapidly than expected.
- Improving the management of chronic diseases has continued, with good results for our programs that address medicine and medical test issues.
- In NSW there was a detected increase in the rate of people with heart failure receiving co-dispensed medicines and a decrease in the rate of unplanned hospitalisations and deaths since the launch of the Heart Failure Program.

Financial Impact

- The 2014 Asthma Program, *Exploring inhaled medicines use and asthma control*, found that for every dollar spent on the program, $2.44 was gained in monetary benefit.
- The 2015 *Imaging for abdominal pain* program saved $22.58 million for the Medical Benefits Schedule (MBS), with significant reductions in CT scans and ultrasound services of the abdominal region by GPs.
- Eight therapeutic topics contributed to $73.65 million worth of savings to the Pharmaceutical Benefits Scheme (PBS).

Impacts on GP practice

- The 2015 program *Chronic pain: opioids and beyond* produced a significant increase in the proportion of GPs who discussed individual goals of therapy with their patients and developed pain management plans (+56%), used pain diaries (+43%) and/or opioid contracts (+35%).
- The 2015/16 program *Preventing fractures: Where to start with osteoporosis* produced improvements in GP knowledge about baseline monitoring, risk factors for males, and correction of pre-existing hypocalcaemia before treatment with an osteoporosis medicine. GPs reported increased confidence in assessing the risks and benefits for six osteoporosis medicines and encouraging adherence.
- The 2015 program *Blood Pressure: What's changing in how we measure, manage and monitor?* achieved a 43% increase in the proportion of GPs whose patients met recommended blood pressure targets and a 70% increase in the proportion of GPs who assessed and documented CVD risk after participating in the clinical audit. Most GPs (66%) reported that they would use the Australian CVD risk calculator after receiving an educational visit on the topic.
- The 2016 program *Managing depression: re-examining the options* resulted in an 8% increase in GPs identifying inappropriate first-line antidepressants, and a 15% increase in GPs identifying appropriate first-line treatment for adolescents when an antidepressant is required. Other impacts included improved GP confidence in selecting antidepressants that do not interact with other medicines; increased referral of patients to online mental health programs; and increased preference for SSRI antidepressants rather than SNRIs for first-line treatment of severe depression.
- The 2015/16 *Proton Pump Inhibitors: Too much of a good thing* program continued to have a positive impact. Choosing Wisely contributed to this message with new recommendations about the quality use of PPIs. Overuse of PPIs improved with an estimated 3.4% reduction in the volume of high strength PPI concessional prescriptions over the program period.

MedicineInsight data program 2016/17

- Over 2,500 health professionals from over 400 general practices enrolled in the MedicineInsight program received practice-based, facilitated educational sessions informed by clinical data relating to depression, type 2 diabetes and chronic obstructive pulmonary disease (COPD).
- 70% reported their practice had reflected on patient care, 48% made more informed decisions at the practice, and 46% improved data recording.
- 41% reported that they had changed patient management and reviewed patients using the patient lists generated within the practice by MedicineInsight tools.

Australian Prescriber

- Users of Australian Prescriber were satisfied with the publication content and found the online publication to be accessible.

National Pharmacist Survey findings

- Pharmacists consider NPS MedicineWise an independent and trusted source of information about medicines and medical tests that promotes evidence-based practice.
- About 60% of pharmacists reported using NPS MedicineWise resources such as NPS RADAR, Australian Prescriber, MedicineWise News and the website, with 66% referring their customers to the website.
- Australian Prescriber and NPS MedicineWise are among the top sources for pharmacist's continuing professional development (CPD).

Choosing Wisely Australia

- 80% of medical colleges as well as several societies and associations are now participating in Choosing Wisely in Australia.
- During the second year of Choosing Wisely Australia, 13 medical colleges, societies and associations submitted lists of recommendations.
- The website recorded a monthly average of 8,009 sessions and 6,451 users.
- Social media channels, including Facebook and Twitter, reached over 1.5 million impressions.
- Choosing Wisely Australia and its recommendations gained over 1,123 media mentions with an audience estimated at almost 6 million people.

OUTCOMES OF A PROGRAM TO IMPROVE USE OF ASTHMA MEDICINES

Introduction

Asthma is a chronic inflammatory disease that causes wheezing and breathlessness due to narrowing of the airways and is associated with significant morbidity and mortality. It affects around 10% of the Australian population and occurs in both children and adults.[1] Despite the availability of national and international guidelines for asthma, a number of quality use of medicines (QUM) issues are evident in Australia.[1-5]

Asthma medicines act either to relieve or prevent the symptoms of asthma. In Australia the most commonly used reliever medicines are short-acting beta agonists (SABAs). Preventer medicines are available as either monotherapy (inhaled corticosteroids (ICS) are the most common in Australia), or combination therapy (ICS and long-acting beta agonists [LABAs]). Other preventer medicines used in asthma include montelukast and the cromones (cromoglycate and nedocromil). Appropriate medicine use should take into consideration the pattern of asthma symptoms, level of asthma control, ability to use the device, preferences and age of the person with asthma.

Intervention

In 2014 NPS MedicineWise launched the *Exploring Inhaled Medicines Use and Asthma Control* program (the Asthma Program), a multifaceted national program delivered from May 2014 to June 2015. The program was designed to address: overprescribing of ICS+LABA combination medicines; prescribing of ICS+LABA combination medicines in children aged less than 6 years; patients' adherence to preventer medicines; sub-optimal inhaler technique; and utilisation of written asthma action plans. By addressing these issues, the program aimed to improve GP and pharmacist practice in line with Australian clinical guidelines, improve asthma control for people with asthma and reduce unnecessary costs to the PBS.

Key messages

Health professionals

- Consider asthma diagnosis, symptoms and risk factors before treating to achieve control.
- Initiate or continue inhaled medicines following a review of asthma control.
  - Good control: consider stepping down treatment.
  - Poor control: confirm symptoms relate to asthma, check adherence and inhaler technique before stepping up.
- Provide written, individualised information to encourage patient self-management and improve asthma outcomes.

Consumers

- It is important that your asthma is reviewed regularly. Asthma can change over time, so your treatment may need to be adjusted, even if you are well.
- Understand what 'well-controlled' asthma means (recognising your asthma symptoms will help you know how well-controlled your asthma is).
- Check any written information provided to you about managing your asthma and make sure it is current. Recognising your asthma symptoms and how to manage them can help you control your asthma more effectively.
- Use inhalers, and the appropriate equipment, as prescribed. Following your treatment plans and using medicines as intended can help to optimise your treatment.

The main activities and interventions for the Asthma Program are shown in Table 1. Reach (not unique) for all health professionals (HPs) and GPs is shown where applicable.

The Asthma Program was a national program primarily targeting health professionals and was delivered by Clinical Services Specialists (CSS).

Educational visiting involves an NPS MedicineWise Clinical Services Specialist (CSS) meeting with a GP individually in their practice to discuss evidence-based therapy on a particular topic. A discussion aid (educational visiting card) is used to guide the conversation and left behind for the GP as a reference. This type of intervention is also known as *academic detailing* and is a highly effective intervention, proven to bring about prescribing behaviour change. Small group case-based meetings may include members of the multidisciplinary team such as GPs, pharmacists and practice nurses. In this intervention a case scenario depicting real clinical dilemmas is used as the basis of discussion in a group of up to 10 participants, facilitated by an NPS MedicineWise CSS.

Table 1: Interventions, activities and participation for the Asthma Program

Health professionals (HPs)		Consumer and media
Prescribing (PBS) feedback (All registered GPs prescribing PBS medicines)	e-Pharmacy practice review –1055 pharmacists	Consumer knowledge hub
1-1 Educational visiting – 6053 HPs (including 5371 GPs)	Online learning module on inhaler technique (partnership with Asthma Australia) – 1393 HPs and students, (including 21 GPs)	Consumer messages delivered by HPs / partner organisations
Small group case-based meetings – 5701 HPs (including 3964 GPs)	Knowledge hubs (website)	Social media campaign
Conference workshop – 136 HPs (including 26 GPs)	NPS Direct	Media releases
Clinical audit (566 GPs)	Engagement with asthma specialists	HP and consumer EDMs
Case study – 469 GPs	MedicineWise News	

Prescribing (PBS) feedback, known as a prescribing practice review, is a paper-based intervention sent via mail to Australian GPs. The prescribing (PBS) feedback presents GPs with their prescribing patterns for the selected therapeutic topic in comparison with their peers. It also contains relevant messages for reflection and information on the quality use of medicines. This personalised prescribing feedback data is drawn from Pharmaceutical Benefits Schedule (PBS) data and coordinated through the Department of Human Services. This intervention is sent to all GPs who have prescribed over $1000 of medicines on the PBS over a 3-month period.

NPS MedicineWise interventions are described in Appendix 1.

Expected program outcomes

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

- Reduced inappropriate prescribing of combination medicines for asthma, particularly in children, and associated reduced PBS expenditure on these products
- A corresponding increased prescribing of monotherapy medicines for asthma. These changes in prescribing patterns may indicate: increased stepping down of combination therapy; increased use of the stepwise approach during treatment initiation; and increased review of adherence and inhaler technique prior to stepping up of therapy
- Increased provision of written asthma action plans
- Improved patient adherence to asthma medication

Evaluation studies

Three independent studies were conducted to evaluate the outcomes of the Asthma Program:

- an analysis to explore the impact of the Asthma Program's effect on GP prescribing practice and patient asthma management using data from the MedicineInsight program
- an analysis of patient adherence to asthma preventer medicines using the 10% PBS data sample
- a cost–benefit analysis at the population level, using PBS data to identify, in monetary terms, the cost and benefit of the Asthma Program.

Table 2 summarises the three studies undertaken to evaluate the Asthma Program.

Table 2: Studies undertaken in the analysis of the Asthma Program

Study type	Evaluation question	Outcomes assessed	Source of outcomes data	Level
Program effectiveness study	Has the Asthma Program improved GP prescribing practice and writing of asthma action plans?	Prescribing of medicines for asthma; prescribing of medicines for asthma in patients aged 6 and younger; and reference to the provision of a written asthma action plan	MedicineInsight data	GP
Adherence study	Has the Asthma Program impacted on patient adherence to asthma medicines?	Change in patient adherence to asthma preventer medicines before, during and after the 2014 Asthma Program	10% PBS sample	Patient
Cost benefit analysis	Are the PBS savings higher than the cost of conducting the Asthma Program?	Program cost	NPS MedicineWise operational systems data	Population
		Change in PBS cost for asthma medications	PBS data	

PROGRAM EFFECTIVENESS STUDY

Evaluation design and population

The impact of the Asthma Program on GP prescribing and patient management behaviour was evaluated using time series analysis of MedicineInsight data. This study used MedicineInsight data to evaluate the impact of the visiting component of the Asthma Program amongst participating GPs and the impact of nationwide components of the Asthma Program (eg, PBS feedback and information dissemination) amongst the whole population of GPs within MedicineInsight practices.

Outcome indicators for this study were developed based on the Asthma Program key messages and expected outcomes, and availability of data in the MedicineInsight database.

The analysis measured the rate at which specific prescribing occurred each month in patients visiting the GP for the reason of asthma. Some outcome indicators were only relevant to young children. Prescriptions issued to children (≤ 6 years) were extracted based on calculated age of each patient at the date of prescription. Since actual dates of birth are not provided in the MedicineInsight database, this was done using each patient's year of birth and assuming a birthdate of 15 June in their year of birth. The data were then selected where age at prescription date was 6 years or younger.

Patients with chronic obstructive pulmonary disease (COPD) or COPD and asthma were excluded from the analysis.

MedicineInsight data

This study used GP practice data from the MedicineInsight dataset and GP program participation data from the NPS MedicineWise database.

MedicineInsight is a national general practice data program developed and managed by NPS MedicineWise. It is the first large-scale general practice data program in Australia that extracts longitudinal de-identified patient health records from the software GPs already use to manage patient records and write prescriptions. MedicineInsight includes approximately 7% of general practices in Australia. MedicineInsight utilises a third party data extraction tool which extracts, de-identifies, encrypts and securely transmits whole of practice data from the GP Clinical Information System. Patient level data is de-identified 'at source' meaning the patients' personal identifiers such as name, date of birth, and address are not extracted by the tool (although year of birth and postcode are extracted enabling the calculation of age and Socio-Economic Indexes for Areas [SEIFA]). The data held in the MedicineInsight database are anonymous. However, each patient has a unique identifying number which allows all the records (clinical, prescription, referral, etc.) held in the database for a particular individual over time to be linked.

MedicineInsight extracts data from general practices including: 1) patients' demographic and clinical data (except for progress notes) for all encounters entered directly by GPs or practice staff into the system; 2) system-generated data (eg, start time and date of an encounter); and 3) GP identifiable information. De-identified patient data are extracted regularly from each participating practice, collated with de-identified GP information, and analysed centrally in the data repository held by NPS MedicineWise in an external, secure environment.

MedicineInsight data used included data from 1 January 2006 to 31 December 2016.

NPS MedicineWise participation data was used to identify the interventions from the Asthma Program in which GPs involved in MedicineInsight participated. This information was used to create the study variable for the analysis.

Study factors

The study factor for the analysis of the impact of the visiting intervention was the GPs' participation in either a one-to-one educational visit or a small group case-based meeting that was part of the Asthma Program.

To evaluate the impact of the program as a whole, the analysis examined the trend before and after the start of the Asthma Program in June 2014. The program included visits by CSSs to about 1,000 GPs and the PBS feedback and information which was available to all GPs.

Outcome measurements

The study examined three areas of GP behaviour which the program may have influenced:

- prescribing in the general population
- prescribing in young children (≤ 6 years)
- provision of written asthma action plans.

Prescribing of asthma medicine in the general patient population was examined by the different classes of asthma medicine (ICS, ICS+LABA, cromones and montelukast). The Asthma Program aimed to address the quality use of medicines (QUM) issue of the overprescribing of ICS+LABA combination medicines. The program had educational messages about the appropriate approach to the initiation and stepping up and stepping down of asthma medicines according to patients' asthma control. The importance of assessing adherence and inhaler technique before stepping up medicines for patients who have poorly controlled asthma was also addressed. It was expected that, as a result of the Asthma Program, there would be a reduction in the proportion of patients being prescribed an ICS+LABA combination medicine when visiting a GP for asthma.

Prescribing for young children (≤ 6 years) was examined separately from prescribing for the general population. There is a lack of evidence for the safety and efficacy of LABAs, including in combination with ICS, in children aged 5 years or younger. The analysis used ≤ 6 years rather than ≤ 5 years to account for the lack of patients' day and month of birth in the MedicineInsight data set. A birthdate of 15 June in their year of birth was assigned to patients and the definition of ≤ 6 years was used to ensure comprehensive capture of the population. The educational visiting intervention of the Asthma Program recommended the referral of children < 6 years whose asthma is poorly controlled on a low-dose ICS to a specialist. Stepping up treatment to low-dose ICS+LABA, high-dose ICS, or ICS+montelukast was only recommended for children ≥ 6 years whose asthma was poorly controlled on an ICS alone. The PBS feedback intervention of the Asthma Program provided feedback about the prescribing of ICS+LABA combination medicines in different age groups and noted, as a point of reflection, that guidelines recommend against the use of combination inhalers or LABAs in children ≤ 5 years due to lack of evidence for efficacy and safety. It was expected as a result of the Asthma Program that there would be a reduction in the proportion of young children who were prescribed an ICS+LABA combination medicine when visiting a GP for asthma.

Written asthma action plans have formed part of Australian national asthma management guidelines since 1989. Despite

this, ownership of a written asthma action plan is low. A written asthma action plan enables people with asthma to recognise deterioration in their condition promptly and respond appropriately, by integrating changes in symptoms or peak expiratory flow measurements with written instructions to adjust medication. The aim of a written asthma action plan is to enable early intervention and to prevent or reduce the severity of asthma exacerbations. One of the three key message of the Asthma Program was to provide patients with written information tailored to their identified needs to enable them to manage their asthma.

Time series analysis

For each outcome of interest, a time series of the proportion of patients with the outcome of interest was calculated at a month time-step. The analyses were conducted using the CausalImpact package of R. The intervention was defined as beginning in June 2014.

To analyse the impact of active participation in the Asthma Program's educational visit, GPs were allocated to a participating or non-participating group, based on data obtained from the NPS MedicineWise participation database. A counterfactual time series was constructed for the participating group on what the outcome of interest would have been had this group not actively participated in the Asthma Program. This counterfactual time series was constructed using data on the pre-intervention behaviour of participating GPs and the pre- and post-intervention behaviours of non-participating GPs.

To analyse the impact of the nationwide components of the 2014 Asthma Program on the whole population of GPs, a similar analysis was undertaken using the CausalImpact package of R. In this analysis, data from both participating and non-participating GPs were pooled. The forecasts of the expected rate of GP prescribing and management behaviours had the intervention not taken place are based on pre-intervention data only.

Results

There was evidence of a decrease in the proportion of young children prescribed an ICS+LABA combination product associated with the national program. On average the proportion of young children prescribed a ICS+LABA combination was a relative 32% (2.6% absolute) lower than expected for all GPs, following the start of the national Asthma Program (Bayesian Credible Interval [BCI] 95% -49% to -14%).

Trends were observed toward a decrease in ICS+LABA combination therapy prescribing and an increase in ICS monotherapy prescribing in young children. There was evidence of an increase in the proportion of young children prescribed montelukast, which is consistent with a best practice move away from the prescribing of ICS+LABA combination medicines towards monotherapy medicines in young children. On average the proportion of young children prescribed montelukast was a relative 25% (4% absolute) higher than expected for participating GPs following the start of exposure to the visiting program (BCI 95% 16% to 34%) (Table 3).

Table 3: GP prescribing behaviour for children (≤ 6 years), results from the time series analysis of the effect of the Asthma Program and the visiting intervention

Intervention level analysed	Medication class	Actual average proportion after intervention (June 2014–December 2016)	Modelled average proportion after intervention (June 2014–December 2016) had intervention not occurred (BCI 95%)	Relative intervention effect (BCI 95%)
Visiting program participants	SABA	56%	61% (59% to 63%)	-8.5%(-12% to -5.5%)
	ICS+LABA	6.3%	7.3% (6.1% to 8.4%)	-14%(-29% to 1.8%)
	ICS	41%	39% (37% to 41%)	5.1% (-0.86% to 11%)
	anticholinergics	1.2%	1.1% (0.23% to 2%)	11% (-68% to 90%)
	montelukast	20%	16% (14% to 17%)	25% (16% to 34%)
National program – All GPs (PBS feedback)	ICS+LABA	5.6%	8.2% (6.8% to 9.7%)	-32% (-49% to -14%)

The proportion of people attending the GP for asthma each month with a record of receiving a written asthma action plan was very small. On average, the proportion of patients with a record of the provision of a written asthma action plan was a relative 43% (absolute 5 per thousand patients per month) higher than expected for participating GPs following the start of exposure to the visiting program (BCI 95% 32% to 53%). The number of records of written asthma action plans peaked early every year and most of the increase in recorded written asthma action plans associated with the visiting intervention was estimated to have occurred during these peak periods (Table 4).

Table 4: Impact of interventions on GP provision of written asthma action plans

Intervention level analysed	Actual average proportion after intervention (June 2014–December 2016)	Modelled average proportion after intervention (June 2014–December 2016) had intervention not occurred (BCI 95%)	Relative intervention effect (BCI 95%)
Visiting program participants	17 per thousand patients per month	12 per thousand patients per month (BCI 95% 13.3 to 10.8)	43% (BCI 95% 32% to 53%)
National program – All GPs receiving feedback and information	22.8 per thousand patients per month	21.6 per thousand patients per month	5.6% (BCI 95% -12% to 22%)

Discussion

This evaluation found that the Asthma Program had a positive impact on GP concordance with guideline-recommended prescribing and patient asthma management.

Among MedicineInsight GPs, the Asthma Program was associated with a statistically significant reduction in the volume of prescriptions of ICS+LABA combination medicines in patients aged 6 and younger, in whom there is lack of evidence for safety and efficacy, with an absolute 0.6% fewer children prescribed an ICS+LABA combination medicine each month and an increase in the proportion of young children prescribed montelukast.

Among GPs who chose to participate in either a one-to-one or a small group case-based meeting, there was a statistically significant increase in the provision of written asthma action plans, with 5 more written asthma action plans provided per 1,000 patients each month.

The analysis of MedicineInsight data allowed the investigation of differences in outcomes following GP participation in NPS MedicineWise visiting interventions.

ADHERENCE STUDY

Method

We used the 10% PBS data sample, supplied by the Department of Human Services, to evaluate the change in patient adherence to asthma preventer medicines before, during and after the Asthma Program. The 10% PBS data contains a longitudinal cohort of 10% of Australian patients randomly sampled and tracks medication records among the cohort.

The study sample was restricted to those patients who were alive throughout all 3 periods and had more than one prescription for ICS monotherapy or ICS+LABA combination products dispensed between: 1 July 2013 and 30 June 2014; 1 July 2014 and 30 June 2015; and 1 July 2015 and 30 June 2016. The same cohort of patients was followed before, during and after the intervention.

Adherence was measured using the proportion of days covered (PDC) for prescriptions prescribed in the year before, the year during and the year after the Asthma Program. We defined a prescription-period as the total intended duration for an episode of treatment between the prescribing date and the theoretical end date of that treatment, depending on the number of repeat scripts issued. The PDC ranges from 0% to 100%, and an 80% cut-off threshold, commonly used in medication adherence studies, was applied to classify a patient into a group of adequate adherence (≥ 80%) or non-adherence (< 80%). We limited the calculation to fluticasone and fluticasone+LABA combination medications. These medicines have a 30-day supply per prescription based on clinical guidelines for recommended dosages.

To examine the association between the time period of the intervention and patient characteristics and the likelihood that patients achieve adequate adherence (PDC ≥ 80%), models based on generalised estimating equation (GEE) with binomial distribution and a logit link function were used. The models also assessed and adjusted for confounders to adequate adherence, such as patient's age, gender, concessional status, number of other medications used, class of asthma medicine used (ICS or ICS+LABA), frequency of GP visits and state of residency.

Results

The final study sample consisted of 21,438 individual patients who filled more than one asthma prescription over the period between July 2013 and June 2016. The majority of patients were females (54%), general beneficiaries (65%) and in the adult age groups with age ranged between 18 and 100+ (91.3%). For the medicines (fluticasone and fluticasone+LABA combinations) included in the study, in each time period 90% of patients were prescribed fluticasone+LABA combination medicine and 10% were prescribed fluticasone monotherapy.

The median PDC did not change for either medicine: 58.8% for the dispensed scripts prescribed before the intervention; 58.0% for those scripts prescribed during the intervention; and a median PDC of 56.4% post-intervention. Adequate adherence (PDC ≥ 80%) of patients over the 3-year period was stable at 27%.

There was a difference in adherence to fluticasone compared to fluticasone+LABA combination products (Table 5). The median PDC for those being prescribed fluticasone was consistent at 49% over the three time periods. The percentage of patients being adequately adherent to fluticasone before, during and after the intervention period was 17.4%, 14.3% and 13.9%, respectively. Adequate adherence of patients on fluticasone+LABA combination medicines was higher, with the median PDC at nearly 60% and about 28% of patients adequately adhering to their treatment over the same periods.

Table 5: Median proportion of days covered (PDC) and its interquartile range (IQR), number (N) and proportion (%) of patients adherent and non-adherent by intervention period and medication

Intervention period	**Fluticasone** (10% of patients)			**Fluticasone+LABA Combination** (90% of patients)		
	Median PDC (IQR)	Adherent N (%)	Non-adherent N (%)	Median PDC (IQR)	Adherent N (%)	Non-adherent N (%)
Before	49.8 (35.8)	373 (17.4)	1765 (82.6)	60.2 (44.0)	5545 (28.7)	13755 (71.3)
During	49.3 (33.2)	302 (14.3)	1808 (85.7)	60.1 (45.1)	5517 (28.5)	13811 (71.5)
After	49.3 (33.2)	288 (13.9)	1791 (86.1)	58.3 (47.7)	5404 (27.9)	13955 (72.1)

Both unadjusted and adjusted models (for age, gender, concessional status, frequency of doctor visits and number of other medications) showed that there were statistically significant interactions between the intervention period and asthma medication class with adherence in terms of unadjusted odds ratio (OR) and adjusted odds ratio (aOR) (Table 6). Among patients who were prescribed fluticasone monotherapy, adherence was lower for the prescriptions issued during the intervention period and after the intervention period compared to that before the intervention period. However, among patients who were prescribed fluticasone+LABA combination products there was no evidence of change in adherence during the intervention period compared to the period before the intervention.

The unadjusted model showed that patients on fluticasone+LABA combination products were less likely to be adherent to the treatment after the intervention period, but after adjusting for the other factors this was no longer evident. During all three periods, adherence among patients who were using fluticasone+LABA combination products was much higher than those using fluticasone monotherapy. Adequate adherence was positively associated with male gender, increasing age, concessional beneficiary status, frequent visits to doctors and an increasing number of other medications being prescribed.

Table 6: Patient characteristics, unadjusted and adjusted odds ratio from GEE parameter estimations

Medicine and time period				**Unadjusted model**	**Adjusted model**
Medicine	**Time period**	**N**	**%**	**OR (CI 95%)**	**aOR (CI 95%)**
Fluticasone	Before	2138	10	1.00	1.00
	During	2110	10	0.79 (0.70 to 0.91)	0.78 (0.67 to 0.92)
	After	2079	10	0.76 (0.66 to 0.87)	0.73 (0.62 to 0.86)
Fluticasone+LABA combination	Before	19300	90	1.00	1.00
	During	19328	90	0.99 (0.96 to 1.02)	0.99 (0.95 to 1.02)
	After	19359	90	0.96 (0.93 to 0.99)	0.97 (0.93 to 1.01)
Fluticasone	Before			1.00	1.00
Fluticasone+LABA combination				1.86 (1.66 to 2.09)	1.69 (1.48 to 1.94)
Fluticasone	During			1.00	1.00
Fluticasone+LABA combination				2.32 (2.05 to 2.63)	2.14 (1.86 to 2.46)
Fluticasone	After			1.00	1.00
Fluticasone+LABA combination				2.35 (2.07 to 2.67)	2.25 (1.95 to 2.60)

Discussion

This observational cohort study was conducted to assess the change in asthma medication adherence in relation to the Asthma Program over a three year period. The majority of the patients (90%) were on fluticasone+LABA combination therapy, most were treated with the fluticasone+salmeterol combination product (89%) and only 10% were treated with fluticasone monotherapy. This is in line with national data which show that 81.4% of people in 2013 had an ICS+LABA combination product dispensed. We did not find any improvements in adherence during or after the intervention, and found even lower adherence to ICS monotherapy over time. It is plausible that there was less adherence to ICS monotherapy over time because patients' asthma was mild or became controlled enough to not warrant continual preventer medication use. Better and stable adherence

was shown for ICS+LABA combination medicines compared to ICS monotherapy. One potential reason for this is that the addition of the LABA drug can provide patients with immediate symptomatic relief, hence encouraging adherence, or their therapy was better established and they had fewer problems with treatment.

There were some limitations with the current study. PBS data only contains data on medicines, and does not contain data on diagnostics or disease states. Therefore, one of the study assumptions was that the selected study sample were patients with asthma, and those possibly with a non-asthma condition such as COPD cannot be separated from the data. Only patients using fluticasone and fluticasone+LABA combination products were selected for this study to ensure consistent definition of adherence intervals. Each fluticasone and fluticasone+LABA script theoretically has a 30-day supply according to the clinical guidelines on recommended dosage regimens and the drug formulations. Of patients who were using ICS monotherapy alone, approximately 57% were prescribed the ICS fluticasone. Although only patients who were using fluticasone were included, it was assumed that similar levels of adherence should be expected in the other ICS drugs, based on the literature. As in other medication studies using administrative data, the measure of adherence used in this study only related to filled scripts, and whether patients actually took the medications or used the device properly could not be determined.

Adequate adherence to preventer asthma medications is poor, and there was no improvement in adherence demonstrated over the intervention periods. While the Asthma Program included key messages around assessing patient medication adherence, assessing change in patient adherence as a result of the program was complicated. Poor patient adherence in using ICS or ICS+LABA medicines is a well-documented phenomenon in the Australian and international literature. Future programs should continue to address the importance of adherence to improve patients' clinical outcomes and quality of life, and to reduce unnecessary health care costs.

COST-BENEFIT ANALYSIS OF THE ASTHMA PROGRAM

Evaluation design

A cost–benefit analysis was used to compare the costs and effects of the 2014 Asthma Program, expressed in monetary terms from the perspective of the payer. The payer is the Commonwealth Department of Health which funds both the quality use of medicine (QUM) programs implemented by NPS MedicineWise, and the PBS. The measures used in this analysis are:

- The **costs** of the resources required to deliver the Asthma Program
- The **benefits** of the program expressed as the monetary value of the effects generated by the program. In this analysis the benefits are restricted to the direct savings associated with the reduction in PBS benefit paid for ICS+LABA combination medicines, accounting for the cost associated with the increase of ICS monotherapy medicines.

The cost–benefit analysis was conducted by calculating the program *net benefit* and the benefit–cost ratio. The net benefit is calculated as the difference between the benefits and the costs. Values higher than zero indicate that the benefits exceed the costs, and thus the program represents an efficient use of public resources. The *benefit–cost* ratio is calculated as the ratio of benefits to costs. Values higher than one indicate that the benefits exceed the costs.

The economic evaluation is based on the program effectiveness results and program cost data collected from NPS MedicineWise organisational timesheet data, invoice records and budget data.

Only expenditure effects that were significantly associated with the Asthma Program are included in the base case cost–benefit analysis.

Estimates of variation for invoiced costs and staff resource costs were derived from three national NPS MedicineWise visiting programs that occurred at a similar time to the Asthma Program and involved a similar intervention product suite. These programs were the 2015 Blood Pressure Program, the 2015 Chronic Pain Program and the 2016 Depression Program. The Blood Pressure Program did not include a PBS feedback intervention, which the Asthma and the other comparison programs included. To account for this difference, the invoiced cost of the PBS feedback in the Asthma Program was added to the invoiced cost total of the Blood Pressure Program. All costs were adjusted to 2015/16 financial year equivalent value, using Australian CPI values published by the ABS and discounted at a rate of 5% per year after the first year. The costs for the Asthma Program were the greatest of the four programs. Variation estimates were calculated by varying the Asthma base case by the standard deviation of the four similar program costs.

The cost of delivery of one-to-one educational visits and small group case-based meetings was calculated using the average cost per GP face-to-face visit for the 2014/15 financial year ($332.19) and the number of GP face-to-face visits based on participation data for the Asthma Program (9,375).

The estimate of variation for the cost of delivery of visiting was derived from the average cost per GP face-to-face visits for the three financial years 2013/14, 2014/15 and 2015/16. There was a 15% reduction in this cost from 2014/15 to 2015/16. This change was due to change in delivery model; from delivery primarily through contracts with Medicare locals to a majority in-house workforce delivery model.

Time series analysis was used to measure the impact of the program on provider-level reimbursement PBS data for the following asthma medication classes: ICS+LABA therapy; ICS monotherapy; and cromones. This data was obtained from the Department of Human Services for the period July 1996 to June 2016.

Program operational costs were collected from NPS MedicineWise finance and timesheet systems and were adjusted to 2016 currency using the Australian Consumer Price Index (CPI). Costs and benefits of the Asthma Program were discounted at a rate of 5% per year.

The development of the 2014 Asthma Program started in 2013/14. The evaluation of impact of the program on the PBS has been calculated until 30 June 2016.

All costs have been adjusted to 2015/16 financial year equivalent value for the base case, using Australian CPI values published by the ABS. The CPI value for the financial year was calculated by averaging the CPI values for the four quarters within that financial year. To adjust costs that occurred in 2016/17 the average CPI value of the three available quarters was used. Program costs and savings to the PBS after the first year (2013/14) were discounted at a rate of 5% per year.

In order to undertake sensitivity analysis, a simple decision tree was created in TreeAge Pro with the net costs and benefits associated with the NPS MedicineWise Asthma Program compared to no program at a population level.

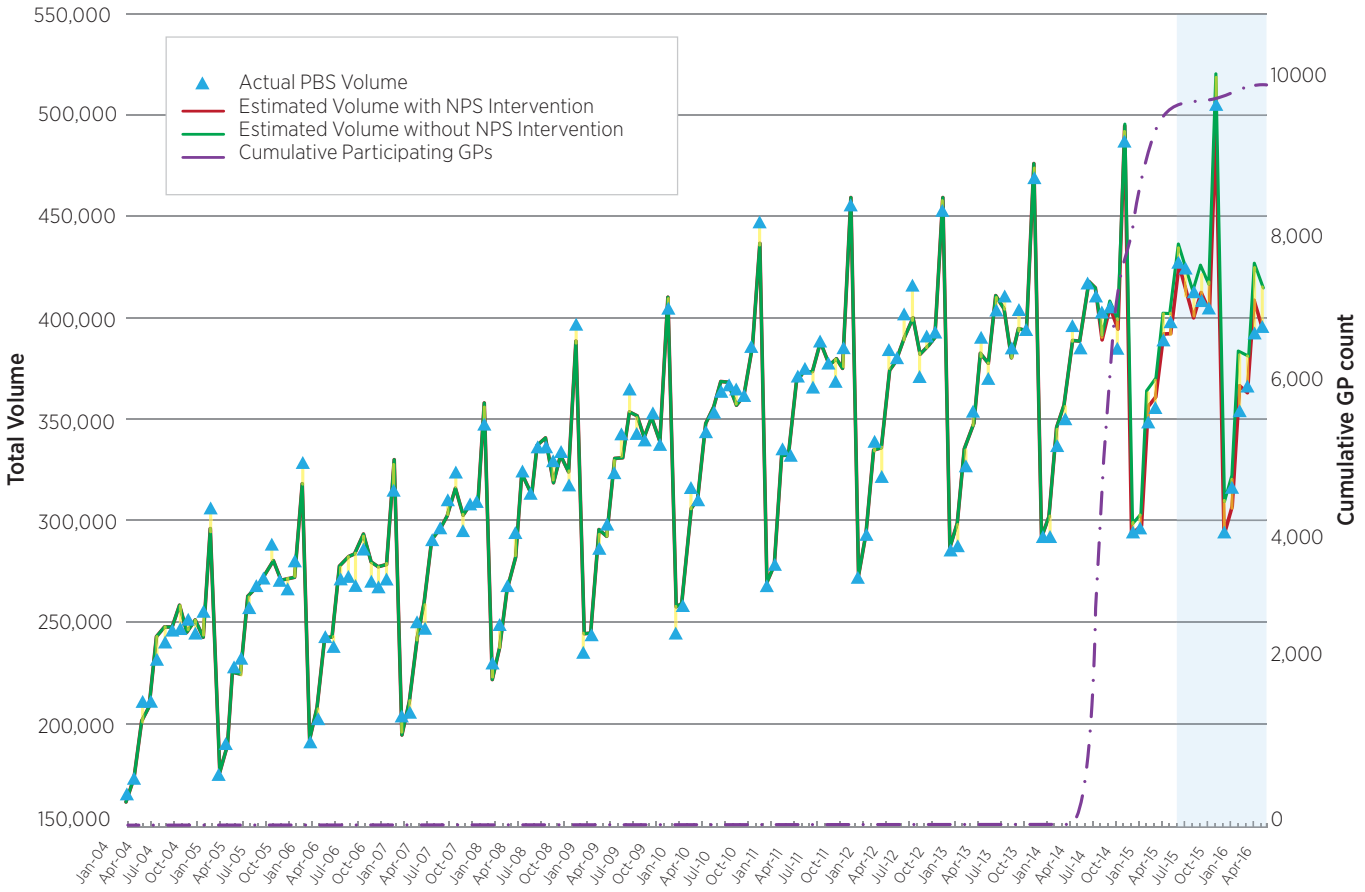
Univariate analyses were conducted with scenarios based on the key assumptions and variations of point estimates used.

Results

In the 2-year period following the Asthma Program, the volume of dispensed prescriptions for ICS+LABA combination medicines decreased by a statistically significant 2.5% from the predicted trend without the Asthma Program. As shown in Figure 1 the yellow shaded area between the estimated expenditures with the NPS MedicineWise program included (red line) and the estimated expenditure without the program (green line) depicts the impact of the intervention in reducing the cost of prescriptions for drugs used to treat asthma, after allowing for covariates and assuming no decay of key messages. The period over which savings were calculated is shaded in blue. The purple line depicts the cumulative total of participating GPs.

This corresponds to an estimated mean reduction of 259,446 prescriptions from July 2014 to June 2016 and savings to the PBS of $13,012,090 ($11,994,226 after discounting) attributable to the Asthma Program.

Figure 1: Time series analysis of concessional PBS monthly volume of ICS+LABA combination medicines, January 2004 to June 2016



In the period following the Asthma Program, there was an increase in the volume of dispensed prescriptions for ICS monotherapy medicines, by a relative 4.18% from the predicted trend without the Asthma Program. This corresponds to an estimated mean increase of 45,026 prescriptions from July 2014 to June 2016 and an introduced cost to the PBS of $1,194,740. No statistically significant association was found between the Asthma Program and PBS reimbursement for cromones. Changes in PBS expenditure associated with the Asthma Program for ICS+LABA combination medicine ($11,994,226 decrease), ICS monotherapy ($1,194,740 increase) and cromones (no change), resulted in net PBS savings of $10,893,737 after discounting.

The resources required to develop and deliver the Asthma Program were $4,632,783 ($4,470,116 after discounting and adjusting).

The net benefit of the Asthma Program was $6,423,621 which is the difference between the net savings to the PBS and the cost of the Asthma Program, accounting for discounting.

The benefit–cost ratio is calculated by dividing the estimated cost of changing prescribing patterns ($10,893,737) by the cost of the NPS MedicineWise program ($4,470,116). Values higher than one indicate that the benefits exceed the costs.

The benefit–cost ratio was 2.44, indicating that for every dollar spent on the program, $2.44 was gained in monetary benefit.

Discussion

Analysis of PBS data found evidence of a change in asthma medicine utilisation associated with the Asthma Program which aligned with the predicted outcome of the program. The benefit–cost ratio of the program was 2.44. A benefit–cost ratio greater than one, such as for this program, means the benefits exceed the costs, and thus the program represents an efficient use of public resources.

Time series analysis was used to quantify the impact of the Asthma Program through investigating whether there was a statistically significant change in trend over a defined period

of time that could be attributed to the program. A change in trend, decreasing ICS+LABA and increasing ICS medicines, was observed in 2012 that could not be attributed to the 2014 Asthma Program. This was accounted for in the time series analysis to ensure an accurate effect estimate for the Asthma Program.

The results of the cost–benefit analysis showed little change when sensitivity analysis was conducted and variation was introduced regarding: program costs; non-significant increases in PBS costs for cromones and the leukotriene receptor antagonist; and the effect estimate of the Asthma Program on PBS ICS monotherapy medicine utilisation. The results of the cost–benefit analysis were highly sensitive to the introduction of variation around the effect estimate of the Asthma Program on PBS ICS+LABA combination medicine utilisation. If the true effect estimate was the lower confidence interval the benefit–cost ratio was 0.17 meaning the costs exceed the benefits.

The strengths of this 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 Asthma Program. Program cost data was sourced directly from organisation records, increasing our confidence in the veracity of the cost estimate used. Invoiced records from NPS MedicineWise were used to capture external costs of the program from inception until completion. All NPS MedicineWise staff are required to complete a daily timesheet, in which they allocate the time they spend on specific programs that day. This timesheet data was linked to salary data for each individual to calculate the resources spent on the program. There is a high level of consistency between the staff resource costs for similar programs which supports the reliability of this method. The cost of visiting is calculated from the average cost to NPS MedicineWise of the delivery of visiting per GP visited. The PBS data used includes all dispensed prescriptions reimbursed by the PBS for the Australia population. This census administrative data set is not affected by selection, sampling, recall or self-report biases.

This study used established statistical and health economics methodologies to demonstrate that the Asthma Program was an efficient use of public resources. For every dollar spent on the program, $2.44 was gained in monetary benefit. This economic evaluation found that the Asthma Program had economic benefit in terms of reducing costs to the PBS. This is a cost–benefit analysis of direct costs and savings related to PBS. No analyses of changes to MBS claims or of changes in quality-adjusted life years (QALYs) were undertaken. The savings reported are therefore expected to be an underestimate of the total savings from the program.

FINANCIAL IMPACT OF NPS MEDICINEWISE PROGRAMS

PHARMACEUTICAL BENEFITS SCHEME (PBS) SAVINGS

Introduction

NPS MedicineWise identifies therapeutic areas where there is strong evidence of practice gaps and inappropriate prescribing or use of medicines, and designs multifaceted national educational programs to address these issues. Areas are targeted where education and information can have a positive impact on practice, consistent with quality use of medicines principles. On the basis of the evidence–practice gap, programs are designed with appropriate interventions and levels of intensity and may include academic detailing and PBS feedback as well as other proven educational interventions with GPs and practice staff.

The analyses were conducted in the 2016/17 financial year although the savings identified are attributable to the 2015/16 financial year.

PBS savings for this reporting period are based on analysing the impact of eight NPS MedicineWise national programs that focused on specific therapeutic areas. Utilisation of the following medicines was expected to change as a result of these programs and these were used in the assessment of PBS savings: antibiotics, statins, ezetimibe, antipsychotics, antidepressants, proton pump inhibitors (PPIs), antihypertensives, opioid analgesics and ICS+LABA combination inhalers used in asthma.

The aim of this evaluation is to demonstrate PBS savings attributable to NPS MedicineWise educational programs in the 2015/16 financial year.

Method

The monetary impact, in terms of cost savings to the PBS, of the NPS MedicineWise programs evaluated in this period was determined using time series analysis. Based on actual PBS prescribing volumes, statistical models were developed to estimate the volume of PBS prescribing over time, for the relevant medicines, in the presence and absence of the NPS MedicineWise program under investigation. Cost savings were calculated if an NPS MedicineWise program was shown to have a statistically significant impact on reducing prescription volume.

A Bayesian hierarchical time series approach was applied to the time series analysis for the antibiotic resistance programs. Using this approach, PBS data for both GPs and other non-GP prescribers were used to forecast GP prescribing trends. Cumulative levels of GP participation for a specific program were not used in this analysis. This approach was used for detecting cumulative impacts that occurred as the result of a continuity of NPS MedicineWise programs in a particular area, rather than the result of a stand-alone program. See the Annual Evaluation Report Technical Supplement for further details on this approach.

Result

NPS MedicineWise programs across eight therapeutic areas returned significant cost savings for PBS expenditure. The results are further described in the relevant topic section of this report. **The savings reported in 2017 totalled $73.65 million**. See Table 7 for further information.

Table 7: Estimated PBS savings by Program

Program	Year implemented	Medicines analysed	Estimated savings to PBS for 2015/16
Reducing antibiotic resistance	2009, 2012, 2014 and 2015	doxycycline; amoxycillin; amoxycillin+clavulanic acid; benzathine; phenoxymethylpenicillin; cefaclor; cephalexin; cefuroxime axetil; erythromycin; roxithromycin; azithromycin; clarithromycin; trimethoprim + sulfamethoxazole	$20.30 million
Blood pressure: what's changing in how we measure, manage, monitor?	2015	diuretics & potassium-sparing combinations; ACE inhibitor combinations; angiotensin-II receptor antagonist combinations	$3.70 million
Chronic pain: opioids and beyond	2015	codeine+paracetamol; fentanyl patches; hydromorphone; morphine; oxycodone; oxycodone+naloxone	$3.27 million
Cardiovascular risk: guiding lipid management	2011	atorvastatin; fluvastatin; pravastatin; rosuvastatin; simvastatin	$8.04 million
		ezetimibe; ezetimibe+simvastatin; ezetimibe+atorvastatin; ezetimibe+rosuvastatin	$5.67 million
Balancing the benefits and harms of antipsychotic therapy	2011	olanzapine; quetiapine; risperidone	$2.05 million
Depression: challenges in primary care	2012	desvenlafaxine; duloxetine	$15.35 million
Exploring inhaled medicines use and asthma control	2014	fluticasone+eformoterol; budesonide+eformoterol; fluticasone+vilanterol; fluticasone+salmeterol	$8.90 million
Proton pump inhibitors: too much of a good thing?	2015	esomeprazole; lansoprazole; omeprazole; pantoprazole; rabeprazole	$6.37 million
			$73.65 MILLION

Discussion

NPS MedicineWise has been contracted by the Australian Government Department of Health to deliver savings to the PBS. The savings requirement for the total contract period, 2015/16 to 2017/18, is $210 million, including an annual target of $70 million in the 2016/17 financial year. **The PBS savings identified in the 2016/17 financial year for 2015/16 amount to $73.65 million.**

MEDICAL BENEFITS SCHEDULE (MBS) SAVINGS

Introduction

NPS MedicineWise systematically identifies and tailors programs for health professionals and consumers where uncertainties exist about appropriate medical testing, and where inappropriate imaging referrals may result in suboptimal health outcomes and/or increased costs.

During 2015 and 2016, NPS MedicineWise ran three quality use of diagnostic test programs. These programs aimed to reduce the inappropriate use of pathology tests for investigating presentations of fatigue in general practice, reduce the inappropriate use of imaging for abdominal pain, and reduce the inappropriate use of imaging for ankle and knee injuries.

This evaluation explores the financial savings attributable to the Imaging for abdominal pain program (Abdominal Pain Program).

Method

The financial impact of the Abdominal Pain Program on the MBS was the focus of the 2017 savings report. The program was a multifaceted program that started in April 2015 and aimed to reduce inappropriate use of medical imaging in the diagnostic investigation of abdominal pain. The program promoted patient history, physical examination and guidelines to inform decisions on conducting imaging tests, guide the selection of appropriate imaging tests, and improve the quality of referrals. The main components of this program were a personalised MBS data feedback intervention which was sent to 25,703 GPs and an online learning module that was completed by 221 GPs and 30 GP registrars. Information resources, a decision aid and a tool to support communication with patients were also promoted. The expected outcome of the program was a reduction in GP referrals for imaging, particularly computed tomography imaging (CT scan), of the abdominal region. The provider-level reimbursement data for August 2011 to December 2016 were obtained from the Department of Human Services.

The MBS data obtained for this analysis allowed for services referred by GPs to be distinguished from services referred by other health professionals (non-GP). This separation is valuable in evaluating the impact of the NPS MedicineWise interventions which targeted only GPs. The implemented analysis used non-GP data as a control series to predict what would have occurred in the GP time series had the intervention not occurred. This prediction was calculated from the time series values of the GP group in the pre-intervention period, along with the time series values of the control group (non-GP) in the post intervention period. Based on actual MBS service volumes, statistical models were developed to estimate the volume of MBS medical services conducted over time in the presence and absence of the program.

The impact of the intervention program was derived by the subtraction of the predicted data from the observed data in the post-intervention period. The analysis used was Bayesian

hierarchical time series modelling. The hierarchical form in terms of the Data Model and the Process Model provides a unified framework for time series analyses. These include the autoregressive model (AR), the moving average model (MA) or the autoregressive and moving average model (ARMA) used in the conventional time series regression, but not limited to those autocorrelation structures. The model was run using CausalImpact package in R.

Where a significant impact was observed, the saving estimate was derived as the sum of the monthly reductions in services during the post-intervention period multiplied by the monthly average benefit paid, dividing the total benefit paid by the total number of services.

Result

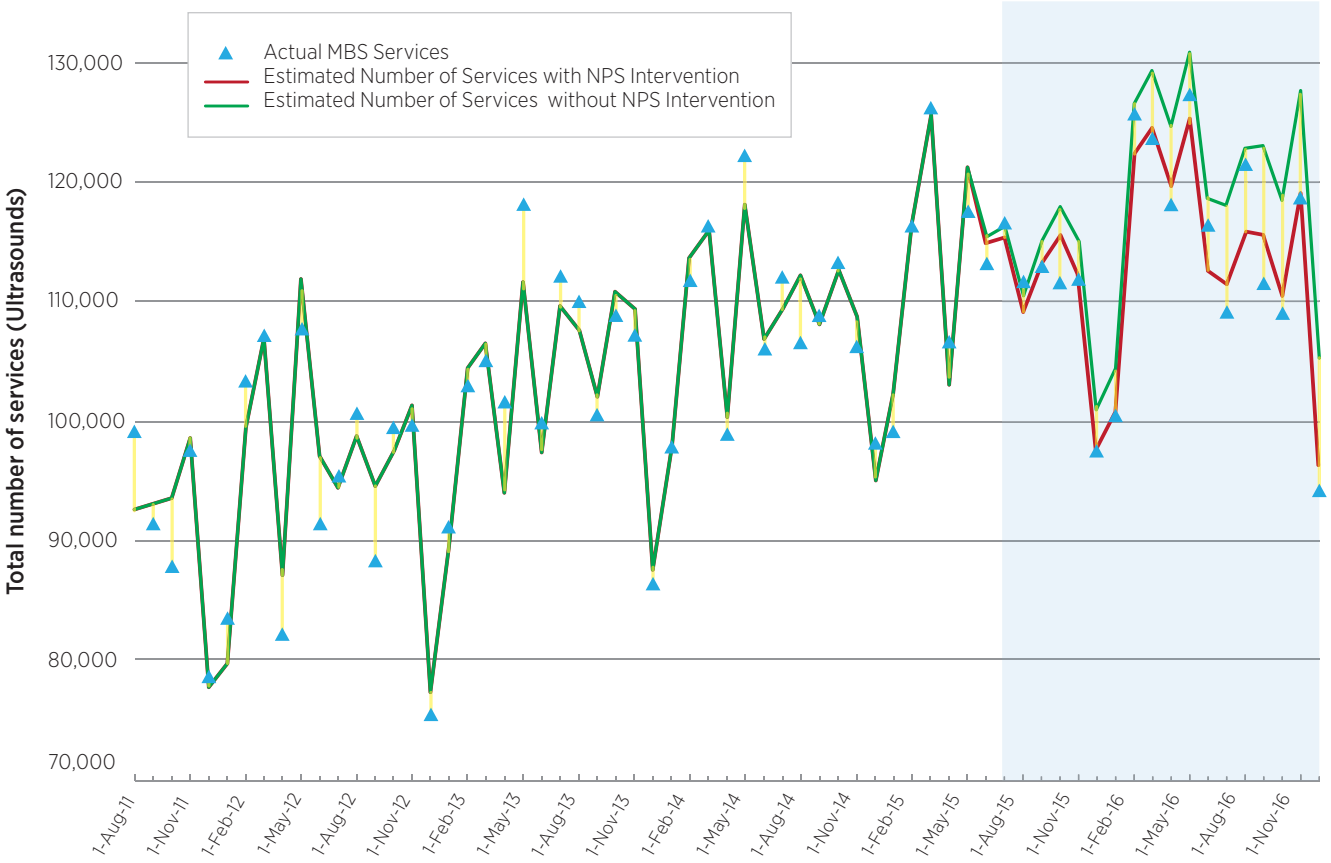
During the pre-intervention period, the trend for GP referral for CT scans of the abdomen was closely correlated to the referral trend of other health professionals. In the post-intervention period, the divergence between the observed referral rate and the predicted referral rate without the NPS MedicineWise intervention was significantly greater than in the pre-intervention period. The Abdominal Pain Program was associated with a statistically significant reduction in CT scan services referred by GPs. The estimated mean CT scan service reduction attributable to the program for the period June 2015 to December 2016 was 33,359 scans, a 6.05% relative reduction. This reduction corresponds to a mean estimated savings to the MBS of $13.85 million with a 95%BCI of $6.85 million to $21.15 million.

The Abdominal Pain Program was also significantly associated with a reduction in ultrasound services of the abdomen referred by GPs. The estimated mean ultrasound service reduction attributable to the program for the period June 2015 to December 2016 was 89,542 ultrasounds, a 4.00% relative reduction. This reduction corresponds to a mean estimated savings to the MBS of $8.73 million with a 95% CI of $0.26 million to $17.21 million.

Figure 2 shows the modelled ultrasound service time series with and without the Abdominal Pain Program. The estimated service change is calculated from the difference between the estimated number of services without the program (green line) and estimated number of services with the program (red line). The blue triangles represent the actual volume of MBS services.

Following the Abdominal Pain Program, ultrasound services referred by GPs decreased by 4% from the number of services estimated to have occurred had the intervention not taken place. This corresponds to an estimated mean ultrasound service reduction attributable to the program by 89,542 ultrasounds from June 2015 to December 2016.

Figure 2: Time series analysis of monthly count of ultrasound of the abdomen services, 1 August 2011 and 31 December 2016



Discussion

The NPS MedicineWise Imaging for abdominal pain program was associated with statistically significant reductions in computed tomography (CT) scan services referred by GPs of 6.05%, and of ultrasound services referred by GPs by 4.00% over 18 months.

The 2017 financial impact of the NPS MedicineWise Quality Use of Diagnostics Program on the MBS, using the Imaging for abdominal pain program, totalled **$22.58 million, including:**

- $13.85 million from reduced expenditure on CT scans of the abdomen for the period June 2015 to December 2016.
- $8.73 million from reduced expenditure on ultrasounds of the abdomen for the period June 2015 to December 2016.

The savings of $22.58 million exceeded the NPS MedicineWise savings target of $13.0 million for 2017.

HEALTH OUTCOMES OF THE HEART FAILURE PROGRAM

Introduction

In 2011, the NPS MedicineWise Heart Failure Program delivered educational messages about optimal medical treatment with the aim of reducing morbidity and mortality in people with heart failure (HF).

Key messages

Health professionals

- Use ACE inhibitors/angiotensin II receptor antagonists and beta blockers in all grades of systolic heart failure
- Consider aldosterone antagonists in patients with systolic heart failure who have symptoms despite being treated with standard doses of ACE inhibitors and beta blockers (note that monitoring of potassium levels and renal function is important)
- Regularly review all medicines and avoid those which may exacerbate heart failure.

The program consisted of a prescribing practice review and a case study. A prescribing practice review provides recommendations about prescribing and other aspects of patient management for HF and key information such as recommended target doses for medications is presented in easy reference tables. Prescribing practice reviews on HF were distributed to 27,185 GPs nationally, including 8,700 GPs in NSW in October 2011 and 269 GPs completed a HF case study between October 2011 and July 2014.

The objectives of the evaluation were to determine the impact of the GP educational program on the treatment and health outcomes of participants with HF using linked data from the Sax Institute's 45 and Up Study, including:

- the co-prescribing rate of targeted medicines used in HF as measured by PBS data
- The prescribing rate of medicines known to exacerbate HF as measured by PBS data
- the outcomes (unplanned hospital admission for HF and/or deaths due to cardiovascular diseases) for participants with HF.

Method

A retrospective time series design was used to assess the impact of the Heart Failure Program on the prescribing behaviour of GPs and the associated health outcomes of participants with HF using linked data from the Sax Institute's 45 and Up Study[10], a large prospective linked data study in NSW Australia, between January 2006 and June 2014 (see Technical Supplement for further information regarding the 45 and Up Study). The focus of this analysis was based on evidence that key messages in the program, if implemented, would lead to improved prescribing patterns (as evidenced by dispensing patterns) and improved outcomes for those with HF. There is substantial evidence that the optimal treatment of HF with HF-specific beta blockers reduces morbidity and mortality[7-10] and that a number of medicines which may be prescribed to HF patients may exacerbate their condition, leading to hospitalisations and CVD events.[11a]

a Although there is evidence that the use of aldosterone antagonists improves survival for heart failure patients, its use is reserved for a small number of patients with severe disease,[12] so it was not considered in this analysis.

Participants with confirmed HF were identified by using linked: (1) NSW Admitted Patient Data Collection (APDC); (2) NSW Emergency Department Data Collection (EDDC); (3) MBS claims subsidised by Australian government for relevant procedures; and (4) PBS subsidised claims for HF-specific prescriptions. The assignment of participants as having possible HF was based on participants who had 3 or more dispensed loop diuretic prescriptions annually with either angiotensin converting enzyme inhibitors (ACE-I) or angiotensin II receptor antagonists (AIIRA) in the PBS data. The study only included concessional participants as information on some medicines which were under general co-payment were not collected in PBS data prior to 2012. We also excluded participants who did not have any PBS record up to 2014, except for those who had a recorded death before 2014. The identification date of each patient with confirmed and possible HF was subsequently adjusted to the first time when they started to use loop diuretics and ACE-I or AIIRA regularly.

We defined and enumerated a dynamic population of participants by including all 45 and Up Study participants with HF before and after January 2006 and followed them up to 30 June 2014 or until death, whichever was first. The study entry date was defined as 1 January 2006 and included participants with confirmed or possible heart failure before 2006 unless a date of death was recorded before the entry date.

The rate for person time at risk was defined as the sum of days in the calendar month for the study population, excluding days when they were classified as hospital inpatients.

To investigate the association between the NPS MedicineWise Heart Failure Program and the medicine use and health outcomes of participants, the analysis was limited to the time after the participants were identified as confirmed or possible HF cases. To estimate the impact of the intervention on prescribing behavior and health outcomes, we calculated the following rates per 100,000 person-time per month: participants who were co-dispensed ACE-I (or AIIRA) and HF-specific beta blockers; participants who were dispensed medicines that could exacerbate HF; and participants who experienced poor outcomes (unplanned hospital admissions for HF and/or deaths due to cardiovascular diseases). All rates were internally age-standardised to the HF cases who entered the study population in January 2006 to ensure the following months have the same age structure in the rates for the time series analysis.

The linkage of APDC and EDDC was conducted by the NSW Centre for Health Record Linkage.[13] The MBS and PBS data were supplied by DHS and linked by the Sax Institute.

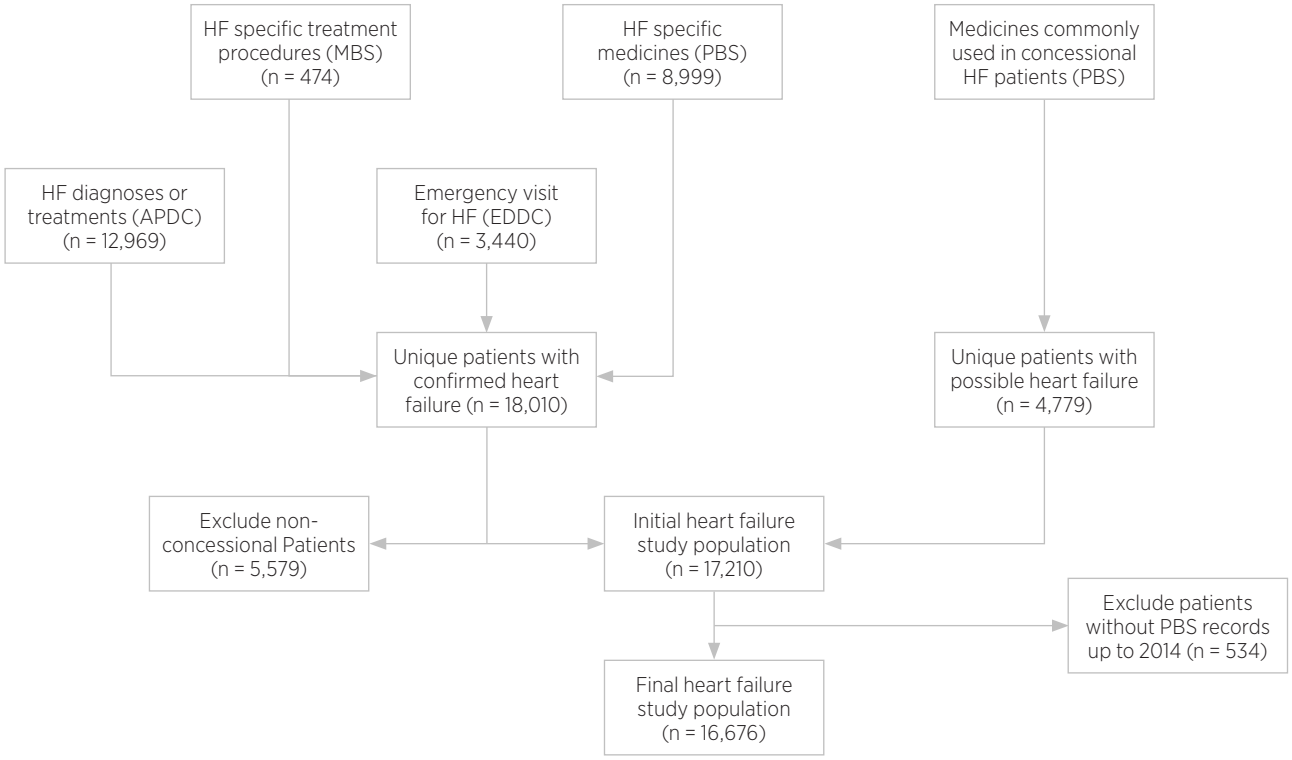
The ethical approval for the 45 and Up Study was obtained from the University of NSW Human Research Ethics Committee and the NSW Population and Health Services Research Ethics Committee.

Time series analysis

Since the passive intervention was delivered to all GPs in NSW, we assumed that all of the study population were exposed to the intervention through their GPs. Time series regression models with an autoregressive moving average error process were used to evaluate the impact of the 2011 NPS MedicineWise's heart failure program. Intervention variables were represented by "pulse" or "step" functions. A pulse function assumes a value of "0" at any time (i.e. before and after the intervention), and this becomes "1" at the time of the intervention. A step function

assumes a value of "0" before the intervention and a value of "1" from commencement of the intervention. Transfer functions were also considered in order to assess whether the impact changed immediately or gradually, and whether it was a sustained or a temporary impact. A deterministic linear time trend was used as the underlying trend, and seasonal dummy variables were used to model the seasonal patterns in the data. The estimated impacts are reported along with 95% confidence intervals (95% CI). The impact was considered statistically significant if two-sided p-value ≤ 0.05. All the analyses were conducted using statistical packages TSA[14] in the statistical software R[15].

Figure 3: Overview of the study population selection



Results

A total of 16,676 concessional participants (6.2%) from the 45 and Up Study were identified to have confirmed or possible HF. Figure 3 summarises how the study population/patients was selected. More than half of participants (52.4%) who entered the study population on or after 1 January 2006 were male, and the average age of the population was 77.5 years (SD: 9.2).

Figures 4 - 6 illustrate the age-standardised rates, the estimated rates and the estimated trend lines of cases who were co-dispensed ACE-I (or AIIRA) and HF specific beta blockers, cases who were dispensed medicines known to exacerbate HF and poor patient outcomes, per 100,000 person-time in each month from January 2006 to June 2014. The marked and dashed black line in each figure is the age-standardised rate, the solid red and green lines are the estimated rate and trend line from the analysis. The vertical dashed purple line indicates the commencement of the NPS MedicineWise HF program.

The analyses showed that there was a statistically significant increase in the rate of cases who were co-dispensed ACE-I (or AIIRA) and HF specific beta blockers ($p = 0.003$) and a statistically significant change in the trends in the rate of poor patient outcomes ($p < 0.0001$) from October 2011. However, there was a small but not statistically significant change in the rate of cases who were dispensed medicines known to exacerbate HF ($p = 0.24$)

After October 2011, the estimated increase in the rate of cases who were co-dispensed targeted medicines per 100,000 person-time per month was 10.56 (95% CI 3.51 to 17.62). The estimated slope change in the rate of poor outcome per 100,000 person-time per month was –0.64 (95% CI –0.86 to –0.42). The change in the rate of cases who were dispensed exacerbation drugs was not statistically significant, but showed a reduction in the level (–9.42, 95% CI –25.14 to 6.31).

Discussion

This was an exploratory study to investigate the use of the 45 and Up Study's linked data to evaluate the NPS MedicineWise 2011 Heart Failure Program.

The study identified 6.2% of participants with confirmed or possible HF. This is similar to estimates of the HF prevalence of 6.3% (95% CI 2.6 to 10.0) by Chan for this age group.[16]

This preliminary analysis shows small but statistically significant changes in the monthly number of cases per 100,000 person-time who were dispensed target medicines in line with the program messages and a larger reduction in the rate of poor outcomes following the intervention date. The rate of cases who were dispensed medicines which exacerbate HF also improved but the change was not statistically significant.

As this is an ecological study with the analysis of each outcome conducted separately, we cannot confirm that the NPS MedicineWise HF program led to the improvements in prescribing and outcomes. We also cannot determine whether the reduction in poor health outcomes after October 2011 was associated with the increase in cases who were co-dispensed targeted medicine and/or the decrease in cases who were dispensed exacerbating medicines.

Figure 4: Number of cases who were co-dispensed ACE-I (or AIIRA) plus HF beta blockers per 100,000 person-time from January 2006 to June 2014

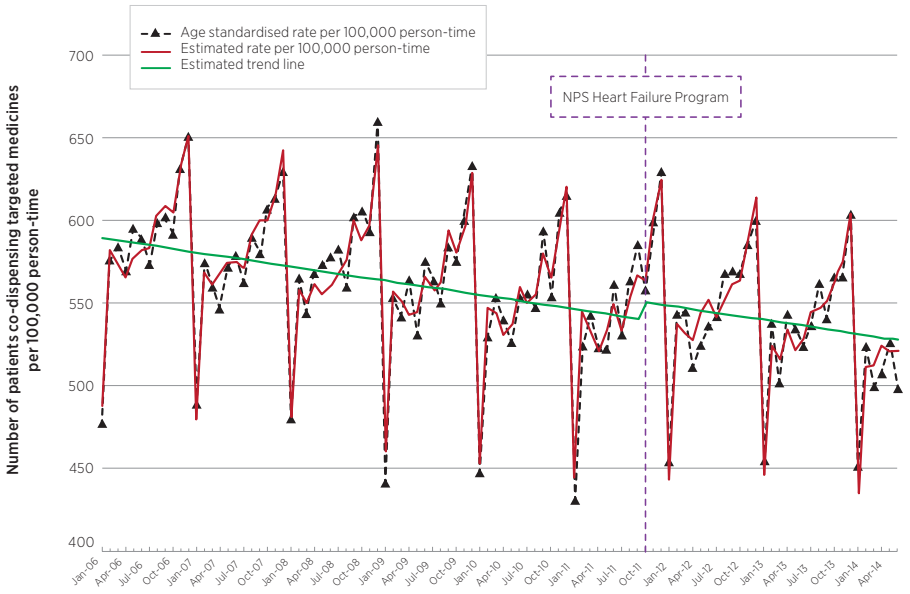


Figure 5: Number of cases who were dispensed medicines that exacerbate HF per 100,000 person-time from January 2006 to June 2014

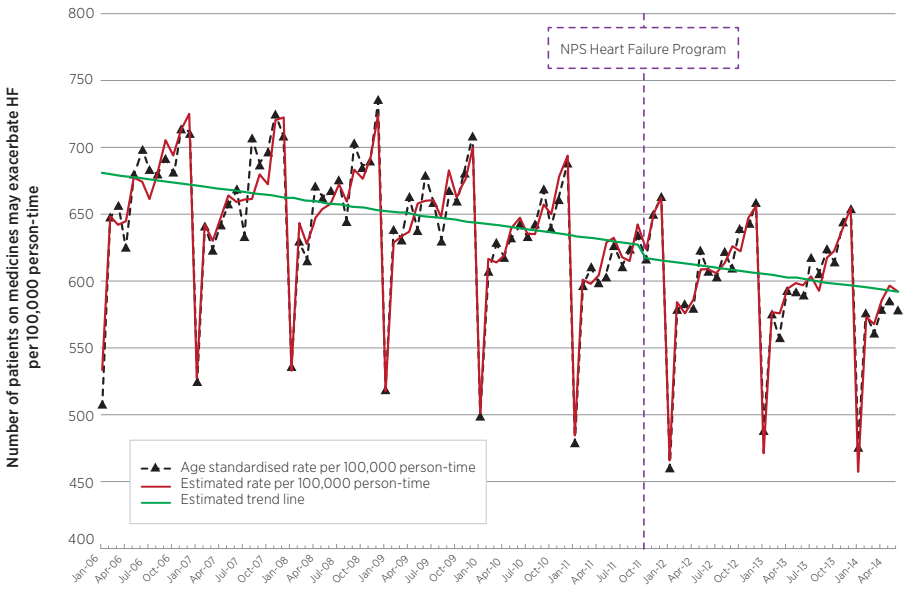
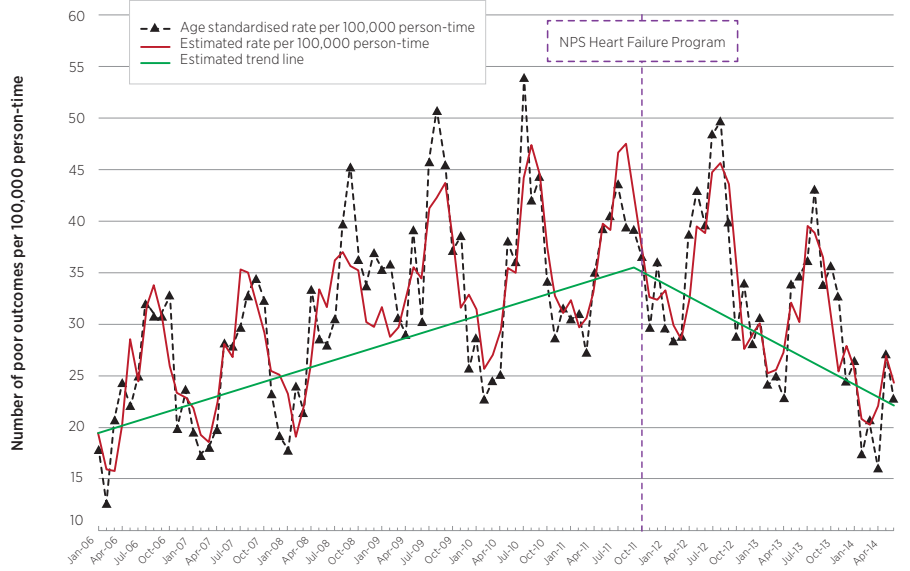


Figure 6: Poor patient outcomes (unplanned hospitalisations for HF and deaths due to cardiovascular diseases) per 100,000 person-time from January 2006 to June 2014



The launch of the NPS MedicineWise Heart Failure Program was at a similar time to the publication of an updated Australian 'Guidelines on the prevention, detection and management of chronic heart failure'.[17] Both may have made some contribution to the changes in co-prescribing of targeted medicines and health outcomes for HF cases observed in this study. Evidence suggests that passive distribution of education materials has only a 'small beneficial impact' on health professional practice and an unknown impact on health outcomes.[18]

There were several challenges and limitations to conducting this study. None of the datasets within the 45 and Up Study provide complete information that allow the accurate identification of all HF cases and their associated diagnosis dates. Most cases were identified through hospital records or procedures which may indicate a HF population with more severe disease. To overcome this we included participants who were 'possible' HF cases based on the co-dispensing of loop diuretics and ACE-I or AIIRA, which can also be prescribed for other conditions. For participants with confirmed HF, we also used the first co-dispensing of these medicines to identify a more 'accurate' date of diagnosis. These assumptions may have led to the overestimation of the HF population and an underestimation of the effect of the intervention and may have identified cases before their actual diagnoses.

Finally, the cohort in the 45 and Up Study is a sample derived from the NSW population with an 18% response rate. As a consequence, the cohort may not be a representative sample of the general population in NSW or Australia.

Acknowledgements

This research was completed using data collected through the 45 and Up Study (www.saxinstitute.org.au). The 45 and Up Study is managed by the Sax Institute in collaboration with major partner Cancer Council NSW; and partners: the National Heart Foundation of Australia (NSW Division); NSW Ministry of Health; NSW Government Family & Community Services – Ageing, Carers and the Disability Council NSW; and the Australian Red Cross Blood Service. We thank the many thousands of people participating in the 45 and Up Study. We also acknowledge the Australian Government Department of Human Services for provision of the MBS and PBS data used in the 45 and Up Study.

IMPROVING MANAGEMENT OF CHRONIC PAIN

Introduction

In June 2015, NPS MedicineWise launched the visiting program *Chronic pain: opioids and beyond* (Chronic Pain Program). The goal of the program was to improve wellbeing for patients with chronic non-cancer pain who are managed in primary care. The main objectives of the program were to:

- Increase the proportion of health professionals who agree on pain management goals with their patients
- Increase the proportion of prescribers who follow best practice when prescribing opioids (eg, develop pain management plans, and assess pain and function)
- Reduce GP prescribing of targeted opioids by 5% (PBS volume) for patients with chronic non-cancer pain 18 months after the start of the program.

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

Key messages were developed for health professionals and consumers and were incorporated into program activities.

Key messages

Health professionals

- 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.

Consumers

- 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 program activities included one-to-one educational visits, small group case-based meetings, clinical audit, case study, pharmacy practice review, print publications and online resources. See Appendix 1 for details of these activities.

A total of 7,346 unique GPs participated in an activity for the Chronic Pain Program; including 3,759 GPs who participated in small group meetings, 3,165 in one-to-one educational visits, 514 in the clinical audit and 285 in the case study. Other participating health professionals included pharmacists, nurses, medical specialists and medical students.

Method

It was expected that the program would increase best practice prescribing of opioids among GPs and reduce GP prescribing of targeted opioids for patients with chronic non-cancer pain.

The estimated changes to PBS for this program were derived from a time series analysis of the change in the monthly number of opioid prescriptions dispensed to concessional beneficiaries. A model based on concessional prescription volume was used to determine changes in monthly volume for the concessional population.

The primary methods used to evaluate the short- to intermediate-term impact of the Chronic Pain Program were:

- Participant survey – a retrospective pre-test (RPT) survey of a random sample of GPs who had participated in one-to-one visits or small group meetings. The RPT asked GPs to indicate their knowledge and practice 'now' and also to reflect on their level of knowledge and practice 'before' participating in the Chronic Pain Program.
- Control survey – a control sample of GPs who had not participated in an active Chronic Pain Program activity was randomly selected from the NPS MedicineWise database for comparison.

Self-completion questionnaires were developed using Survey Gizmo as the online survey platform. GPs from the participant and control email lists were sent an invitation to participate and the survey link. The surveys were conducted in June 2016, 12 months after program launch, and remained open for a period of 6 weeks. Two reminders were sent via email at 2-week intervals.

The response rates for the participant and control surveys were 14% (n=187) and 17% (n=154) respectively. This rate of response was in line with response rates previously received for online surveys.

The participant survey data were analysed to identify self-reported changes in GP knowledge or practice following exposure to a Chronic Pain Program activity. The participant 'now' data was compared with the control data to determine whether there was a difference between the two groups. The data was analysed using SPSS version 23. McNemar's test was used for the matched pre- and post-participant data, and chi-square for the participant and control data comparison (CI 95%, significant if $p \leq 0.05$).

Results

Reduction in prescription volume for opioids

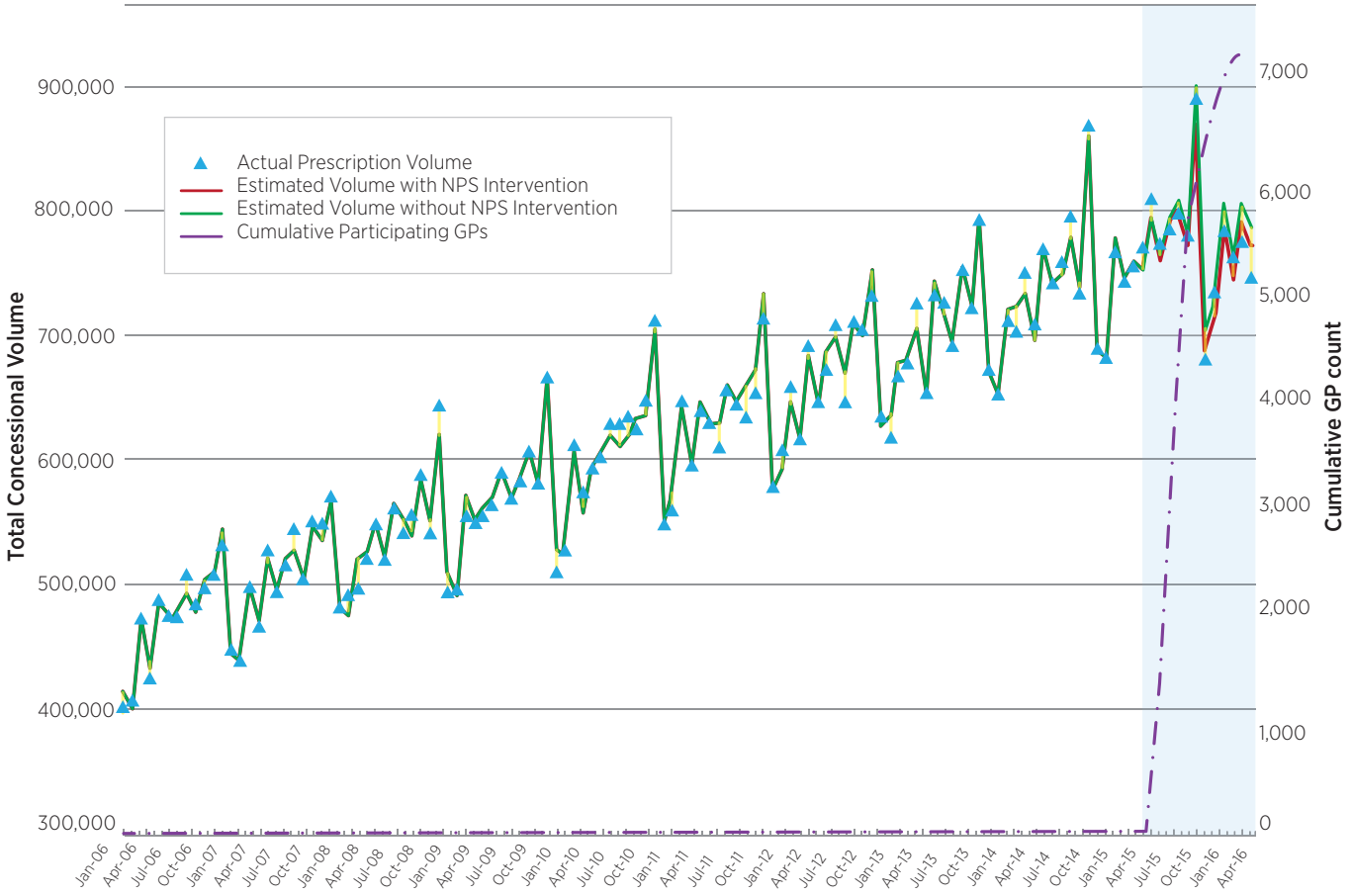
A reduction in the prescription volume for opioids was found to be statistically significantly associated with the Chronic Pain Program. Figure 7 shows the impact of the program on opioid dispensing to concessional beneficiaries since July 2015. The yellow shaded area between the estimated volume with the program (red line) and the estimated volume of prescriptions without the program (green line) presents the impact of the program in reducing the volume of opioids dispensed, after

allowing for covariates and assuming no decay of key messages. The period over which savings were calculated is shaded in light blue. The purple line is the cumulative total of participating GPs.

In order to control for major external events that can potentially affect the trajectory of the volume series and confound with the NPS MedicineWise intervention program, a change-in-level term was used to control for major events that potentially affected the volume model. The major external event with a statistically significant impact was that ten new fentanyl patches were listed on PBS in August 2011.

Changes in GP prescribing practice, attributable to the NPS MedicineWise program, are associated with a total decrease of 130,302 concessional prescriptions between July 2015 and June 2016, or an average relative reduction of 1.4% in modelled concessional prescription volume.

Figure 7: Time series analysis of concessional PBS monthly volume of opioids dispensed, January 2006 to June 2016



Improvement in GP knowledge, attitude and practice

One objective of the Chronic Pain Program was to increase the proportion of health professionals who agree on pain management goals with their patients. The proportion of participant GPs who agreed with the practice of developing pain management goals with patients significantly increased (+12%, $p < 0.001$) after participation in a program activity.

After participating in the program, GPs also reported a significant increase in knowledge in a number of areas. The proportion of participant GPs who recognised that it was best practice to use the '5As' assessment tool to regularly review patients on opioid therapy increased from 27% to 84% (+57%, $p < 0.001$).

There was a 46% increase ($p < 0.001$) in the proportion of GPs possessing the knowledge to taper the use of opioids and implement alternative treatment plans if goals were not met, and a 32% increase ($p < 0.001$) in the proportion of GPs who agreed that opioids should be discontinued after a 4-week trial if there was no improvement in patient wellbeing (Figure 8).

The Chronic Pain Program encouraged health professionals to discuss treatment with their patients before starting them on opioid therapy. The proportion of participant GPs who reported discussing individual goals of opioid therapy with their patients increased significantly ($p < 0.001$) to 85% after participating in the program.

The proportions of participant GPs who reported discussing pain management plans (+56%, $p < 0.001$), using a pain diary (+43%, $p < 0.001$) or using an opioid contract (+35%, $p < 0.001$) with patients before starting opioid therapy also increased significantly after participation in the program. Significant differences in practice ($p < 0.001$ – $p = 0.003$) were also identified between participant GPs (now) and control GPs (Figure 9).

Figure 8: Percentage of GP participants who gave the desired response to knowledge statements about opioids

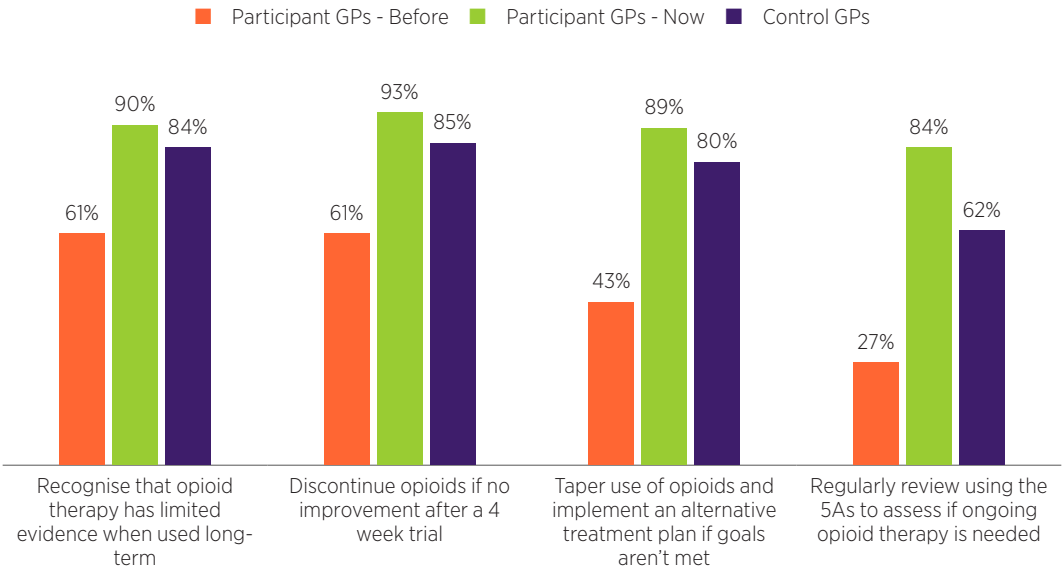
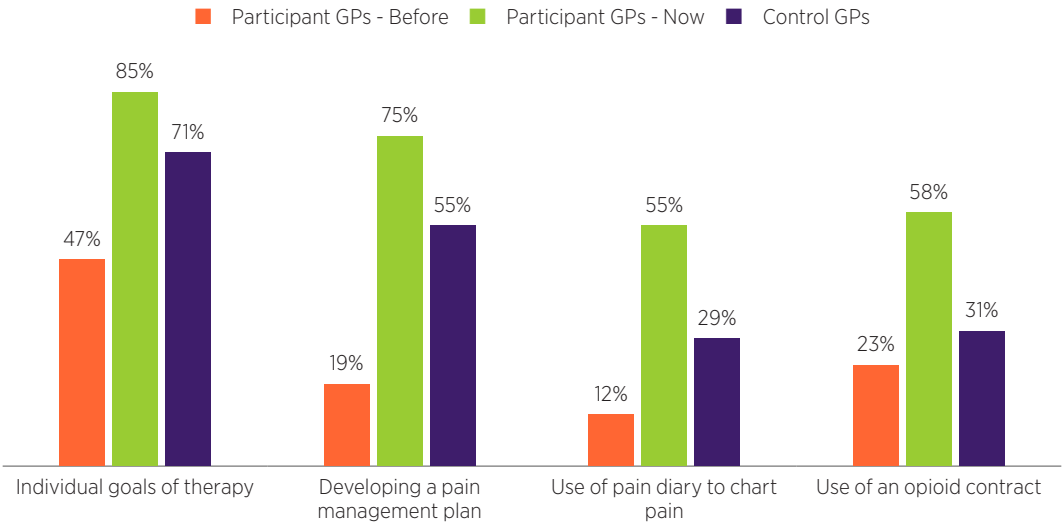


Figure 9: Percentage of GP participants who reported discussing treatments and plans with patients before starting opioid therapy



The program was also successful in prompting GPs to frequently assess pain and function in patients requiring opioids (+32%, $p < 0.001$), and to develop pain management plans with relevant patients (+42%, $p < 0.001$) as per best practice guidelines.

Discussion

Overall, the Chronic Pain Program achieved its core objectives and succeeded in significantly improving GP knowledge and practice in key areas of the program.

Based on the changes to the volume of opioid prescriptions for concessional patients between July 2015 and June 2016, the financial impact of the program due to a reduction in opioid analgesics was estimated at $3.27 million.

The Chronic Pain Program attracted over 7,000 unique GPs, which exceeded the anticipated target by 22%. The program achieved its objective of significantly increasing the proportion of prescribers who follow best practice in agreeing on management goals, developing pain management plans with patients, and assessing pain and function for patients requiring opioids.

The program activities encouraged GPs to have discussions with patients before commencing opioid therapy. In particular, GPs significantly increased discussions about developing pain management plans, using pain diaries or opioid contracts, and discontinuing opioids where no benefit has been observed.

The program activities were also successful in prompting a significant increase in the use of the recommended 5As assessment tool for reviewing patients on opioid therapy.

Surveys remain an important way to evaluate the impact of educational activities on GP knowledge, attitudes and practice. While it is recognised that online surveys have limitations, the response rate achieved for the chronic pain survey was on a par with previous surveys conducted. The short- and intermediate-term changes in GP practice identified in the survey were also borne out in the longer term analysis of changes to the volume of opioid prescribing following exposure to the Chronic Pain Program.

PREVENTING FRACTURES: WHERE TO START WITH OSTEOPOROSIS

Introduction

Osteoporosis is a condition in which bones become weak and fragile, increasing the risk of fractures. It is an incurable disease associated with significant morbidity and mortality, but it can be prevented through changes in lifestyle, and diagnosed osteoporosis can be managed to reduce the occurrence of osteoporotic or minimal trauma fractures.[19]

There is evidence that Australian patients with osteoporosis are not being managed optimally in primary care. Osteoporosis encounters account for less than 1% of all patient encounters in primary care, with the overwhelming majority of GPs initiating seven or fewer patients on an osteoporosis medicine per year.[7]

Despite an ageing population, the total number of prescriptions for commonly used osteoporosis medicines has remained stable in Australia since 2007, even though trends suggest that use of prescription medicines for osteoporosis should be increasing. Poor medicines adherence is a major contributing factor to poor response to treatment. Prescription data from the PBS suggests that 40% of people supplied with a medicine to treat osteoporosis are sub-optimally adherent.[20]

In October 2015, NPS MedicineWise launched the program Preventing fractures: *where to start with osteoporosis* (Osteoporosis Program). The main goal of the program was to reduce occurrence of fractures associated with osteoporosis in the Australian population by increasing appropriate prescribing of osteoporosis medicines and increasing adherence among adults who have been prescribed those medicines.

Key messages

Health professionals

- Identify patients with risks for osteoporotic fracture, and assess the need for investigation and management of osteoporosis.
- Discuss the risks and implications of osteoporotic fractures, and approaches to reduce these risks for patients.
- Medicines for osteoporosis vary markedly: consider effectiveness, tolerability, comorbidities, and patient preferences when choosing therapy.
- Review therapy regularly for adherence, safety and suitability.

Consumers

- Osteoporosis in men and women can cause bones to break easily, even after a simple fall.
- By taking your medicines for osteoporosis as prescribed you can strengthen your bones and reduce the chances of them breaking.
- Discuss with your health professional what the risk of fracture is for you and how your lifestyle and medicines for osteoporosis can help.

Activities for health professionals, focusing on how to manage patients better, included one-to-one educational visits, small group case-based meetings, a case study, online knowledge hubs for GPs including specialist videos, articles in print, and online publications. A GP-mediated consumer tool, the Bone Health Action Plan, was also developed to encourage patient adherence to prescribed osteoporosis medicines.

During the program 7,193 GPs participated in educational visits and 536 nurses, 265 GPs and 684 pharmacists completed the case study.

This evaluation sought to establish whether the Osteoporosis Program had an impact on GPs knowledge, attitudes, and practice in relation to the program's key messages.

Method

An online retrospective pre-test (RPT) survey was used to measure the impact of the program on GP knowledge, attitudes and practice. Self-completion questionnaires were developed using Survey Gizmo as the online survey platform.

Two random samples of GPs were selected:

- 1,000 participant GPs – who had participated in an osteoporosis one-on-one educational visit (EV) and/or a small group case-based meeting (SGCBM); and
- 1,000 control GPs – who did not participate in an osteoporosis activity but were known to NPS MedicineWise through participation in previous programs.

The survey was administered in an online-only format, and was in the field for four weeks. A total of 244 GPs participated in the survey (125 participant survey, 119 control survey), for an overall response rate of 13%.

Results

Survey results show that participating GPs reported positive changes in identification and management of patients with or at risk of osteoporosis. Improvements included increases in:

- The proportion of GPs who indicated that their practice for a patient presenting with a minimal trauma fracture would be to prescribe an osteoporosis medicine, and refer for a bone density scan, or dual-energy X-ray absorptiometry (DXA) scan as a baseline for monitoring, reflecting a higher proportion selecting the best practice approach (+21%, $p < 0.001$)

- GP knowledge of risk factors that would put male patients at risk of osteoporosis (+17%, p = 0.004)
- GP knowledge that pre-existing hypocalcaemia should be corrected before commencing treatment with an osteoporosis medicine (+29%, p < 0.001).

For six medicines highlighted in the program, there was a statistically significant increase in the proportion of GPs reporting confidence in assessing risks and benefits of those medicines.

GPs were asked to rate their confidence assessing the risks and benefits of specific osteoporosis medicines, with responses on a three-point scale. Changes in participant confidence are reported in Table 8.

Table 8: Changes in reported confidence among participant GPs (Before/Now)

Medicine	N	Increase in confidence	No difference	Decrease in confidence	Significance (Before/Now)
Denosumab (Prolia)	114	42% (48)	55% (63)	3% (3)	p < 0.001
Zoledronic acid (Aclasta)	112	34% (38)	64% (72)	2% (2)	p < 0.001
Alendronate (Fosamax)	117	27% (32)	72% (84)	1% (1)	p < 0.001
Raloxifene (Evista)	117	27% (32)	71% (83)	2% (2)	p < 0.001
Risedronate (Actonel)	113	27% (31)	71% (80)	2% (2)	p < 0.001
Strontium ranelate (Protos)	112	24% (27)	72% (81)	4% (4)	p = 0.001

Participant confidence ratings after participation were also compared with the control group ratings. Self-reported participant confidence ratings for alendronate (Fosamax) (p = 0.046), risedronate (Actonel) (p = 0.001), and denosumab (Prolia) (p = 0.011) were higher for the participant GPs after the intervention than for the control group.

Discussion

Overall, the Osteoporosis Program improved GP knowledge and practice, including identification and management of patients with or at risk of osteoporosis. The program also had an impact on the way GPs approached their consultations with patients.

The GP survey demonstrated that GP knowledge of timeframes and methods for patient monitoring did not improve, despite the information being clearly outlined on the visiting card. Patient review and monitoring should be addressed in future programs related to osteoporosis.

BLOOD PRESSURE: WHAT'S CHANGING IN HOW WE MEASURE, MANAGE AND MONITOR?

Introduction

Approximately 34% of Australians aged 18 years and over have high blood pressure, a major modifiable risk factor for cardiovascular disease.[21] Studies show that a reduction in systolic blood pressure by 10 mmHg or diastolic blood pressure by 5 mmHg can achieve a 22% reduction in coronary heart disease (CHD) and 41% reduction in stroke.[22] NPS MedicineWise delivered the 2015 program *Blood Pressure: What's changing in how we measure, manage and monitor?* to GPs, targeting management of people with primary hypertension aged ≥ 45 years (≥ 35 years in Aboriginal and Torres Strait Islander communities) who required assessment and management of their blood pressure and/or blood pressure-lowering medicines.

The Blood Pressure Program had four objectives: improve blood pressure control in people with suboptimal blood pressure, reduce the proportion of people prescribed a fixed-dose combination blood pressure-lowering medicine as initial therapy, reduce the number of medicine-related problems associated with blood pressure control and improve adherence to blood pressure-lowering medicines by people on existing blood pressure-lowering medicines.

Interventions to achieve program objectives were conducted nationally and included one-on-one educational visits and small group case-based meetings for GPs, a case study, an online learning module, a clinical audit and a pharmacy practice review.

Key GP messages

- Use absolute cardiovascular disease risk to inform initiation of pharmacological therapy.
- Start with or add one blood pressure-lowering medicine at a time.
- Confirm and communicate the active agent(s) in the blood pressure-lowering medicines prescribed for your patients.
- Tailor pharmacological therapy based on the assessment of blood pressure and treatment goals.
- Ask about adherence to blood pressure-lowering medicines.
- Monitor and record blood pressure, recognising the importance of out-of-clinic measurements in blood pressure diagnosis and management.

A total of 8,736 GPs (approximately 26% of all GPs) participated in the Blood Pressure Program with 7,602 GP participating in one-to-one and small group case-based meetings, and 1,196 GPs participating in the clinical audit. A total of 654 GPs participated in an NPS MedicineWise educational program for the first time.

This evaluation sought to establish if the Blood Pressure Program reduced the prescribing of diuretics and potassium-sparing combinations, ACE inhibitor combinations and angiotensin-II receptor antagonist combinations, and improved GP knowledge and practice of blood pressure management.

Method

PBS savings

Given the program's key messages, changes in the number of fixed-dose combination antihypertensives dispensed under the PBS were examined. It was expected that there would be a decrease in the prescribing of fixed-dose combination antihypertensives.

As outlined in the methods section of the PBS savings chapter of this report, the model was based on concessional prescription volume which is robust to price changes and hence is considered primarily for saving estimates. Changes in volume were converted to savings in expenditure based upon a weighted average of the monthly net price per prescription for the concessional beneficiary population. Medicines included in the analysis were diuretics and potassium-sparing combinations, ACE inhibitor combinations and angiotensin-II receptor antagonist combinations.

Online GP survey

To evaluate short-term program impact, an online GP survey was conducted. The survey was used to collect feedback from GPs who had participated in one-to-one educational visits or small group case-based meetings. GPs were emailed a link to the online questionnaire approximately 1 week after participating. The questionnaire contained questions to assess changes in GP practice, program satisfaction and a net promoter score. The data was downloaded for statistical analysis in SPSS and in an aggregated reporting format from Survey Gizmo. The analysis consisted of descriptive statistics and thematic analysis of open-ended survey questions.

Clinical audit

The clinical audit examined nine key indicators related to the assessment of cardiovascular disease, best practice when measuring blood pressure and the use of blood pressure and lipid-lowering medicines.

Data were collected at two time points – an initial and review phase. Data were available for 1,191 GPs and each GP assessed the same 10 patients for each 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 satisfying the indicator. A positive percentage change means more patients satisfied the indicator in the review phase. A negative percentage change means that fewer patients satisfied the indicator in the review phase, which is an improvement for indicators where the practice is not recommended.

Data were excluded from the analysis if there were no patients in the initial or review audit phases. The analysis were conducted using the GENMOD procedure in SAS v.9.3.

Results

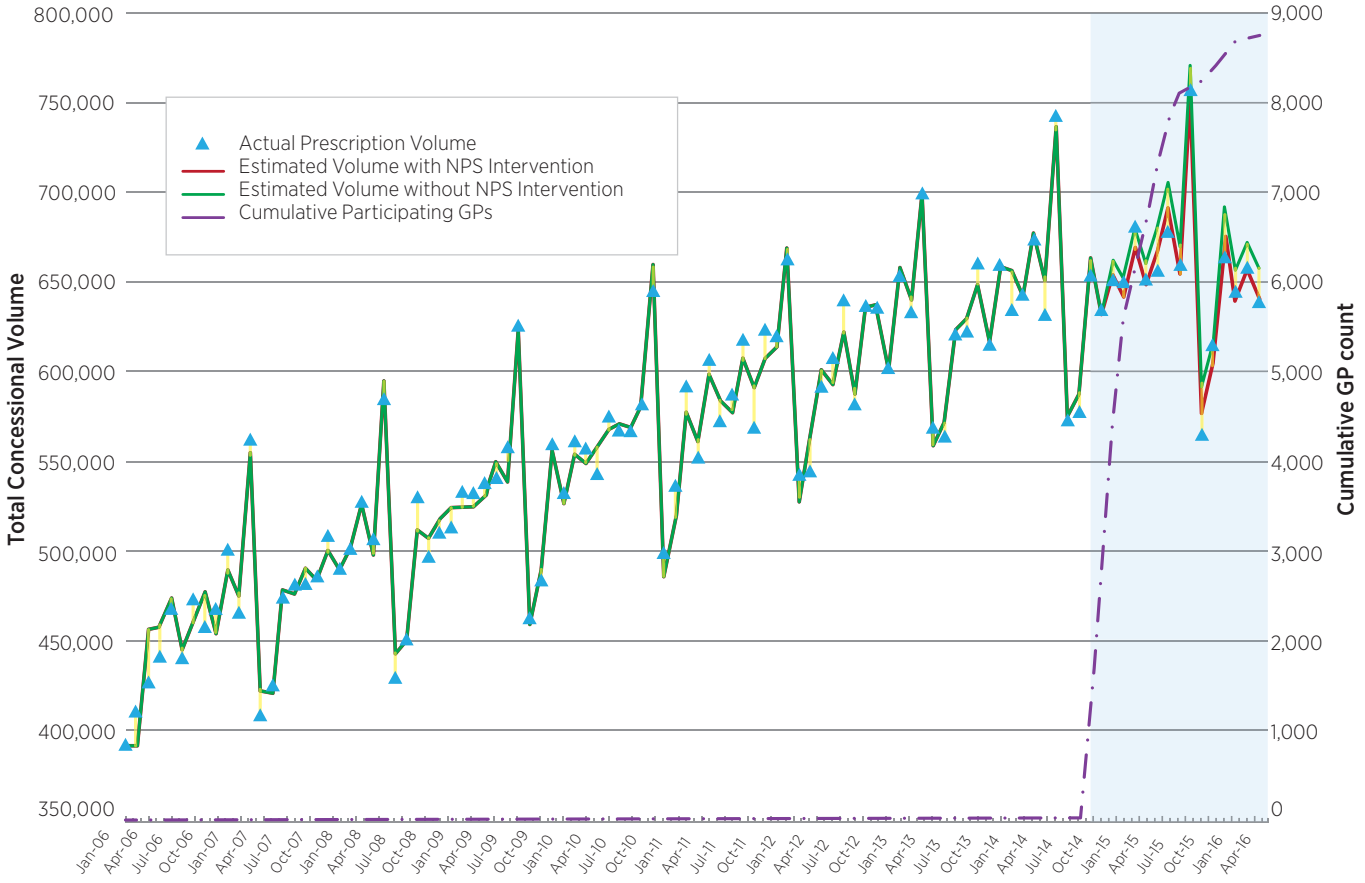
PBS savings

The reduction in the number of fixed-dose combination antihypertensive drugs dispensed to concessional beneficiaries had a statistically significant association with the Blood Pressure Program. As shown in Figure 10, the yellow shaded area between the estimated volume with the program (red line) and the estimated volume of prescriptions without the program (green line) presents the impact of the program in reducing the volume of drugs prescribed. The period over which savings were calculated is shaded in light blue. The purple line represents the cumulative total of participating GPs.

The reduction in PBS expenditure attributable to reduced dispensing of fixed-dose combination antihypertensives between March 2015 and June 2016, following the Blood Pressure Program, is estimated to be $3.70 million.

Changes in GP prescribing practice, attributable to the program, were associated with a decrease of 199,172 prescriptions in the 2015/2016 financial year, or a relative reduction of 1.9% in modelled PBS prescription volume.

Figure 10: Impact of the Blood Pressure Program on PBS volume of fixed-dose combination antihypertensives dispensed to concessional beneficiaries



GP survey

A total of 967 GPs responded to the online survey after participating in educational visits. GP feedback was very good with respect to learning outcomes being met, reported changed practice or intention to change practice, net promoter score and overall satisfaction with the visit. Approximately 67% of GPs indicated that the educational visit reinforced their current behaviour or practice and that no changes were needed. When asked if they intended to change or had already changed their practice as a result of the educational visit, 24% of the GPs indicated intention to change and 16% reported they had already changed their practice (Table 9).

Table 9: GP practice change following their participation in the educational visit

Response	(%)	n
The activity reinforced my current behaviour/practice, no change needed	67.2%	650
I intend to change my practice	23.5%	227
I have changed my practice	15.6%	151
No change will be made, I disagree with the content	1.0%	10

More than 550 GPs responded to an open-ended question about aspects of their practice they had changed or intended to change, or that were reinforced, as a result of the educational visit. GPs most often reported that they would use the CVD risk tool more often or more effectively (66%), use ambulatory blood pressure monitors (22%), and use a stepwise approach with medicines when managing blood pressure (12%).

A total of 1,191 GPs were included in the analysis for the nine clinical indicators. The greatest change in GP practice of clinical relevance was observed for the assessment and documentation of absolute CVD risk (+70%), followed by patients achieving recommended target blood pressure (+43%) and confirming and communicating the active ingredients of prescribed blood pressure-lowering medicines with patients (Table 10).

Table 10: Changes in GP practice based on percentage of patients by clinical indicators, initial and review audit phase

Program	Initial phase	Percentage of patients (n)		
		Review phase	Difference	Percentage change
1. Assessed and documented absolute cardiovascular risk	55.06 (5,399)	93.82 (8,625)	38.8	+70.4 p < 0.001
2. Assessed adherence to medicines at the last consultation in patients not achieving recommended target BP	93.23 (3,742)	99.31 (3,930)	6.1	+6.5 p < 0.0001
3. Provided relevant lifestyle modification advice	95.60 (9,773)	99.30 (10,063)	3.7	+3.9 p < 0.0001
4. Used best practice measurement of in-clinic BP	84.08 (8,675)	98.16 (9,697)	14.1	+16.8 p < 0.0001
5. Achieved recommended target BP	60.24 (5,593)	86.12 (7,700)	25.9	+43.0 p < 0.0001
6. Confirmed and communicated the active ingredient(s) of prescribed BP-lowering medicine(s)	83.18 (8,405)	97.15 (9,496)	14.0	+16.8 p < 0.0001
7. Use of a lipid-lowering medicine in patients at high risk of a cardiovascular event	76.73 (3,998)	85.43 (4,383)	8.7	+11.3 p< 0.0001
8. Use of an ACE inhibitor or an angiotensin-II receptor agonist with a systematic NSAID (other than low-dose aspirin) and a diuretic [not recommended]	1.71 (172)	0.58 (60)	1.13	-65.9 p < 0.0001
9. Started BP-lowering therapy with a single-ingredient BP -lowering medicine in primary prevention of CVD	83.10 (6,606)	83.85 (6,606)	0.75	0.89 p < 0.0001

Discussion

There were no other major interventions addressing blood pressure during the NPS MedicineWise program to account for the changes observed in the 2015/16 financial year. The PBS savings as a result of the program were estimated at **$3.70 million** with a relative reduction of 1.9% of prescribed medicines including diuretics and potassium-sparing combinations, ACE inhibitor combinations and angiotensin-II receptor antagonist combinations.

The GP online survey indicated that 40% of GPs who had participated in one-to-one and small group case-based meetings had changed their practice or intended to change their practice as a result of the visit, with 66% of GPs reporting they would use the CVD risk tool assessment more often and more effectively. It can be expected that a higher proportion of low risk patients will not be initiated on blood pressure-lowering medicines, fixed-dose combinations or single agents, avoiding medicine-related problems. With an improvement in GPs using a stepwise approach to pharmacological treatment and GPs reviewing their fixed-dose combination prescribing, we would expect a reduction in the number of patients being initiated on fixed-dose combination products. Increased use of ambulatory blood pressure monitoring will ensure more accurate assessment and treatment of blood pressure.

Clinical audit indicators show that a significantly larger proportion of GPs assessed and documented absolute CVD risk, achieved recommended target blood pressure for their patients, assessed adherence to medicines by patients who were not achieving blood pressure targets, and confirmed and communicated the active ingredients of prescribed blood pressure-lowering medicines.

MANAGING DEPRESSION: RE-EXAMINING THE OPTIONS

Introduction

In February 2016, NPS MedicineWise launched the program *Managing depression: re-examining the options* (Depression Program). The main goal of the Depression Program was to reduce the burden of disease associated with depression in people managed in primary care through the provision of an intervention for health professionals.

The program objectives were to:

- Increase the proportion of people with depression (or their carers) who actively participate in developing a management plan.
- Reduce GP prescribing of antidepressants first line in adults with mild and moderate depression and adolescents with depression.
- Reduce GP prescribing of serotonin-norepinephrine reuptake inhibitors (SNRIs) first line for antidepressant therapy.
- Increase the proportion of people who adhere to prescribed medicines for depression.
- Increase the proportion of patients who receive adequate trials (4–6 weeks) and treatment of at least 6 months with antidepressants.

Key messages

Health professionals

- Consider antidepressant use, where appropriate, as part of a broader approach to management.
- Develop treatment plans with patients and discuss expectations of treatment(s), including adequate trial periods.
- Compare efficacy, potential adverse effects and discontinuation symptoms when choosing an antidepressant.
- Monitor progress and explore engagement with management strategies: ask about adverse effects and adherence to any antidepressant medicine.

Consumers

- Learn about lifestyle and treatment options that can help you manage depression.
- Work on a depression treatment plan with your health professional and keep them informed of how you respond to treatment and lifestyle approaches.
- Give your antidepressant medicines time to work.
- Ask about potential side effects of your antidepressants and tell your health professional about any you experience.

The program interventions included one-to-one educational visits and small group case-based meetings; practice-based, small-group facilitated discussions with staff in MedicineInsight practices using practice-specific MedicineInsight data; clinical audit; pharmacy practice review; case study; prescribing feedback; and print and online resources.

A total of 12,376 unique health professionals actively participated in NPS MedicineWise Managing depression activities between February 2016 and January 2017, including a total of 8,642 GPs, 2,578 pharmacists and 849 nurses (Table 11).

Table 11: Health professional participation in educational interventions

Activity	GPs	Nurses	Pharmacists	Medical specialists	Other*
One-to-one educational visit	4215	196	102	2	53
Small group case-based meeting	3523	578	131	1	164
MedicineInsight visit	805	103	2	-	71
Clinical audit	468	-	-	-	-
Case study	228	662	759	-	-
Pharmacy practice review	-	-	1039	-	-

* Other health professionals include students, interns, allied health practitioners, practice managers

This evaluation sought to establish if the Depression Program had an impact on GPs' knowledge, attitudes and practice in relation to the program's key messages.

Method

The primary method used to measure the impact of the program on GPs' knowledge, attitudes and practice in relation to the key messages was a pre- and post-intervention GP survey. The clinical audit data was also used to assess the impact of the program on health professional practice.

GP survey

Pre- and post-surveys were conducted with a random sample of 2,500 GPs who had participated in previous NPS MedicineWise programs.

The pre-survey was distributed by mail in January 2016 and was in the field for 5 weeks with two reminders. The post-survey was distributed in October 2016, was in the field for 6 weeks with two reminders and was sent to the same sample of GPs as the pre-survey.

The following descriptors are used when describing the survey findings:

- GPs: all GPs who completed either a pre- or post-survey
- Participant GPs: paired GPs who completed the pre- and post-survey and participated in an NPS MedicineWise *Managing depression* activity
- Non-participant GPs: paired GPs who completed the pre- and post-survey and who did not participate in an active NPS MedicineWise *Managing depression* activity.

The survey data were analysed to identify any changes in GP knowledge, attitudes or practice following exposure to a *Managing depression* educational activity (an educational visit or MedicineInsight depression visit or clinical audit or case study). GP samples (pre- and post-surveys) were paired where possible using non-identifying codes. Pre- and post-survey data were analysed and compared for the following samples to identify any changes in GP practice, attitudes and knowledge:

- All pre-survey GPs compared with all post-survey GPs
- Participant GPs compared with non-participant GPs.

All data were analysed using SPSS version 23. McNemar's test was used for the paired participant data, and chi-square for the overall data comparison (significant if $p \leq 0.05$). The z-test (comparison of proportions) was used to investigate associations between respondent characteristics (eg, years practicing, gender) and knowledge, attitudes or practice. A logistic regression, with model parameters obtained using a generalised estimating equation, was used for participant and non-participant data to determine the impact of an educational activity on dependent variables.

Clinical audit

Data were extracted for the clinical audit between February 2016 and January 2017. Data were available for over 450 GPs and each GP assessed the same 10 patients in two phases. The outcome measure is the number of patients satisfying each of the best practice clinical indicators included in the activity. Five clinical indicators were assessed in both the initial and review phases after identification of potential practice improvement related to management of the patients. For each of these five indicators, a generalised linear model (Poisson distribution, log link function and an offset) was used to estimate the percentage change in the number of patients satisfying the indicator. A positive percentage change means more patients satisfied the indicator in the review phase. A negative percentage change means that fewer patients satisfied the indicator in the review phase, which is an improvement for indicators where the practice was not recommended.

Results

GP survey

The response rate for the pre-survey was 35% with 804 completed surveys and 27% for the post-survey with 606 completed surveys. There were 217 paired participants and 200 paired non-participants in the post-survey.

Overall this program reinforced GPs' knowledge and practice in relation to managing depression, including several areas where measurable change occurred.

GPs who participated in the program showed improved confidence at selecting antidepressants that do not interact with any concurrent medicines that their patients are taking (+4%, Table 12).

Table 12: GPs' confidence and knowledge of antidepressant use

Statement, desired response	Pre participant* % (n)	Post participant* % (n)	Pre non-participant^ % (n)	Post non-participant^ % (n)
I am confident selecting antidepressants that do not interact with any concurrent medicines Agree or strongly agree	68 (143)	72 (150)	64 (127)	57 (113)
Venlafaxine is an appropriate first-line antidepressant based on high risk levels of suicidal ideation Disagree or strongly disagree	30 (62)	38 (77)	29 (56)	29 (56)
Where an antidepressant is necessary to treat depression in someone under 18 years old, fluoxetine is the first-line choice Agree or strongly agree	47 (100)	68 (144)	44 (84)	64 (124)

* paired GPs who completed the pre- and post-surveys and participated in an NPS MedicineWise Managing depression activity; ^ paired GPs who completed the pre- and post-surveys and who did not participate in an active NPS MedicineWise *Managing depression* activity

When comparing *participant* and *non-participant* GPs, an improvement was seen only for participant GPs. The degree of improvement by the participant GPs was significantly greater than for non-participant GPs, with participant GPs showing a 55% (95% CI 3.3% to 133%) better odds of a desired response in the post-period relative to non-participant GPs.

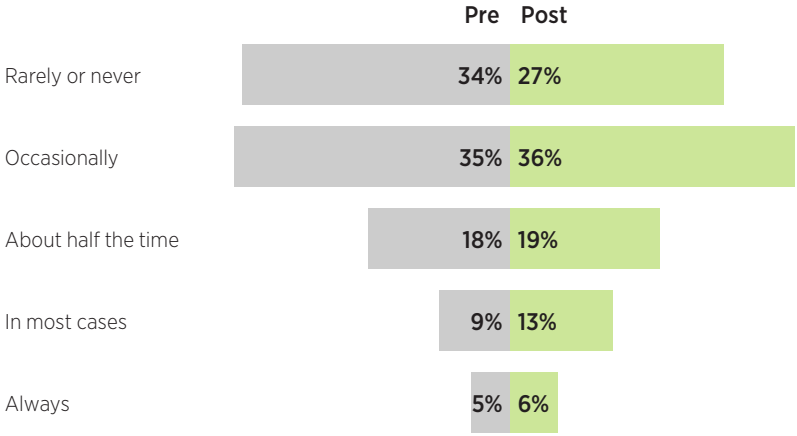
When selecting an antidepressant, the program encouraged GPs to consider the efficacy and potential adverse effects of antidepressants. After the program the proportion of GPs who appropriately *disagreed or strongly disagreed* that 'Venlafaxine is an appropriate first-line antidepressant, based on high risk levels of suicidal ideation' increased by approximately 7%. Comparing GPs who participated in the program with those who did not

participate, the improvement was seen only for participant GPs (95% CI 30% to 38%, p = 0.058).

After the program, the proportion of GPs who appropriately 'agreed' or 'strongly agreed' that fluoxetine should be the first-line choice of medicine when an antidepressant is required for adolescents increased by 15%. However, when comparing *participant and non-participant* GPs, both groups showed the same degree of statistically significant improvement. As such, improvement cannot be wholly attributed to the NPS MedicineWise program. GPs practising for 10 years or less were more likely to provide the desired response for this statement than those practising for 11 to 20 or over 30 years ($p \leq 0.001$).

The program promoted the use of non-pharmacological approaches for managing depression, particularly for mild and moderate depression. The proportion of GPs who would always or in most cases refer their patients to online mental health programs for the management of depression, such as computerised cognitive behavioural therapy (CBT) increased from 14% to 19%. After the program, 27% would rarely or never refer their patients to online programs compared with 34% of GPs before. When comparing *participant and non-participant* GPs, both groups showed the same level of improvement in referral to online programs. Overall, GPs who stated they were confident in directing patients to supportive information and self-guided help were significantly more likely to refer patients to online mental health programs ($p \leq 0.0001$) (Figure 11).

Figure 11: Percentage of GPs by frequency of referrals to online mental health programs



After the program, a greater proportion of GPs selected a selective serotonin reuptake inhibitor (SSRI) rather than an SNRI for the first-line treatment of severe depression (Table 13), however both *participant* and *non-participant* GPs showed small increases in SSRI selection. SSRIs are the preferred first choice due to their tolerability, efficacy and favourable risk–benefit profile. A significantly greater proportion of female than male GPs stated they would prescribe an SSRI ($p \leq 0.05$).

Table 13: GPs' choice of antidepressant for severe depression

Option	Pre: % (n)	Post: % (n)
Selective serotonin reuptake inhibitor (SSRI); desired response	79 (631)	82 (494)
Serotonin and noradrenaline reuptake inhibitor (SNRI)	15 (123)	13 (77)
I would not prescribe an antidepressant	3 (21)	3 (16)
Mirtazapine	2 (16)	2 (10)
Another antidepressant	1 (8)	1 (6)
Tricyclic antidepressant	0 (0)	0.2 (1)

Clinical audit

GPs participating in the clinical audit were asked to reflect on their management of 10 patients diagnosed with depression against five specified indicators (Table 14).

Table 14: Percentage of patients satisfying clinical indicators at initial and review phases

Clinical indicator	Initial audit phase %	Review audit phase %	Percentage change (95%CI)
Ensured a management plan has been developed in collaboration with the patient, and expectations of treatment have been discussed.	72.4	95.8	32.3 (28.5 to 36.2)*
Assessed for adverse effects associated with antidepressant use at most recent review.	96.0	99.2	3.3 (2.4 to 4.1)*
Implemented strategies to promote adherence to medicines.	93.4	98.8	5.7 (4.5 to 7.0)*
Assessed symptoms including mood, thoughts and function at most recent review.	83.6	99.1	18.6 (16.1 to 21.2)*
Those without an indication for longer-term prophylactic treatment using an antidepressant for > 12 months since remission (not recommended).	6.6	3.2	-52.3 (-64.7 to -35.6)*

* $p \leq 0.0001$

A statistically significant increase of 32% ($p < 0.0001$) in patients for whom a management plan had been developed collaboratively with the GP was observed in phase 2 of the audit. An increase of 19% was observed of patients for whom GPs had recently assessed symptoms such as mood, thoughts and function. A significant decrease of 52% was seen for patients who were on a long-term antidepressant without an indication for it. After participation in the clinical audit, GPs reported the following actions that they had taken or intended to take:

- 51% to encourage patients to engage in the development of a management plan
- 42% to monitor patients with depression
- 40% to encourage the use of psychological treatments first line and recommend non-pharmacological approaches for all patients with depression.

Discussion

The Depression Program engaged its target audience and in some cases exceeded participation and engagement targets.

An improvement was seen in GP knowledge that the antidepressant fluoxetine is the first-line choice for an adolescent, when an antidepressant is required. Feedback from GPs suggested that the educational visits had contributed to an increase in their awareness of the appropriate management of adolescents with depression, including the most appropriate antidepressant to prescribe when required. However this result was observed for participant and non-participant GPs, and so this improvement cannot be wholly attributed to the NPS MedicineWise program.

These findings are not surprising, given the attention in both trade and mainstream media directed to mental health, depression and the use of antidepressants. It is likely that both participant and non-participant GPs received messages from a number of sources, including NPS MedicineWise publications, about the management of depression.

The program appeared to have some impact on GPs' practice, though practice was generally consistent with key messages on the treatment of depression and on exploring adherence to and side effects of antidepressants, before and after the program.

The program sought to promote the use of non-pharmacological approaches and GPs' practice appeared to be in line with this approach, with over 90% of survey GPs stating that they always, or in most cases, discuss potential lifestyle changes, including exercise and psychosocial approaches. A 5% increase (14% to 19%) was seen in the proportion of GP survey respondents who would frequently refer their patients to online mental health programs, including online CBT.

This evaluation details only short-term impact of the program as self-reported by GPs. GP survey respondents were similar for both pre- and post-surveys, represented all states and territories across Australia and were similar to national data on gender and location. However, it may be that respondents were those who were interested in the topic and so had a higher level of knowledge and practice than non-respondents in relation to managing depression.

PROTON PUMP INHIBITORS: TOO MUCH OF A GOOD THING?

Introduction

Building on the success of a previous 2009 program targeting proton pump inhibitors (PPIs), NPS MedicineWise launched the *Proton pump inhibitors: too much of a good thing?* program (PPI Program) in early April 2015. The focus of the PPI Program was to provide and reinforce evidence-based recommendations to guide GPs, practice nurses and community pharmacists about the appropriate primary care management of gastro-oesophageal reflux disease (GORD) and to promote the dialogue between health professionals and patients about the relative benefits, risks, harms and costs of treatment with PPIs. The program included PBS feedback, a clinical audit and a case study to facilitate stepping down PPI therapy in patients whose reflux symptoms were well controlled. It encouraged consumers to visit their GP for a medicines review and to discuss lifestyle changes that could help relieve their symptoms.

The PPI Program objectives were to increase the proportion of:

- Health professionals (HP) who select patients who will benefit from a review of their PPI therapy
- HP who differentiate the duration of PPI therapy required at high and low doses
- HPs who implement appropriate step-down PPI therapy
- HPs who initiate PPIs as a trial and undertake a review at 4–8 weeks
- Consumers who plan to have their PPI therapy reviewed
- Consumers who are aware and knowledgeable about lifestyle modifications that can help manage their reflux/heartburn symptoms

Under the Choosing Wisely initiative, the Royal Australian College of General Practitioners (RACGP) and Gastroenterological Society of Australia (GESA) produced recommendations about quality use of PPIs. The RACGP recommendations were published on the Choosing Wisely website at the same time the 2015 PPI Program was launched and were aligned with program messages.

All GPs registered in Australia received PBS feedback in April 2015. A further 902 GPs also participated in a clinical audit and 327 completed a case study over the course of the year.

This evaluation explores whether the PPI Program resulted in a reduction of PPI prescribing and improved management of patients.

Method

Time series analysis of PBS data

Concessional PBS data was obtained from the Department of Human Services. A time series analysis of monthly high-strength and low-strength PPI dispensing volumes was used to determine the association between the PPI Program and changes in dispensed PPIs for concessional patients. The estimated saving to the PBS was assessed by estimating the cost of the difference in predicted volume to actual volume after the intervention.

Clinical audit

Clinical audit data was analysed to assess changes in GP practice using six clinical indicators specified in the audit. A total of 902 GPs participated and each GP assessed the same 10 patients in two phases – an initial phase and a review phase. An evaluation form was included with the clinical audit. Questions were asked about whether GPs intended to change their practice as a result of participating 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 satisfying the indicator. Data were excluded from analysis if there were no patients in the initial or review audit phases. The analyses were conducted using the GENMOD procedure in SAS v.9.3.

Results

Time series analysis of PBS data

Findings from the time series analysis of concessional PBS data showed that there were statistically significant reductions in community-based dispensing of both low and high-strength PPIs following the PPI Program. The estimated reduction in low and high-strength PPI concessional dispensed scripts was approximately 1.4% (71,000 concessional scripts) and 3.4% (400,000 scripts), respectively. The estimated cost savings from the reduction in high-strength PPIs amounted to a $6.3 million saving to the PBS (Figure 12).

Clinical audit

Analysis of the clinical audit indicators showed changes in GP practice towards concordance with the guidelines and recommendations across a number of areas, with the greatest changes observed in a reduction of the regular use of PPIs for more than 8 weeks in patients with adequate symptom control (55%), and a reduction in the use of medicines causing or exacerbating gastric ulceration or irritation (48%, Table 15).

More than half of the GPs reported that they had changed their practice, increasing patient review of the need for medicines that can cause or exacerbate gastric irritation (54%) and increasing identification of patients prescribed a PPI in whom a step-down approach was beneficial (58%). Increased consideration of potential common and rare serious adverse effects of PPI therapy was indicated by 48% of GPs (Table 16).

Figure 12: Time series analysis of concessional PBS monthly volume of high-strength PPIs

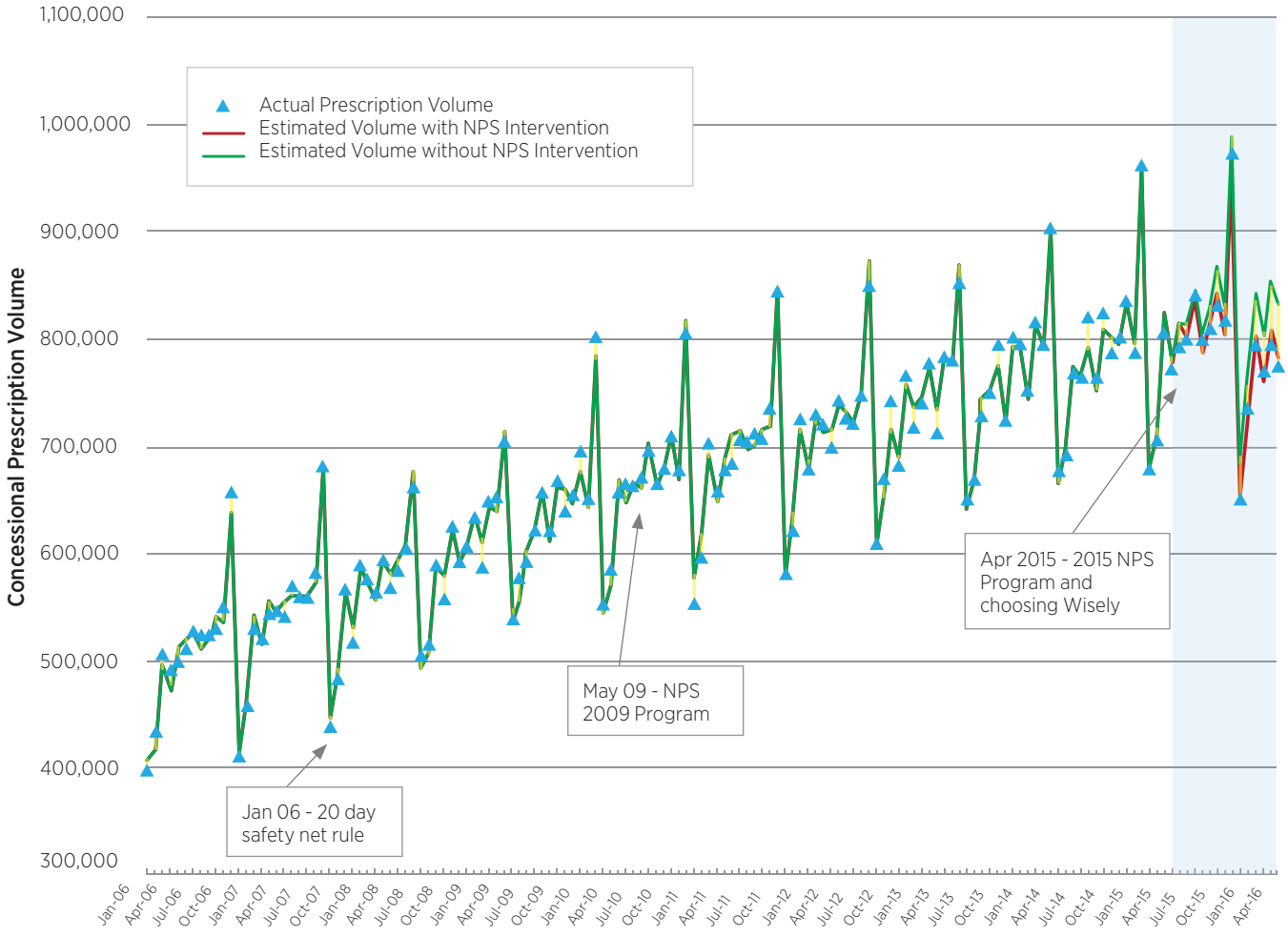


Table 15: Changes in GP practice for clinical audit indicators between initial and review phases

Clinical indicator	Initial phase % (n)	Review phase % (n)	Difference	Percentage change
Confirmed the presence of an ongoing indication for PPI therapy	99.1 (3,293)	99.6 (3,309)	+0.5 $p < 0.0001$	+0.5%
Provided lifestyle counselling	86.8 (3,501)	98.4 (3,967)	+11.6 $p < 0.0001$	+13.4%
Referred to endoscopy/specialist review when indicated	80.2 (559)	88.2 (615)	+8.0 $p < 0.0001$	+9.98%
Use of regular daily dosing of PPI in patients in whom long-term PPIs is indicated	88.0 (822)	95.8 (895)	+7.8 $p < 0.0001$	+8.86%
Continual regular use of a PPI for > 8 weeks in patients with adequate symptom control in conditions where ongoing use should be reviewed [not recommended]	76.1 (1,949)	34.6 (887)	-41.5 $p < 0.0001$	-54.5%
Use of medicine(s) that may cause or exacerbate gastric ulceration or irritation [not recommended]	48.1 (1,748)	25.0 (910)	-23.1 $p < 0.0001$	-48.0%

Table 16: Percentage of GPs who indicated changing their practice or intention to change their practice against a number of outcome measures.

Statement	Intention to change	Percentage
Increased review of the need for medicines that can cause or exacerbate gastric irritation and peptic ulceration	I have changed my practice	54%
	I intend to change my practice	20%
	No change necessary	26%
Increased identification of patients prescribed a PPI in whom a step-down approach would be beneficial	I have changed my practice	58%
	I intend to change my practice	20%
	No change necessary	22%
Increased identification of patients using a PPI who should be referred for endoscopy or specialist review	I have changed my practice	31%
	I intend to change my practice	11%
	No change necessary	58%
Increased consideration of potential common as well as rare but serious adverse effects of PPI therapy	I have changed my practice	48%
	I intend to change my practice	23%
	No change necessary	29%
Increased discussion with patients about the modification of lifestyle factors that may improve gastro-oesophageal symptoms	I have changed my practice	41%
	I intend to change my practice	12%
	No change necessary	47%

Discussion

This NPS MedicineWise program adds to the cumulative effect of previous interventions addressing PPI prescribing nationally, including NPS MedicineWise programs, an Australian Prescriber article, Choosing Wisely initiatives, TGA communications and the Australian Government Department of Veterans' Affairs Veterans' MATES program.

The drug utilisation analysis using interrupted time series analysis showed that there was a significant reduction in community-based dispensing of high and low-strength PPIs. It is reasonable to assume that a proportion of patients on high-strength PPIs were stepped down to lower strength options while a proportion of patients who were already on lower strength PPIs were discontinued. The estimated reduction in prescriptions of high-strength PPIs over the 15-month period was approximately 400,000 scripts or a 3.4% change amounting to an estimated cost saving of $6.3 million to the PBS. This impact can be attributed primarily to the PBS feedback that was distributed to all GPs across Australia in early April 2015 and Choosing Wisely recommendations by the RACGP that were released in the same month.

Clinical indicators from GPs who completed the clinical audit showed that there was an improvement in the proportion of GPs who discontinued continual use of a PPI for more than 8 weeks in patients with adequate symptom control and identified patients for whom a step-down approach would be beneficial.

Limitations of the evaluation are that it only examined concessional PBS data and did not assess prescribing changes in the entire population. It is not possible to differentiate the contribution of the Choosing Wisely recommendations from that of the NPS MedicineWise program.

MEDICINEINSIGHT: USING DATA TO SUPPORT PRACTICE

Introduction

MedicineInsight is a national general practice data program developed and managed by NPS MedicineWise since 2011. MedicineInsight extracts longitudinal, de-identified, whole-of-practice data from the clinical information system software GPs use to manage patient records and write prescriptions.

Since 2013, MedicineInsight has been delivering routine practice reports to GPs showing trends in clinical practice including prescribing and testing to support effective educational interventions and quality improvement programs that help GPs deliver the best care to their patients. Aggregated information has also been produced for policy makers, to ensure Australia's health and medicines policy is driven by accurate and timely information from general practice.

NPS MedicineWise delivers MedicineInsight-specific visits to participating general practices. These visits include the delivery of a tailored practice report via a facilitated meeting. In the 2016/17 financial year, over 2,500 health professionals from over 400 general practices participated in MedicineInsight visits on topics that included managing depression, type 2 diabetes and COPD. All practices have access to an online report repository, allowing them to download their tailored updated practice reports as required. Over 500 confidential practice reports are provided monthly to participating practices via an online portal and through the NPS MedicineWise team of CSSs. Reports are tailored for each practice and compare procedures and prescriptions between 'Your practice 12 months ago', 'Your practice now', and in comparison to all other MedicineInsight practices.

This evaluation explored how participating MedicineInsight practices felt about their participation in the program in terms of its value, use, benefits received and improvements that could be made.

Method

A survey was administered online in July 2016 to 1519 practice staff in MedicineInsight practices who had participated in a MedicineInsight facilitated meeting between January 2015 and May 2016 and whose contact details were available. The survey aimed to gain a greater understanding of the value and use of MedicineInsight, benefits received and improvements moving forward. The survey was open for 3 weeks with two reminders.

Data were analysed using SPSS version 23. Significance testing was conducted using the chi-square and z-tests (significance level set at 0.05).

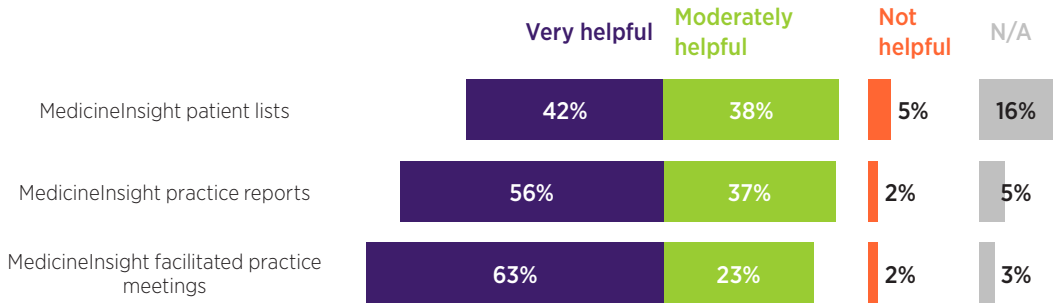
The data for open-ended questions were analysed in Excel for common themes using content analysis.

Results

A total of 422 (28% response rate) MedicineInsight participants responded to the survey, representing 219 MedicineInsight practices. Participants were GPs, practice nurses, practice managers, registrars and nurse practitioners and represented all states and territories.

MedicineInsight continues to be valued by many MedicineInsight participants with the facilitated visit and practice report thought to be the most helpful aspect (Figure 13).

Figure 13: Helpfulness of MedicineInsight activities



Through participating in MedicineInsight, participants reported improved clinical knowledge, improved clinical practice, the ability to compare their prescribing with their peers and improved patient outcomes. These levels of achievement are greater than those identified in a 2014 MedicineInsight survey. The majority of participants rated the ability to compare their data with best practice guidelines as one of the most important aspects of the program, whereas less importance was placed on cleaning data and committing to an action plan. However, practice managers believed these latter two activities were more important compared to GPs.

Following the visit, 70% of participants stated that their practice had reflected on their patient care (Table 17). Close to half of practices had improved their data recording. Only one-third had cleaned data and one-fifth stated they had carried on as usual.

Half of the respondents commented on the benefits of participating in MedicineInsight. Participation in the program has:

- allowed participants to see their practice data and use that to explore clinical practice 'as a whole' and identify areas for improvement, particularly in disease management, to ultimately improve patient outcomes
- provided the ability to compare and benchmark participants' practice against that of other general practices and best practice
- enhanced and improved participants' knowledge, allowing them to keep up to date with current evidence and best practice guidelines for chronic disease management
- allowed participants to reflect on and review their practice, individually and collectively

- brought the practice together to stimulate discussions among colleagues about patient care
- highlighted the importance of good data.

Table 17: Practice actions as a result of MedicineInsight

Action	Percentage
Reflected on my patient care	70%
Made more informed decisions at the practice	48%
Improved data recording	46%
Changed patient management	41%
Reviewed patients using the patient lists	41%
Reviewed processes or systems at the practice	39%
Improved coordination of care at the practice	35%
Cleaned data	33%
Recalled patients using the patient lists	30%
Carried on as usual	19%

"We have a clearer understanding of our chronic disease management. Strong and weak points of the practice management were highlighted making us aware on which areas we can improve on." ***Practice nurse***

"As a full time GP, it is hard to find time to reflect on my own practice let alone gather data. NPS provides a valuable resource in gathering data and benchmarking it against others and guidelines." ***GP***

"Data clean up emphasised the role of the team so that more meaningful relevant research can be done. Doing this together was most interesting and will further improve patient care & collaboration in our practice" ***Practice nurse***

The majority of respondents did not have any suggestions for how NPS MedicineWise could improve the program and 18% highlighted potential improvements in a number of areas (listed in order of frequency).

- Improve the accuracy of the data collection and analysis and its ability to reflect actual clinical practice
- Provide a greater selection and breadth of topics
- Conduct more regular practice visits
- The design of the reports and visits, where reports could be GP led, more user friendly and quicker to engage with, more relevant to real clinical practice, and provided prior to the practice visit
- Practice engagement and follow-up
- Category 1 CPD points awarded

Discussion

The findings from this survey have demonstrated the value of MedicineInsight to general practice and has also highlighted areas that can be improved to meet the ongoing needs of and maintain engagement with practice staff.

MedicineInsight continues to be valued by many participants, with the facilitated meeting thought to be the most helpful aspect. Most participants felt they have achieved improved clinical knowledge, improved clinical practice and the ability to compare their prescribing with their peers. Half of the participants felt that patient outcomes had improved as a result. The majority of participants rated the ability to compare their data with best practice guidelines as one of the most important aspects of the program, whereas less importance was placed by practice staff on cleaning data and committing to an action plan. Practice managers, however, placed greater importance on these two activities.

As a result of the meetings the majority of participants stated their practice had reflected on their patient care, however close to 20% of practices had taken no action.

Consistent with previous evaluations, some participants were concerned about the accuracy of the data and its ability to accurately reflect clinical practice. This may be an ongoing issue given the nuances of the data. However it may also be affected by the limited importance participants place on cleaning data which is likely to result in data inaccuracies. More practice visits continue to be requested on a variety of topics which is unsurprising given how helpful participants found them. There is great value in face-to-face meetings that bring practice staff together to stimulate discussions.

Future actions highlighted for consideration by NPS MedicineWise as a result of these findings include addressing data quality concerns with practices (currently underway), maintaining engagement with practices, continuing to review the design of reports and visits based on feedback from GPs and addressing actions that practices can take to help improve MedicineInsight.

AUSTRALIAN PRESCRIBER: EVALUATING USABILITY

Introduction

Australian Prescriber (AP) became a purely digital publication in July 2016. Readers were provided with an opportunity to provide feedback about the usability of the redesigned website, while also identifying opportunities for further maximisation of readership and loyalty. The evaluation explored current subscriber engagement, including barriers, enablers and opportunities for improvement of website content as well as factors impeding or facilitating website usability.

Methods

Health professionals were randomly selected from the NPS MedicineWise database who responded to the request and were available during the allocated times. A total of nine in-depth interviews with remote and regional health professionals were conducted. This included four GPs, three pharmacists and two specialists. Interviews were recorded and transcribed and analysed for themes and relationships across themes.

A total of 15 health professionals participated in mini-focus groups and usability testing for the evaluation, including five GPs, seven pharmacists, and three specialists. Focus groups were recorded, transcribed and analysed for themes until saturation of themes was achieved, and cross checked with video recording of website navigation.

Data was entered into NVivo for analysis.

Results

Findings from the evaluation indicated that:

- users were happy with the publication content
- email alerts are highly valued by users and prompt them to engage with the website.

"...[with the print version] you got it sent to you and that was the way it would remind you to read it because it got sent in the mail. And the same thing with this, the message comes through the mail, if no message came through the mail I'd be struggling to think about looking at Australian Prescriber." ***GP, subscriber***

- The publication frequency is sufficient; however, some readers expressed an interest in increased frequency as long as the quality of the publication was not affected.

"... 2 months is too long to wait for the [new issue], and if you're waiting for that long it's going to be a big read. I don't know, I guess monthly keeps everyone on their toes and refreshed, I guess." ***Pharmacist, subscriber***

- Health professionals found the online publication to be highly accessible.
- The majority of health professionals read the publication content from their computer screens and were unlikely to download and print articles.

"I don't think I've ever downloaded anything." ***Pharmacist, subscriber***

Discussion

Overall, the evaluation demonstrated that health professionals continue to value and engage with Australian Prescriber. The most valued features of the website were the contents of articles and the ability to receive email alerts about new issues. While opinions were mixed, a number of health professionals expressed an interest in increased frequency of publication to monthly editions as long as it did not negatively affect the quality of content. They reported that email alerts improved their engagement with the AP website and were often the only prompt that caused them to go to the site, especially when the alert highlighted specific articles relevant to them. Increasing the frequency of publication may serve to increase health professional engagement with Australian Prescriber and substantially increase traffic to the website.

Near complete access to the publication content reduced the need for health professionals to log into the website and reduced the need for new users to subscribe to the publication. Findings from the evaluation suggest that users would prefer full access to Australian Prescriber without the need for logging in.

Limitations of the evaluation included the small sample size of other health professionals and their under-representation. Specialists (non-subscriber) response rate was low or finding availability for interviewing was not possible and so the evaluation was unable to include a mini-focus group with these health professionals.

PHARMACISTS TRUST NPS MEDICINEWISE

Introduction

Pharmacy practice has evolved and pharmacists today operate in a much more complex environment than previously. NPS MedicineWise conducted the 2017 National Pharmacist Survey to understand current information and learning needs and preferences of pharmacists for the purpose of keeping NPS MedicineWise's activities and products relevant to their needs.

The NPS MedicineWise National Pharmacist Survey investigated pharmacists' information and learning needs, their perception of and attitudes towards NPS MedicineWise as well as their usage of or participation in NPS MedicineWise products and activities for pharmacists. The survey also explored pharmacists' confidence in undertaking clinical intervention involving biosimilars and attitudes to antibiotics.

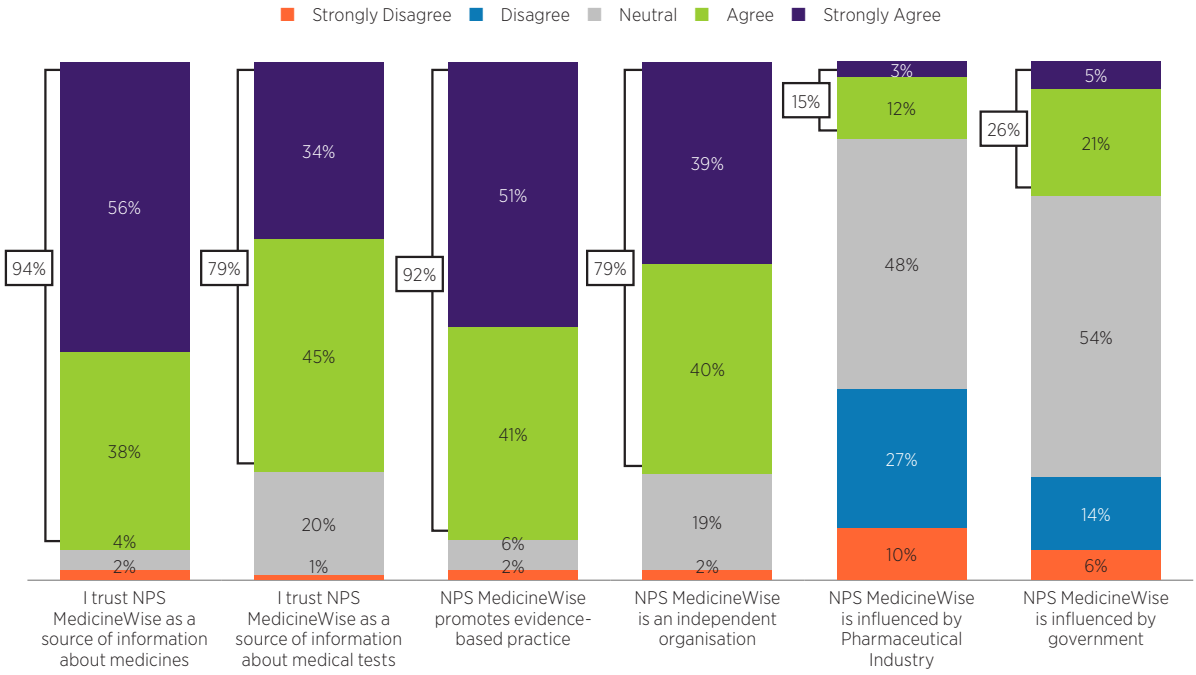
Method

A random sample of 3,500 pharmacists across Australia were invited to participate in the survey and 499 responses (14.2% response rate) were analysed using SPSS version 23. Descriptive statistics were used to summarise responses by key demographic variables. Statistical tests were conducted to determine whether differences between results were significant. A p-value ≤ 0.05 was considered to be significant.

Results

The strongest perception about NPS MedicineWise by pharmacists is that it is a trusted source of information about *medicines* (94%) and *medical tests* (79%), promotes evidence-based practice (92%) and is an independent organisation (79%) (Figure 14).

Figure 14: Rating of NPS MedicineWise on statements



The survey revealed that the majority of pharmacists are aware of NPS MedicineWise's resources and that approximately 6 out of 10 pharmacists sometimes, often or always use resources such as NPS RADAR (65%), Australian Prescriber (56%), MedicineWise News (61%) and the NPS MedicineWise website (61%) (Figure 15).

NPS MedicineWise provides patient resources such as fact sheets and tools that health professionals and patients can access through the NPS MedicineWise website. The survey results report that 66% of pharmacists refer customers to the online patient resources sometimes, often or always.

Continuing Professional Development

The most preferred format for a CPD activity is online (84%) followed by face-to-face (73%) and paper-based activities (57%).

The online format appealed the most to pharmacists aged 34 years and under with significantly more from this age group preferring this format (92%) compared to older age groups (79% of 35–44, 80% of 45–54 and 78% of 55–64 age groups). More pharmacists aged 45 to 54 (86%) and 55 to 64 years (85%) prefer face-to-face activities compared to younger age groups (68% of 34 years and under, 72% of 35-44 years).

NPS MedicineWise, including Australian Prescriber and NPS RADAR, had a net audience share for CPD of 46% based on activities undertaken by respondents over the 2015-16 CPD year.

Figure 15: Pharmacist usage of NPS MedicineWise resources

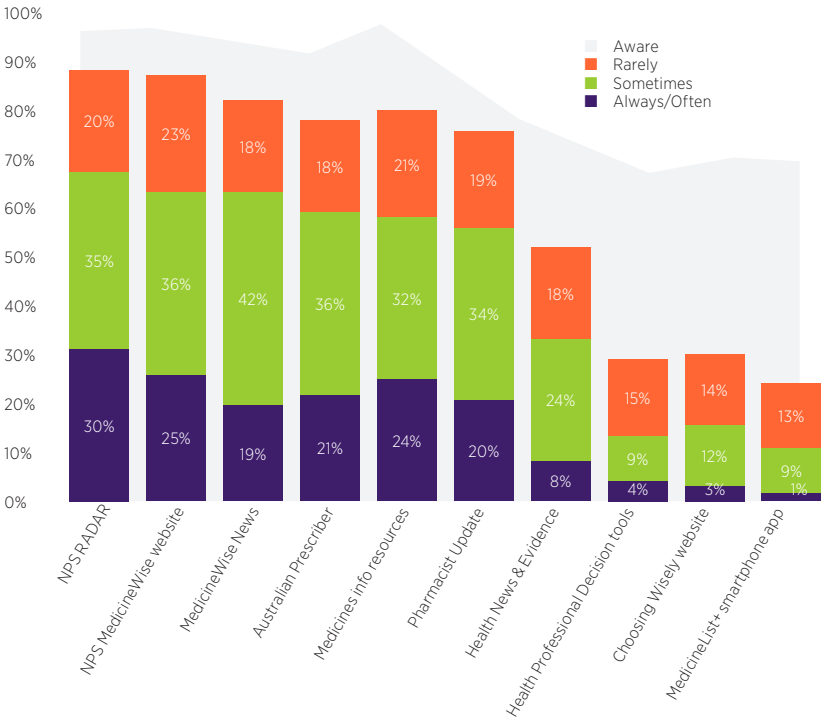
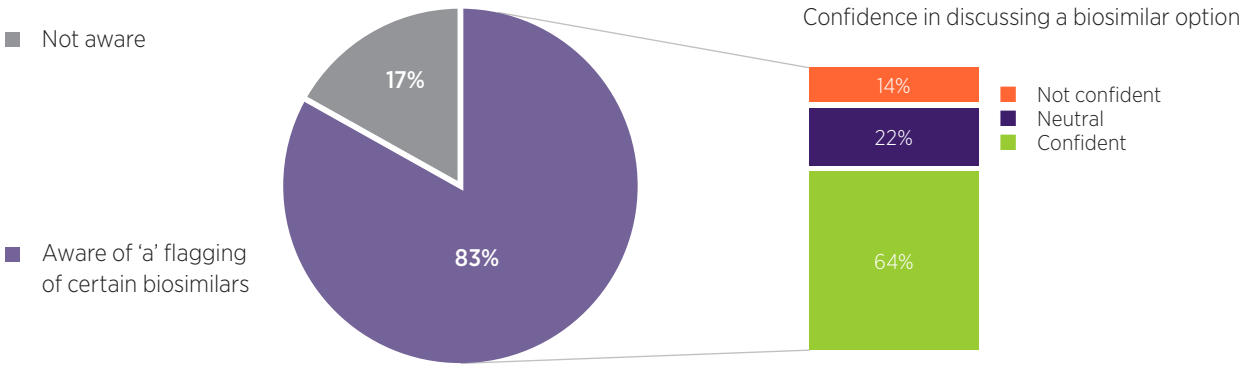


Figure 16: Awareness of 'a' flagging of certain biosimilars and confidence of pharmacists in discussing a biosimilar option with customers



Discussing a biosimilar alternative with customers

In 2015, the Pharmaceutical Benefits Advisory Committee recommended 'a' flagging of certain biological medicines if the biosimilar is considered as safe and effective as the reference biological medicine. For 'a' flagged medicines, pharmacists can substitute the biological medicine with a biosimilar in consultation with the patient but without needing to go back to the doctor. However, if the doctor has ticked the 'brand substitution not permitted' box on a prescription, by law the pharmacist cannot dispense a brand other than that prescribed. The National Pharmacist Survey explored how confident pharmacists are in discussing a biosimilar option with customers.

The majority of pharmacists (83%) were aware of biosimilars and the 'a' flagging of certain biosimilars. Of those who were aware, 64% felt they were confident discussing a biosimilar option with customers, 22% were neutral and 14% were not confident to do so (Figure 16).

Discussion

The 2017 National Pharmacist Survey demonstrates that NPS MedicineWise is valued by pharmacists with the majority using resources and services provided by NPS MedicineWise. NPS MedicineWise plays a leading role in providing continuing professional development opportunities to pharmacists. The survey found that online CPD is the preferred method of the majority of pharmacists which confirms that current NPS MedicineWise online learning modules, online case studies and pharmacy practice reviews respond to pharmacist needs and preferences.

Not all pharmacists are aware of 'a' flagging of biosimilars and 36% of pharmacists feel neutral or do not feel confident discussing this option with customers. The results suggest that there is an opportunity for further education and support of pharmacists in this area.

CHOOSING WISELY – THE SECOND YEAR

Introduction

Choosing Wisely Australia® is an initiative led by Australian medical colleges and professional societies and facilitated by NPS MedicineWise. One of the main aims of the initiative is to encourage clinicians and consumers to start a conversation about appropriateness of care. A number of key messages were developed that sit behind the initiative and are disseminated through activities and information for health professionals and consumers.

Choosing Wisely Australia
An initiative of NPS MedicineWise

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.
- Focussed 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, that 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.

This evaluation sought to determine if the second year of Choosing Wisely Australia resulted in an increase in participation in and awareness of Choosing Wisely Australia, in measurable change in health professional knowledge and practice, and in partners who were satisfied and participating.

Method

Process evaluation was conducted to assess reach and engagement among the target audience from May 2016 to June 2017. The second year of the Choosing Wisely Australia initiative was evaluated using a range of methods.

Health professional surveys: online surveys (designed using the Survey Gizmo software) were conducted with a national sample of GPs and medical specialists to monitor trends over time and identify changes in awareness, attitudes, knowledge and self-reported practice in relation to tests, treatments and procedures. The AMPCo mailing list was used to select a representative sample of GPs and medical specialists, and the survey link was sent via email to approximately 4,000 GPs and 2,500 medical specialists. The surveys were sent out in December 2016 for a period of 4 weeks with one reminder. The response rates were 7% of GPs (264) and 7% of specialists (160). This response rate was expected as response to online surveys is typically much lower than for paper-based surveys.

Consumer survey: five questions were included in the 2017 NPS MedicineWise National Consumer Survey, which was completed by 2,494 consumers across Australia. These survey questions were used to measure awareness of Choosing Wisely Australia, and knowledge and attitudes regarding tests, treatments and procedures.

Partnership analysis: an online partnership survey was conducted with representatives from member colleges, societies and associations about key aspects of the partnership with NPS MedicineWise and their involvement in Choosing Wisely Australia. The survey was sent to all 26 members and 22 responded, a response rate of 85%.

Results

In the first 12 months of the initiative, Choosing Wisely Australia reported:

- a monthly average of 8,009 sessions (total of 96,105) and 6,451 users (total of 81,764) of the website
- Facebook and Twitter reaching over 1.5 million impressions with an average engagement rate of 3%
- Support for the Choosing Wisely Australia initiative has continued to grow and exceed expectations, with the second year resulting in:

- 80% of medical colleges, societies and associations signed up
- 9 health services joining the initiative
- 13 medical colleges, societies and associations submitted lists of recommendations
- 1,123 media reports, with none classified as 'unfavourable', and the cumulative potential audience of this coverage estimated at 5,919,319
- 59% GP awareness (4% increase), 49% specialist awareness ($p < 0.001$, 11% increase), and 54% of other health professionals aware
- A significant increase of 16% of GPs and 16% of specialists that reported seeing the Choosing Wisely Australia recommendations
- an increase of 6% of GPs and 4% of specialists agreeing that there is a problem with the use of unnecessary tests, treatments and procedures
- 47% of GPs agreeing that they have a responsibility to help reduce the inappropriate use of tests, treatments and procedures compared to 36% in the first year.

The proportion of medical colleges, societies and associations and health services that engaged in implementation activities, (such as workshops, promotions and resources) and integrated Choosing Wisely Australia recommendations and principles into mainstream activities also exceeded expectations.

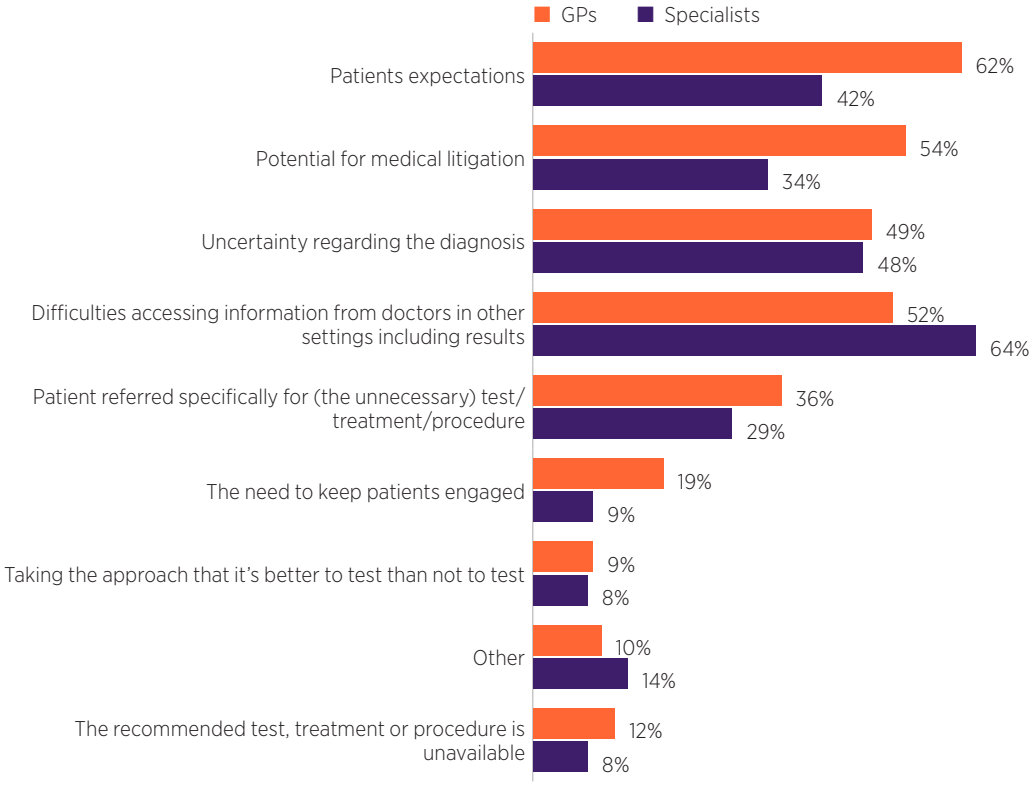
Choosing Wisely's impact on health professional attitudes and practice

The most common reasons for requesting an unnecessary test, treatment or procedure were:

- patient expectations – 62% of GPs and 73% of other health professionals
- difficulties accessing information from other providers – 64% of specialists
- uncertainty regarding the diagnosis – 61% of other health professionals.

GPs and specialists who were aware of Choosing Wisely Australia reported action that was more aligned to certain recommendations.

Figure 17: The main reasons specialists and GPs may request an unnecessary test, treatment or procedure



Consumer attitudes and practice to medical tests, treatments and procedures

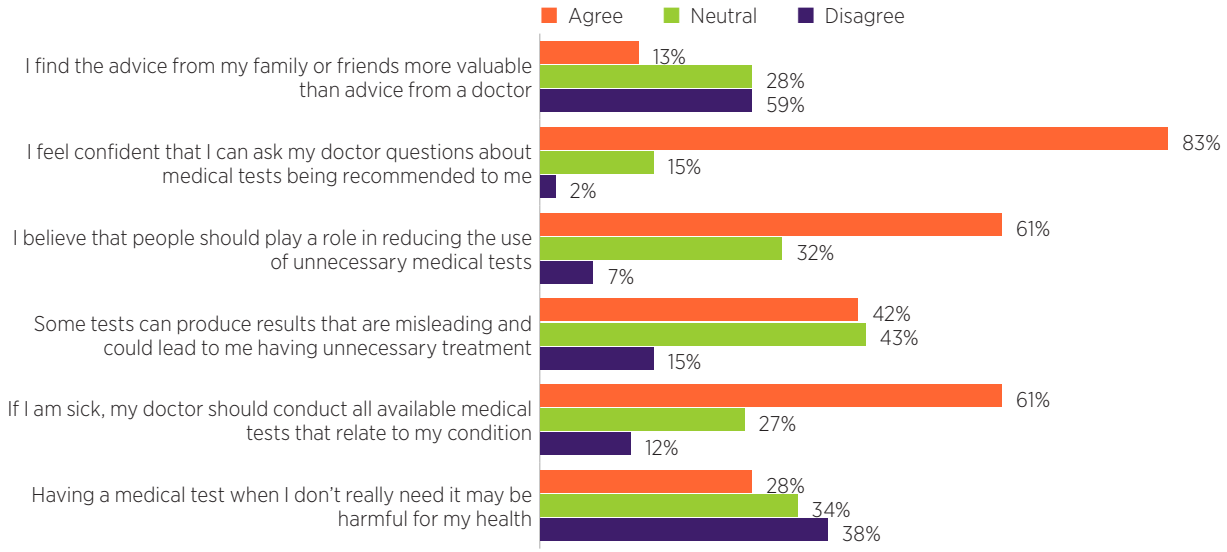
Consumer awareness of Choosing Wisely remains steady with 6% of the 2,494 consumers who participated in the 2017 NPS MedicineWise National Consumer Survey aware of the Choosing Wisely Australia initiative, a rise of 1% from the first year.

While only 14% of all consumers reported asking their doctor if they could have a medical test, 23% of respondents aged between 25 to 34 years asked. However, 84% of consumers reported having had a medical test because it was recommended by a health professional.

In order to assess consumer understanding of the risks of unnecessary tests, respondents were asked to indicate their level of agreement or disagreement with a number of statements about medical tests (Figure 18). Main findings included:

- 83% of consumers felt confident asking their doctor questions about medical tests
- 61% of consumers believed that people should play a role in reducing the unnecessary use of tests
- 61% agreed or strongly agreed that in the event of an illness their doctors should conduct all available medical tests, a decrease of 13% from the first year.

Figure 18: Consumer attitudes towards medical tests



Participation and satisfaction of members

A total of 22 of the 26 Choosing Wisely partner organisations responded to a partnership survey. Satisfaction of college, society and association members and health service members with the initiative was very high. Survey results showed that the aspects that respondents were most satisfied with were overall communication and facilitation of the Choosing Wisely Australia initiative by NPS MedicineWise.

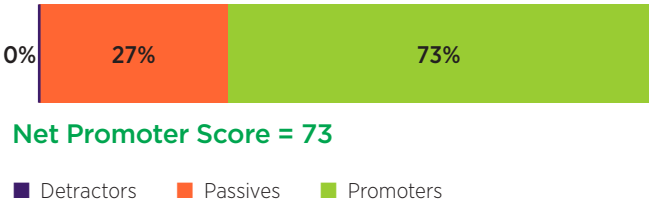
Just under half (46%, n=10) of participating organisations anticipated that their level of involvement in the Choosing Wisely Australia Initiative will be 'high' within the next 12 months, with nine (41%) anticipating a medium level of involvement. In general, the health services anticipated a higher level of involvement in the future with 78% selecting high in 3, 6 and 12 months.

Of the 15 organisations that have been involved in the development of a list of recommendations, just over half (53%) had developed collaborative relationships with other organisations during this process.

Involvement in the Choosing Wisely Australia initiative prompted 73% of participating organisations to think about how they could work with consumers to reduce unnecessary tests, treatments and procedures. This included all health services and seven colleges/societies.

The effectiveness of NPS MedicineWise as the facilitating organisation was rated very positively by the majority of organisation representatives with 96% (n=21) selecting a rating of 'very good' or 'good' and 73% of organisations were found to be 'promoters' when asked about their likelihood of recommending working with NPS MedicineWise on the Choosing Wisely initiative using the Net Promoter Score. All organisations selected eight or above out of ten (Figure 19).

Figure 19: Net promotor score for working with NPS MedicineWise on the Choosing Wisely initiative



Discussion

The Choosing Wisely Australia initiative has experienced a very successful second year. Australian medical colleges and societies have demonstrated that they are highly engaged with the initiative, and motivated to promote evidence-based care to their members, and to contribute to reducing unnecessary tests, treatments and procedures long term. The majority of participating colleges and societies found working with NPS MedicineWise to be a valuable experience and were very satisfied with the support and facilitation provided by our organisation. The majority would consider working with NPS MedicineWise in the future.

The consumer survey findings indicate that eight out of ten consumers felt confident asking their doctor questions about medical tests, treatments or procedures. It is also encouraging that there was a significant decrease in the number of respondents who believed that in the event of an illness their doctors should conduct all available medical tests.

Health professional survey results showed an increase in GP awareness of Choosing Wisely Australia and a significant increase in specialist awareness from the first to the second year. There was an increase in agreement that there is a problem with the use of unnecessary tests, treatments and procedures and also strong agreement that GPs and specialists have a responsibility to help reduce the inappropriate use of tests, treatments and procedures.

The most common reason for requesting an unnecessary test, treatment or procedure for GPs continues to be patient expectations while for specialists it was difficulties accessing information from other providers. There was a decrease in the second year in the proportion of GPs and specialists worried about the potential for medical litigation. These concerns serve to highlight the importance of the initiative in facilitating conversations between health professionals in different health settings and between health professionals and consumers.

Education for consumers is still needed to raise awareness of Choosing Wisely Australia and reinforce messages about the risks and benefits of medical tests, treatments and procedures.

GP INFORMATION PACKS FOR ANTIBIOTICS

Introduction

Excess prescribing of antibiotics in primary care contributes to the development of antibiotic resistances of clinical importance. Programs that encourage judicious prescribing of antibiotics in general practice are therefore crucial for mitigating the public health risks of antimicrobial resistance. In July 2016, NPS MedicineWise undertook a social marketing and general practice information campaign aimed at improving the quality of antibiotic prescribing in MedicineInsight practices. The campaign's messages were also directed at GPs via information-packs mailed to practices. The information pack consisted of a large envelope with cover letter, symptomatic management pad, commitment to reducing antibiotic resistance statement, poster and a coughs colds and flu tent card. The information packs were distributed to GPs to encourage judicious antibiotic prescribing, and emphasised the public health risks of excessive or unnecessary antibiotic prescribing. Improved quality of antibiotic prescribing was expected to result in fewer antibiotic prescriptions being written overall, but particularly for respiratory tract infections (RTI).

As children are generally overprescribed antibiotics to a greater extent than the general population, the effect of improved prescribing was expected to be larger for children.

The evaluation explored whether practices that received the print materials about antimicrobial resistance prescribed fewer antibiotics in the months following the intervention and whether this result was different for children aged 13 or younger.

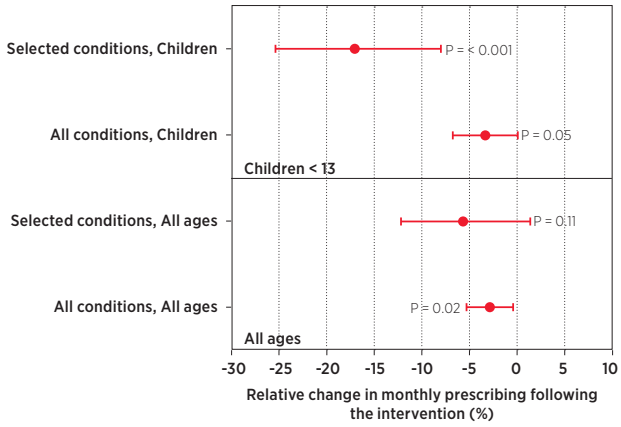
Method

MedicineInsight data was used to evaluate the impact of the mailouts on practice-level antibiotic prescribing rates. A total of 221 MedicineInsight practices received an information-pack. Another 280 practices did not receive an information pack. These practices acted as a control against which intervention practices were compared. A generalised linear mixed model was used to estimate the effect of the information packs on the monthly volume of antibiotics dispensed from each practice. To estimate the effect of the intervention, the model incorporated information on the difference in prescribing between intervention and control practices, as well as historical prescribing data beginning 8 months prior to the intervention. The antibiotics data were analysed for all conditions, for upper RTI only (selected conditions) and for children 13 years of age or younger.

Results

The monthly number of antibiotics prescribed by the practices that received print materials (information packs) was reduced by an average of 2.9% (95%CI 0.5% to 5.3%; p = 0.02) in the four months following the intervention (Figure 20). The effect was slightly higher for prescriptions dispensed for RTI (selected conditions) – a 5.7% reduction (95%CI -12.2 to +1.3). The strongest reduction in prescribing following the receipt of print materials was for children aged 13 or younger presenting with upper RTI (selected conditions, children). The monthly number of antibiotics prescribed to this group was reduced by an average of 17.1% (95%CI 8.0% to 25.3%; p = 0.0005) in the 4 months following the intervention.

Figure 20: Relative effect of information packs on monthly antibiotic prescribing volume in MedicineInsight practices.



Note: Negative percentages indicate reduced prescribing. Error bars are 95% confidence intervals.

Discussion

The results of this analysis demonstrate that a practice-level intervention which reminds health professionals to be conscious of excess antibiotic prescribing can be an effective means of reducing antibiotic prescribing for up to several months following the intervention. The finding that reduced prescribing was greater in patients presenting with upper RTI (when compared with all indications) is consistent with the key message of the information packs to limit antibiotic prescribing particularly for the common cold and flu.

The impact of the information-packs was largest in children presenting with RTI. This is consistent with reports that children are more frequently prescribed antibiotics than are the general population. The large degree of overprescribing in children implies the largest scope for improved antibiotic prescribing and this is reflected in the 17% reduction in in monthly prescribing following the intervention.

Overall, these results suggest that information packs for GPs, in additional to a social media campaign directed at the community, can have an impact on antibiotic prescribing. These interventions are an additional tool for improving the quality use of antibiotics in primary health care.

TESTING OF THE ONLINE CHRONIC PAIN COMMUNICATION TOOL

Introduction

Resources and tools to help manage chronic pain were developed for consumers as part of the *Chronic pain: opioids and beyond* program. One of these was the online communication tool which was available on the NPS MedicineWise website for the duration of the program. The online chronic pain communication tool was an interactive tool that enabled people with chronic pain to select a list of statements that reflected their concerns and experiences of pain, which could be saved as a personalised summary. The primary aim of the tool was to encourage people with chronic pain to use this summary as a basis for conversations with a range of health professionals, carers and others who could provide them with support.

The evaluation explored how consumers use the online chronic pain communication tool in 'real world' settings and whether the online chronic pain communication tool encouraged people with chronic pain to have conversations about their pain with others who could provide them with support.

Method

Qualitative interviews (n=25) were conducted with consumers who were invited to use the tool in a 'real world' setting (at home or in a GP/specialist consultation). The interviews were 45 minutes long and were conducted face-to-face for Sydney-based participants and by telephone for other participants.

Results

Participants commonly used the tool at home to help them in conversations about their pain with family members, carers and friends. Fewer participants used the tool in a GP or specialist consultation. Analysis of the data identified a number of factors that can impact on confidence and individual response to pain and inhibit open communication with health professionals and others (eg, age, gender, mental health, financial circumstances, and health professional time available to them).

One particular barrier to open communication is that pain itself is complex and often not easy for people to talk about with health professionals, colleagues or family and friends.

Pain can be difficult to explain to others	Pain is often associated with strong emotions	Medication may inhibit open communication
Experience is unique, pain thresholds vary, difficult to recall, not understood	Fear, anger, sadness, isolation, guilt, embarrassment, despair, depression	May affect memory, concentration, clarity, stigma of 'addiction' or overuse

Participants felt that the tool was easy to use and navigate and covered all relevant topic areas about chronic pain. The categories of statements about different aspects of chronic pain (eg, support, medicines, how I feel, daily living) resonated with most participants, and working through the tool 'made a lot of sense'.

The most positive outcomes of the tool were that it served to clarify thinking and validate feelings and concerns about pain. It also gave participants permission to pursue active conversations with health professionals, family members and others about how pain was affecting their lives.

Helped to clarify thinking	Validated feelings and concerns	Prompted a new perspective
Using the tool helped to think more clearly about the current situation and focus on desired outcomes	Seeing the statements made feelings and concerns real and reduced perception of isolation	The tool prompted a different way of thinking about pain and unresolved concerns

Discussion

Analysis of the qualitative interview data found that the online chronic pain communication tool helped consumers with chronic pain to clarify their thinking and focus their immediate concerns. It also served to validate emotions associated with the experience of chronic pain, and for this reason the majority of consumers who participated in the evaluation emerged as advocates of the tool.

Participants commonly used the tool for their own purposes, and to assist them in conversations with family members and friends. Fewer participants were confident using the tool to have a conversation with a GP or specialist.

Effective use of the tool within a consultation setting proved to be quite challenging for consumers. It was felt that providing further direction on how to use the tool to communicate with health professionals would have been beneficial for people with chronic pain, and would have improved the usefulness of the tool.

Further promotion of the tool to GPs would also be beneficial to gain their support. If a similar online communication tool was required for a future program the improvements suggested by consumers in this evaluation should be taken into consideration.

REFERENCES

1. Easton K, Belcher J, Raymond J. Formative Research: Asthma. Sydney: NPS MedicineWise. 2013.
2. Phillips CB, Toyne H, Ciszek K, et al. Trends in medication use for asthma in school-entry children in the Australian Capital Territory, 2000-2005. Med J Aust 2007;187:10-3.
3. Asthma Foundation NSW. Complacency endangering asthmatics health. Sydney: Asthma Foundation NSW, 2012.
4. National Asthma Council Australia. Inhaler technique in adults with asthma or COPD. Melbourne: National Asthma Council Ltd, 2008.
5. Australian Centre for Asthma Monitoring. Asthma in Australia 2011. Canberra: Australian Institute of Health and Welfare, 2011.
6. 45 and Up Study Collaborators, Banks E, Redman S, Jorm L, Armstrong B, Bauman A, et al. Cohort profile: The 45 and Up Study. Int J Epidemiol 2008;37(5):941–7.
7. The Cardiac Insufficiency Bisoprolol Study II (CIBIS-II): a randomised trial. Lancet 1999;353:9.
8. Brophy JM, Joseph L, Rouleau JL. Beta-blockers in congestive heart failure. A Bayesian meta-analysis. Ann Intern Med 2001;134:550.
9. Poole-Wilson PA, Swedberg K, Cleland JG, et al. Comparison of carvedilol and metoprolol on clinical outcomes in patients with chronic heart failure in the Carvedilol Or Metoprolol European Trial (COMET): randomised controlled trial. Lancet 2003;362:7.
10. Effect of metoprolol CR/XL in chronic heart failure: Metoprolol CR/XL Randomised Intervention Trial in Congestive Heart Failure (MERIT-HF). Lancet 1999;353:2001-2007.
11. Amabile CM, Spencer AP. Keeping your patient with heart failure safe: a review of potentially dangerous medications. Arch Intern Med 2004;164:709.
12. Pitt, B, Zannad F, Remme, WJ, et al. The effect of spironolactone on morbidity and mortality in patients with severe heart failure N Engl J Med 1999;341:709-717.
13. Center for Health Record Linkage (CHeReL). Available at http:www.cherel.org.au/about-us. Accessed 8 January, 2018.
14. Chan KS, Ripley B. TSA: Time series analysis. R package version 1.01. 2012. (https://CRAN.R-project.org/package=TSA)
15. R Core Team. R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. 2015.
16. Chan YK, et al., Current and projected burden of heart failure in the Australian adult population: a substantive but still ill-defined major health issue. BMC Health Serv Res, 2016;16:501.
17. Heart Foundation, Guidelines for the prevention, detection and management of chronic heart failure in Australia. 2011.
18. Giguère A, Légaré F, Grimshaw J, et al. Printed educational materials: effects on professional practice and healthcare outcomes. Cochrane Database Syst Rev 2012;10:CD004398.
19. Australian Institute of Health and Welfare. A snapshot of osteoporosis in Australia 2011. Canberra: Australian Institute of Health and Welfare, 2011.
20. Australian Institute of Health and Welfare. Use of antiresorptive agents for osteoporosis management. Canberra: Australian Institute of Health and Welfare, 2011.
21. Australian Bureau of Statistics. Australian Health Survey 2014/15 (4364.0). Canberra: ABS, 2016.
22. Law MR, Morris JK, Wald NJ. Use of blood pressure lowering drugs in the prevention of cardiovascular disease: meta-analysis of 147 randomised trials in the context of expectations from prospective epidemiological studies. BMJ 2009;338:b1665.

APPENDIX 1: DEFINITIONS OF INTERVENTION TYPES

Academic detailing – Educational visiting facilitated through general practice

This remains NPS MedicineWise's most effective and proven intervention to bring about prescribing behaviour change among GPs. NPS MedicineWise Clinical Services Specialists meet with GPs individually in their practices to discuss evidence-based therapy on a particular therapeutic topic. Educational visiting may also be called practice visiting, academic detailing or educational outreach visiting. Educational visiting is also provided for pharmacists and practice nurses.

Small group case-based discussions facilitated through general practice

Case scenarios depicting real clinical dilemmas are used as the basis of discussion in groups of up to ten participants. These groups are run by NPS MedicineWise Clinical Services Specialists and may include members of a multidisciplinary team such as pharmacists and/or practice nurses. These discussions are an opportunity for GPs and other health professionals to learn from their peers and share information.

Interactive workshops

There are two types of workshops facilitated through general practice. Workshops for nurses and other aged-care employees are generally held in residential aged-care facilities. These workshops are used to increase awareness of the quality use of medicines (QUM) and best practice principles of medicine use for the elderly. There are also workshops that target GPs and pharmacists.

Clinical audits (paper-based and electronic)

GPs review their practice, receive individual and peer feedback and implement changes to practice on a specific therapeutic topic. Since 2012, NPS MedicineWise has moved largely to delivering interactive online clinical audits.

Pharmacy practice reviews

Similar in process to a clinical audit but completed by pharmacists and interns who review their practice and undertake a reflective learning exercise on a therapeutic topic. These activities help pharmacists enhance their counselling interaction with consumers and provide up-to-date, balanced information. Pharmacists are informed of the key messages provided to medical practitioners to ensure consistency of service provision.

Prescribing practice reviews

A prescribing practice review provides recommendations about prescribing and other aspects of patient management for a particular condition. Key information such as recommended target doses for medications is presented in easy reference tables.

Prescribing feedback (PBS/MBS)

Provides GPs with their prescribing and medical test referral patterns for selected therapeutic topics in comparison with their peers. The feedback also contains relevant key messages on the quality use of medicines and medical tests (QUMMT).

Prescribing feedback (MedicineInsight)

Provides GPs from participating practices with monthly reports via an online portal and through the NPS MedicineWise team of Clinical Services Specialists. Reports are tailored for each practice and compare procedures and prescriptions between *'Your Practice 12 months ago'*, *'Your Practice now'*, and in comparison to all other participating practices.

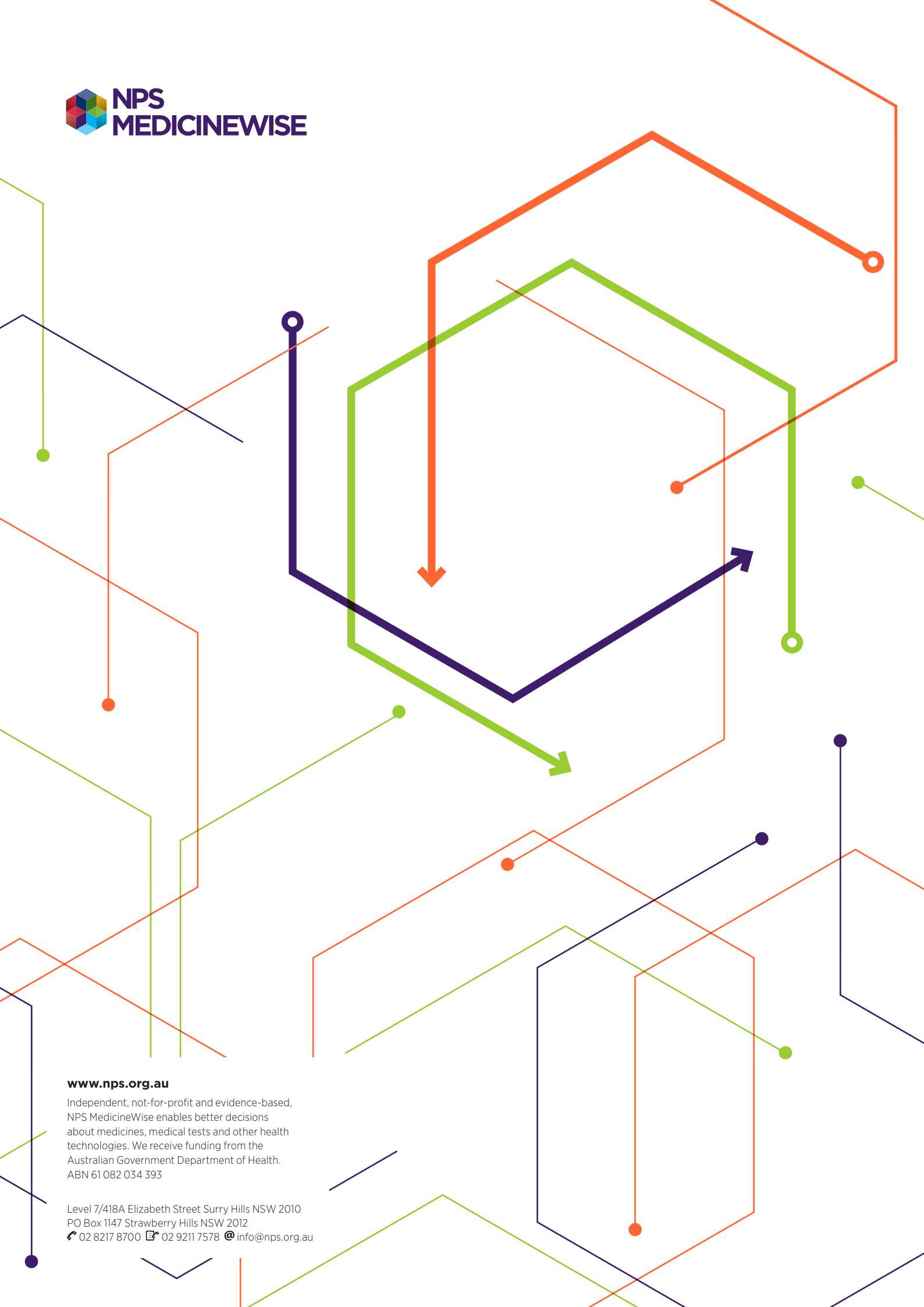
Case studies

Case studies take the form of a case scenario accompanied by a set of questions which are completed by GPs, pharmacists and nurses. Participants receive feedback on their own and the aggregated responses, evidence-based practice points and expert commentary on the case. Distributed in print via NPS News until 2012, case studies are now provided online via NPS MedicineWise's learning site and are developed for most therapeutic topics.

Webinar

An educational activity for health professionals where a panel discussion on a therapeutic topic is streamed live over the internet. The audience can participate by asking questions during the broadcast. The panel discussion is recorded and is available online after the live broadcast. Participants are eligible for a range of continuing professional development (CPD) points for all of these activities.

NPS MEDICINEWISE



www.nps.org.au

Independent, not-for-profit and evidence-based, NPS MedicineWise enables better decisions about medicines, medical tests and other health technologies. We receive funding from the Australian Government Department of Health.
ABN 61 082 034 393

Level 7/418A Elizabeth Street Surry Hills NSW 2010
PO Box 1147 Strawberry Hills NSW 2012
02 8217 8700 02 9211 7578 info@nps.org.au