

Improving medication safety: influence of a patient-specific prescriber feedback program on rate of medication reviews performed by Australian general medical practitioners^{†,‡}

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SUMMARY

Purpose To determine if patient-specific prescriber feedback for general medical practitioners (GPs), supported by educational material mailed to their patients, would increase home medicines review (HMR) rates.

Methods An observational study was conducted using the Repatriation Pharmaceutical Benefits Scheme (RPBS) Pharmacy Claims Database. The intervention group ($n = 40\,270$) included all veterans aged ≥ 65 years, dispensed ≥ 5 unique medicines each month over a 4 month period. Comparison group veterans ($n = 49,227$) were those who did not have ≥ 5 or more unique medicines dispensed each month, but did have at least one prescription each month and ≥ 20 prescriptions over 4 months, of which five were unique medicines. Intervention GPs ($n = 11,384$) were subdivided into 2 groups: GPs with intervention veterans ($n = 2097$) and GPs with both intervention and comparison group veterans ($n = 9287$). The comparison group of GPs ($n = 3630$) were primary prescribers to the comparison veterans only. Rates of HMRs pre and post-intervention and the number of new GPs participating in HMR services were examined.

Results There was a significant increase in HMR rates in intervention group, from 2.2 per 1000 in the pre-period to 4.6 per 1000 per month in the post-intervention period (Rate Ratio (RR) 2.06, 95% Confidence Interval (CI) (1.90, 2.22), $p < 0.0001$). HMR rates increased in the intervention group compared with the comparison group ($p < 0.0001$). HMR rates increased in the intervention group GPs compared with the comparison group (RR 1.79, 95% CI (1.58, 2.02), $p < 0.0001$).

Conclusion Patient-specific feedback provided to GPs, supported by educational material mailed directly to their patients increased HMR rates for targeted veterans and increased GP participation in the delivery of HMRs. Copyright © Commonwealth of Australia 2007. Published by John Wiley & Sons Ltd.

KEY WORDS — home medicines review; patient specific; prescriber feedback; medical practitioners; health service; veterans

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INTRODUCTION

Medication review has been demonstrated to be an effective tool for improving medication safety.^{1–3} The Australian government has funded a program, home medicines review (HMR) to provide free medication reviews to those at risk of medication misadventure.⁴ The program funds general medical practitioners

(GPs) to refer at risk patients to an accredited pharmacist who then visits the patients in their own home. At this visit, the patient presents all the medicines and the pharmacist checks the understanding of the patient regarding the medicines, devices and conditions, patient perceptions of medicine effectiveness and side effects, the appropriateness of use and compliance, as well as provides for disposal of unwanted medicines. The pharmacist prepares a report back to the GP. The GP will, if necessary, review the patient and implement a care plan. Pharmacists are paid a fee for conducting these reviews.

Despite the evident need for HMRs, and evidence of their effectiveness in preventing and resolving medication-related problems, uptake has been low.⁵ Focus groups of GPs and pharmacists have identified a range of practice management issues, including a lack of knowledge of the HMR process by GPs and time constraints in using the process.⁶

The Australian war veteran population is vulnerable to adverse medication-related events because of their age, multiple chronic conditions and polypharmacy.⁵ A total of 287,000 veterans (82%) are over the age of 65 years and take multiple medicines,⁷ putting them in the high risk category for medication-misadventure, and making them eligible for HMR services. Federal Government funding for these services has been provided since October 2001, however only 5,161 medicines review services were reimbursed for veterans in 2002 and 4,975 in 2003.⁵

The purpose of our research was to test the effectiveness, in the Australian setting, of unsolicited, patient-specific feedback and an educational brochure, mailed to GPs, combined with mailed educational material to veterans in increasing the utilisation of HMR services. The provision of performance feedback to prescribers has been a widely used strategy to improve professional practices; results however have been variable. An Australian study providing aggregated prescribing information accompanied by an educational newsletter to GPs found the practice to be ineffective.⁸ On the other hand, a US study which assessed the effect of patient-specific feedback, where, health providers received a letter identifying their patients with 10 or more active prescriptions, achieved statistically significant reductions in polypharmacy at four months post-intervention compared to the control group; the duration of effect was six months.⁹ Patient-specific feedback has also been demonstrated to be effective in increasing the use of preventative health services such as faecal occult blood screening¹⁰ and in the appropriate prescribing of anti-ulcer

agents.¹¹ Patient-specific prescriber feedback supported by reminder letters to patients was shown to have a modest effect in two studies.^{12,13}

METHOD

This study was conducted as part of the evaluation of the Veterans' Medicines Advice and Therapeutics Education Service (Veterans' MATES). This service has been established by the Department of Veterans' Affairs to utilise its administrative health databases to improve the care of veterans. Every three months, an educational module that includes patient-specific prescriber feedback supported by written educational material is provided to doctors who treat veterans who meet the target criteria for the module. Veterans are also mailed an educational brochure with the aim of encouraging more active participation in their medication management. This study was conducted as part of an ongoing service provided nationally that aims to include all veterans who qualify (i.e. meet the target criteria) for the module. For this reason, evaluation of the program was undertaken using an observational study design. The first topic for the Veterans' MATES program aimed to increase home medicine reviews amongst veterans who were considered to meet the criteria for poly-pharmacy, i.e. those on five or more different medicines concurrently. Pharmacy claims data were used to identify the target group.

In this study, all veterans over the age of 65 years who were dispensed five or more unique medicines, as defined by unique Pharmaceutical Benefits Scheme (PBS) item codes, each month over a four month period (May to August 2004 inclusive) were considered to meet the criteria for poly-pharmacy and made up the intervention group. The doctors of these patients, and the patients themselves, were mailed Veterans' MATES materials with the aim of increasing the uptake of HMRs.

The comparison group was selected post the intervention and included veterans over the age of 65 years who were not dispensed at least five unique medicines, but did receive at least one prescription each month and at least 20 prescriptions in total over the same four month period, of which five were unique medicines. This group was chosen as they were also considered to meet a definition of poly-pharmacy and so while not identical, likely to be similar to the intervention group.

From the pharmacy claims data, the GP who had written the maximum number of prescriptions for each intervention group veteran over the four-month period

was defined as the primary provider for that veteran (intervention GPs). Where there was a tie in the number of prescriptions written, the GP who had written the latest prescription, as defined by the date on which the prescription was dispensed, was selected as the primary provider.

Intervention GPs were subdivided into two groups. Group 1 consisted of GPs who were identified as the primary provider of veterans in the intervention group and who were not identified as the primary provider of any veterans in the comparison group. Group 2 consisted of GPs who were identified as the primary provider of veterans in the intervention group and who also were identified as the primary provider of veterans in the comparison group. The inclusion of this group of GPs enabled an assessment of whether the listing of patients on the feedback form resulted in a difference in the uptake rates of HMR as all these GPs were targeted, but not all their patients. A comparison group of GPs (Group 3) were identified as the primary providers of the comparison veteran group and who were not the primary providers for any veterans in the intervention group (Table 1).

The intervention consisted of the following strategies:

1. Mailed, unsolicited, patient-specific prescribing feedback, was provided to primary GPs, identifying the veterans for whom they were the primary prescriber and who met the inclusion criteria; whether or not they had received an HMR in the last 12 months, and the average number of unique medicines dispensed each month;
2. Supporting educational material was included in the mailing. It explained the need for medicines review, issues putting veterans at risk of medication

problems, HMR, its benefits and how to access the services;

3. Seven weeks after the intervention package had been sent to GPs, a letter was sent to veterans informing them of the availability of the HMR service and encouraging them to speak with their doctor about an HMR.

The endpoints for this study were the rate of HMRs per month, where the rate was defined as the number of HMRs per month divided by the population eligible for a review, and the number of new GPs per month participating in the provision of HMR services in the 12 months pre- and post-intervention. Eligible veterans were those who had not had a medication review in the previous 12 months, consistent with the funding requirements, and who were alive at the end of that month. New GPs were defined as those who had not billed for an HMR service in the previous 18 months.

Statistical tests: All data were analysed using SAS version 9.1. Poisson regression analysis was used to compare HMR rates and GP participation rates between the pre- and post-intervention periods and between the two groups. The pre-intervention period was July 2003 to November 2004, and the post-intervention period was December 2004 to November 2005.

RESULTS

Relevant material was mailed to 11 384 GPs on 30 November 2004 and to 40 270 Veterans between 17 January and 31st January 2005. On average, each GP mailing contained feedback on 3.5 veteran patients (range 1–20).

Table 1. Study design

Veteran Study Groups <i>Total veterans (n=89,497)</i>	Intervention veterans <i>(n=40,270)</i>		Comparison veterans <i>(n=49,227)</i>
GPs Total GPs (n=15,014)	Group 1	Group 2	Group 3
Intervention GPs <i>(n=11,384)</i>	GPs (n=2,097) with intervention veterans only	GPs (n=9,287) with intervention & comparison veterans	GPs (n=3,630) with comparison veterans only
Comparison GPs <i>(n=3,630)</i>	<i>(n=3,050 veterans)</i>	<i>(n=80,658 veterans)</i>	<i>(n= 5,789 veterans)</i>

Overall, 40 270 veterans were eligible for inclusion in the intervention group: 54% were male, 46% female and the average age was 81.2 years. The average number of unique medicines dispensed to each veteran per month was 8.4 (range 5–39). Four per cent of these veterans had received an HMR in the last 12 months.

Of the 49,227 identified as eligible for inclusion in the comparison group, 53% were male and 47% female. The average age was 81.4 years and the average number of unique medicines dispensed to each veteran per month was 5.5 (range 2–30).

There was a statistically significant increase in HMR rates in the intervention group, from an average 2.2 per 1000 in the pre-period to 4.6 per 1000 per month in the post intervention period (RR 2.06, 95% CI (1.90, 2.22), $p < 0.0001$). Across the same time interval there was only a small change, which was statistically significant in HMR rates in the comparison group (RR 1.17, 95% CI (1.06, 1.28)). Overall, there was a significant difference in the rate of HMRs between the intervention and control groups in the pre-intervention period (RR 1.46, 95% CI (1.33, 1.59), $p < 0.0001$ and in the post-intervention period (RR 2.6, 95% CI (2.37, 2.78) $p < 0.0001$). (Interaction RR 1.76, 95% CI (1.56, 1.99), $p < 0.0001$) (Figure 1).

Comparison of the rate of HMRs provided by Group 1 GPs (Intervention group GPs with intervention group veterans only) and Group 3 GPs (comparison of group GPs with the comparison group veterans only) found there was a statistically significant increase in the rate of HMRs in the post-intervention period compared to pre-intervention among GPs in Group 1 (RR 1.59, 95% CI (1.21, 2.09), $p = 0.001$). The effect of the intervention on HMR rates was significantly different between the Group 1 and Group 3 GPs (RR 1.45, 95% CI (0.99, 2.13), $p = 0.05$).

A separate analysis was undertaken of the veterans associated with Group 2 GPs who all received the intervention, but had patients who were in the intervention group and those who were not. There was a statistically significant increase in the rate of HMRs in the post-intervention period compared to pre-intervention among the intervention veterans (RR 2.11, 95% CI (1.96, 2.29), $p < 0.0001$). The effect of the intervention on HMR rates was significantly different between the intervention and comparison group veterans who were treated by the same GP (RR 1.79, 95% CI (1.58, 2.02), $p < 0.0001$).

On an average, 73 new GPs/month billed for HMRs in the 12 months prior to intervention compared to

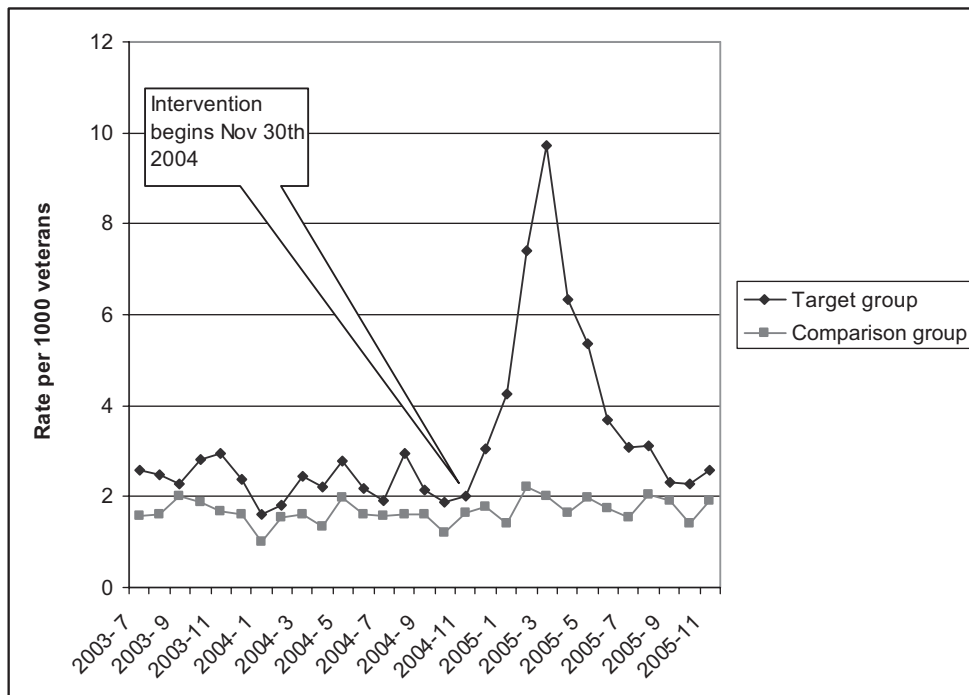


Figure 1. Rate of home medicines reviews per month for targeted veterans versus the comparison group

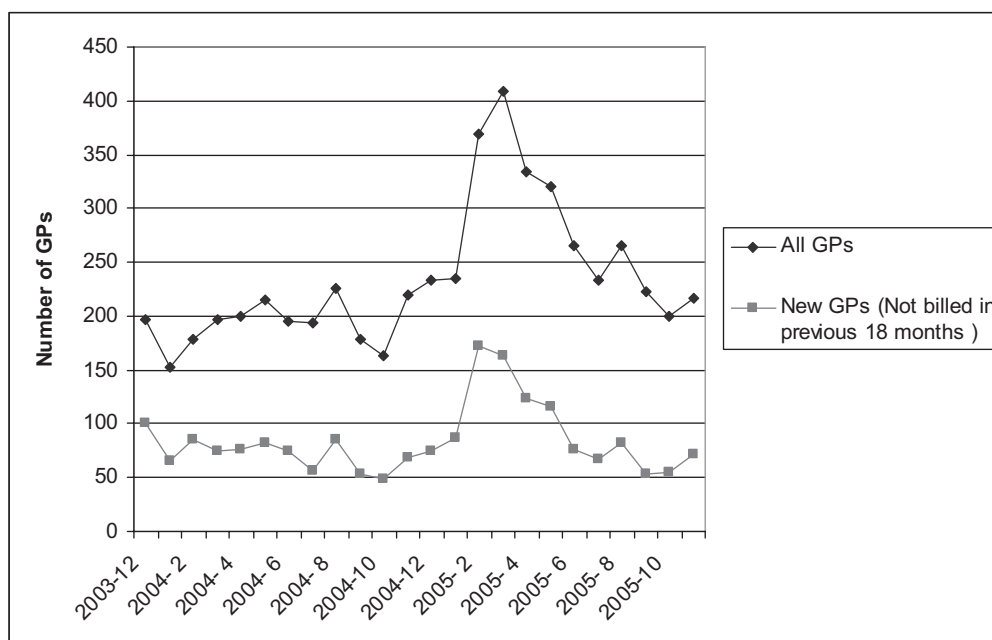


Figure 2. Number of GPs (new and all) billing for a home medicines review service each month

95 new GPs per month who billed for HMR in the 12 months post-intervention (diff 22; $p = 0.0593$) (Figure 2).

DISCUSSION

This study demonstrates that a patient-specific prescriber feedback, combined with a patient-directed intervention was successful in increasing the rate of HMR, with veterans in the intervention group having approximately a four-fold increase in HMR rates within three months of the mailing. The duration of the effect was not sustained, declining over time and returning to baseline by six months. The number of new GPs participating indicates the intervention was successful in both increasing the number of veterans who received an HMR and the number of GPs providing referral.

Subgroup analysis of the Group 2 GPs who care for veterans in both intervention and comparison groups has revealed that the identification of both veterans and GPs was critical to the success of the intervention. No observable increase was seen in HMR rates amongst the comparison group veterans of these GPs, despite the fact that these comparison group veterans also satisfied the criteria to receive the HMR service and their GP was provided with the educational

material. It appears the list of veterans was a critical factor in the GPs' decision to order a HMR.

The ability to identify and track the actions of both individual veterans and GPs is important both in the delivery of feedback and the evaluation of the intervention. The results of this Australian study are in keeping with the findings of other studies which have demonstrated the success of patient-specific feedback.^{9,12,13} The clarity of the results around which veterans were and were not provided with an HMR indicates that the GPs, who acted on the feedback advice, only attended to patients on the list provided by the project team. The ability to follow individuals and the pre and post-test comparison group designs provides some confidence that threats to the internal validity of the results are minimised. For example, the complimentary activities of other agencies such as the National Prescribing Service and Divisions of General Practice to promote HMRs do not appear to have influenced HMR rates in the comparison group over the time period of this study. They may well have, however, created a supportive environment for the messages delivered through the prescriber feedback.

One limitation in the study design relates to the differences between the comparison group and the intervention group. Comparison group veterans had received significantly less HMRs than those of the intervention group prior to the intervention and also

KEY POINTS

- Provision of patient-specific prescriber feedback to GPs supported by educational material mailed directly to these targeted patients, was successful in increasing the rate of health service utilisation in Australia.
- This intervention also increased the participation rate of GPs in the delivery of HMRs for their patients.
- Providing GPs with a list of patients at risk of medication misadventure was a critical factor in the GPs decision to order a HMR.

used significantly less medicines. It appears that the intervention group veterans were sicker and more likely to come to the GPs' attention for a HMR than the comparison group veterans. This situation was unavoidable in the evaluation of a service delivery program where all veterans meeting the pre-specified criteria were included in the intervention group.

A further limitation of the study design is that it precludes any assessment of the potential additional impact of the patient directed side of the intervention over the mailing of materials only to GPs. It is apparent from the results that the patient specific nature of the intervention was an important contributor to the effect as similar patients who were not identified were less likely to receive an HMR. The sharp rise in the rate curve for HMRs in the intervention veteran group implies that the referral for HMR is GP generated rather than led by patient demand. The time lag after the GP mail out for the mail out to veterans, the time it would take for a veteran to get an appointment to see their GP and the time delay in the referral of a veteran to a pharmacist for the review and the time taken by the pharmacist to organise the review and report back to the GP, was seven weeks which suggests if the increased rate of HMRs was driven by patient demand, the peak would have been further to the right of the graph.

To our knowledge, this is the first Australian study to demonstrate the effectiveness of unsolicited, mailed patient-specific prescriber feedback on influencing patterns of service delivery in General Practice Medicine. The intervention, on which this study reports, was the first in an ongoing series of interventions, on therapeutical topics relevant to the Australian veteran population, as part of the Australian Government's Department of Veterans' Affairs, Medicines Advice and Therapeutics Education Service (Veterans' MATES).

The key elements appear to have been the patient-specific feedback, in the form of a patient list to individual GPs, and the engagement of the patients through a mailed brochure encouraging them to discuss HMR with their doctor. Future analyses in the RPBS database and other related databases may be able to establish whether increased HMR rates translate into prescribing changes or changes to health service utilisation rates.

These results provide promise for this type of service as a practice management and quality improvement tool in the Australian health sector. Further research will establish whether these results translate to other areas of medication use and health service delivery.

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