

Identification of the reasons for medication returns

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ABSTRACT

Aim

To identify and quantify the reasons for unused medications returned to pharmacies.

Methods

Over a five-week period medications returned to two collection point pharmacies were analysed for medication types and quantities. Those returning the medications were asked to complete a questionnaire to indicate why the medications were not used.

Results

The main reason indicated was 'changed to other therapy' (37%). The second reason was 'passed expiry date' (28%).

There was one box of returns from an individual with a total calculated cost of over \$14,500. The most commonly returned item was simvastatin although half of the top 10 were 'prn' or 'as required' medications.

Conclusion

While a degree of medication wastage is unavoidable, the most reported reason was 'changed to other treatment'. As this often happens early in treatment therapy, prescribers may wish to prescribe a smaller amount when initiating a new therapy.

Keywords

Medication, wastage

(NZFP 2008; 35: 248–252)

Introduction

Medicine wastage has a huge impact worldwide, especially in monetary terms and studies have estimated this cost to be as high as NZD 9–11 billion per annum.¹ Along with the significant financial cost, there is also a growing recognition of the environmental impact of medication wastage.^{2,3} The objective of health care systems is to maximise health benefits for patients via optimal allocation of health care resources, while avoiding expenditure on wastage. However, factors such as poor compliance, discontinuation of medication, side effect intolerance, dosage changes and medications reaching expiry date have led to an ongoing issue of unused or expired medicines hoarding in some households.⁴ This

represents a lost opportunity to improve the health outcomes of the patients involved as well as a waste of health budget resources which could have otherwise been used to fund other much needed areas of health care.

We have previously reported the types and quantities of medications returned to pharmacies in the Otago region, and identified that many were 'stat' or all-at-once dispensed items.⁵ Addressing the issue of medication wastage requires an establishment of the reasons behind it. Four main reasons contributing to wastage identified in a Swedish study were passed expiry date, bereavement, improved condition/drugs no longer needed and change of medicines due to adverse drug reactions.⁶

A UK study found that change or stoppage of medicines was the main reason for non-usage of medicines. In addition, this study also noted that 66% of the cases involved medicines dispensed for more than a month's supply which may translate to the issue of 'stat' dispensing here in New Zealand.⁷

To develop appropriate waste reduction strategies it is first necessary to identify the reasons that these medications are not used in the New Zealand setting.

Methods

Medication collection

A medication return collection was advertised via posters and radio. Over a five-week period, medications re-

turned to two collection point pharmacies were collected and a questionnaire was completed to determine the reasons that the medications were not used (Appendix 1). All identifying information was removed as per the protocol approved by the Human Ethics committee at the University of Otago.

Medication quantification and analysis

A database was generated cataloguing the medications based on generic name, trade name, strength, form, quantity, subsidy amount, cost per unit, stat or non-stat, and therapeutic classification. The subsidy amount and cost per unit were taken from the New Zealand Pharmaceutical Schedule April 2007. This schedule dictates the amount that pharmacies are reimbursed for the medications dispensed based upon the brand and the strength dispensed. This allowed the cost of each medication returned to be calculated.

Results

Over the collection period there were 163 returns, comprising of 1399 items. Of these, 37 had no questionnaire completed. The other 126 returned questionnaires were analysed.

Medications returned

The items were identified both by number returned and cost. These results are shown in Table 1. Medications are listed by the generic name and the differing strengths available have been combined. Additionally if these medications are on the 'stat' list this is indicated by 's'. Simvastatin was the most frequently returned item and, with the exception of linezolid, was also the most costly. Sildenafil is included in the cost table because, despite generally being an NSS item, the patient returning it did not pay for this item and it was not being used for erectile dysfunction.

The total cost of the returned medications was \$23,590 but of this total \$14,596 was from a single individual. Removing linezolid (\$12,430) as it

Table 1. Ranking of generic items returned by (a) quantity and (b) cost.

Ranking	Generic name	Number returned	
1	Simvastatin	1498	S
2	Paracetamol + codeine tablets	1360	S
3	Calcium carbonate	1333	S
4	Docusate + sennosides	1045	S
5	Diclofenac sodium	820	S
6	Codeine phosphate	758	
7	Cilazapril	649	S
8	Omeprazole	593	S
9	Paracetamol	559	S
10	Metoprolol	557	S

Ranking	Generic name	Cost \$	
1	Linezolid	12 430	
2	Simvastatin	587	S
3	Omeprazole	476	S
4	Sildenafil	458	
5	Codeine phosphate	447	S
6	Cyclosporin	425	S
7	Sumatriptan succinate	281	
8	Budesonide	236	S
9	Ipratropium	195	S
10	Fluticasone	130	S

skews the data, leaves the remaining total cost of returns at \$11,160. This excludes professional service fees and patient co-payments. Figure 1 shows the relative cost percentage of the returned items, based on therapeutic classification (again linezolid is removed).

Questionnaire

The age of people returning medications is shown in Figure 2 and the reasons indicated for the non-use of medications is illustrated in Figure 3. The most commonly reported reason was 'changed to other treatment' (37%) and this could be further analysed as 'side effects of medications' (n=18), 'ineffective in treating condition' (n=15) and 'others' (n=14). The second most commonly reported reason was 'passed expiry date' (28%).

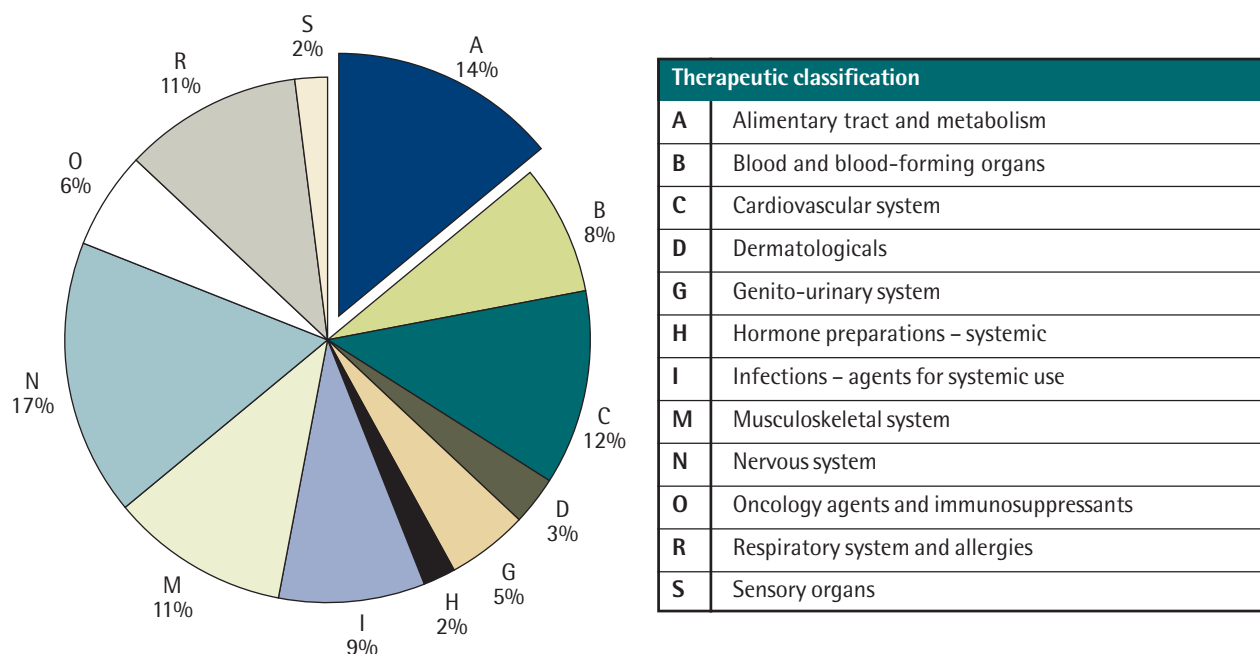
When asked about subsidy status, 40% had a community services card and also 40% did not know if they had any prescription subsidies (Figure 4).

When asked to estimate the cost of the returned medications the majority of respondents could not answer. Of people who did respond, the calculated cost versus estimated cost was calculated, but no meaningful pattern was observed.

Discussion

The most commonly returned item by number and the medication incurring most cost (with the exception of linezolid) was simvastatin (Table 1). This was also in the top five prescribed medications for New Zealand, according to Pharmac's 2007 Annual Report⁸ (the top five included paracetamol, aspirin, simvastatin,

Figure 1. Returns based on therapeutic classification



omeprazole and amoxycillin). Half of the most returned medications were those that are often prescribed on a 'prn' or as required basis. Furthermore, 'prn' medications include NSAIDs and analgesics that are usually dispensed 'stat' (i.e. three months' supply dispensed all at once). Hence, careful assessment of each patient's condition on a case by case basis is necessary to avoid over-prescribing the treatment supply of such drugs which may further precipitate wastage due to drug expiry.

Another high cost item returned was omeprazole. Even without a change in prescribing, this should change with the introduction of the generic versions and their significant cost reduction (i.e. Omeprazole 20mg: Losec is \$24.81 for 30 caps whereas Omezol is \$5.95 for 30 caps).

One bag had over \$14,500 worth of returned medications – 70 different medications. Classes of medicines returned by this individual ranged from immunosuppressants (cyclosporin), cardiovascular (frusemide, nadolol, glyceryl trinitrate, losartan), nervous system (amitriptyline, oxycodone, morphine) as well as various muscu-

loskeletal and diabetic medications. The most expensive medicine was linezolid which cost \$12,430 for the 113 returned tablets. This was removed from the analysis as it would have skewed the total medicine wastage analysis towards the cost of medications for infections. It was not clear why the patient ended up with more than 100 tablets of linezolid but the hospital was following this up. While this may be an extreme case that happened to occur during the collection phase, there is literature to suggest that 50% of returned medications are from 10% of the individuals.⁶

When looking at the percentage returned based on therapeutic classification (Figure 3), many mirror Pharmac's reported spending with the exception of two groups. Pharmac's 2007 annual report⁸ shows that the infection (I) group is responsible for 5% of dispensed medications whereas we found it to be 9% of returned medicines (excluding linezolid). Of greater interest is that 7% of the spending falls into the 'other' category which include medicines related to genito-urinary and musculoskeletal systems, sensory or-

gans, and special foods. Aggregated, these make up 19% of returns.

The completed questionnaires provide further information about why these medications were not used. The major reason for the medicines being returned was 'changed to other treatment' and 'passed expiry date'. This finding is consistent with other published studies.⁹ The finding of 'treatment change' is also important as the most likely time for changes in prescribed medications for a patient's condition is in the early phases of the treatment,¹⁰ and so it may be prudent not to dispense an entire three months' medications when treatment is being initiated. Pharmac have recently changed the close control rules to allow this. Expired medications however may not necessarily imply that the medication was not taken as prescribed. There is the possibility that patients 'misread' the label and interpret the dispensing date which is printed to be the expiry date. Additionally with 'prn' medications if a patient does not take all of the dispensed items then they may actually expire. This may be the case as Table 1 shows that many analgesic tablets are returned.

The majority of those returning medications fall within the 61–80 age range (Figure 2). This aligns with the Ministry of Health annual report¹¹ which shows increased spending on subsidised GP-prescribed pharmaceuticals with increasing age and may not necessarily indicate that this age group uses less of their prescribed medications.

A large number of patients have community services cards or other prescription subsidy cards. It may be possible that paying this reduced fee encourages individuals to collect medications even if they do not intend to use them. Interestingly 40% of respondents do not know if they have any subsidy cards or belong to a Primary Health Organisation (PHO).

Limitations

As the questionnaire was designed to investigate all the returned drugs in a bag instead of individual drugs, the reasons given may not be applicable to all the drugs in the bag. For instance in a bag of medicines, drug A might be unused due to its adverse effects on the patient while drug B due to its ineffectiveness. The questionnaire could not identify or differentiate the reason for each individual drug because people gave reasons of wastage for the whole bag. In addition, the person who returned the medicine may not be the person who used the medicine. So they could have been answering the questionnaire on behalf of the real owners of medicines returned hence the answers given could well be guessed. Moreover, there could have been patient information bias such as recall bias, incomplete questionnaires, vague answers and misinterpretation of the options given.

The small number of returned medications does somewhat limit the ability to generalise the results and allow comparison with other studies, but it gives a starting point on potential areas of focus. Additionally the amount of returned medications may be a significant underestimate of the extent of unused medications. A study conducted in the USA found that less

Figure 2. Age distribution of respondents

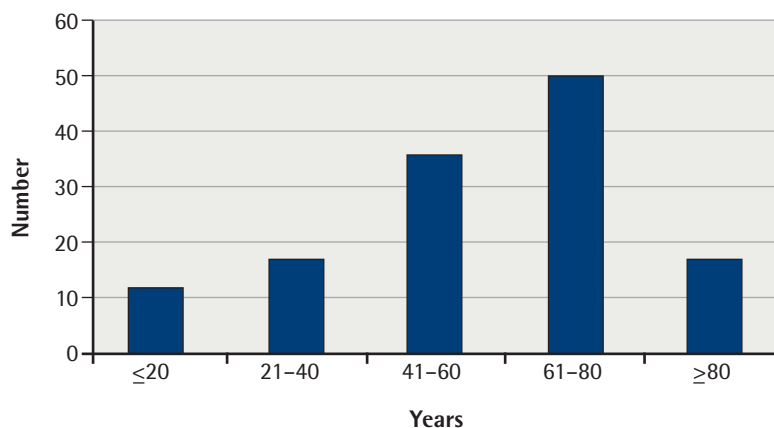
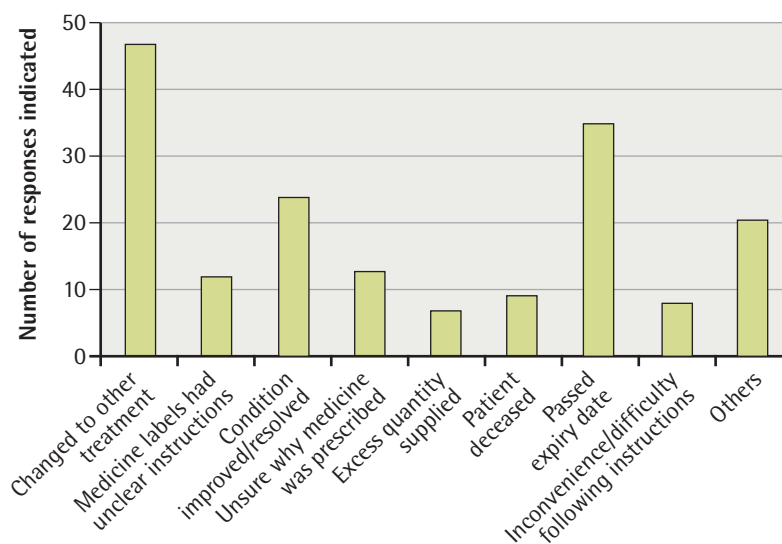
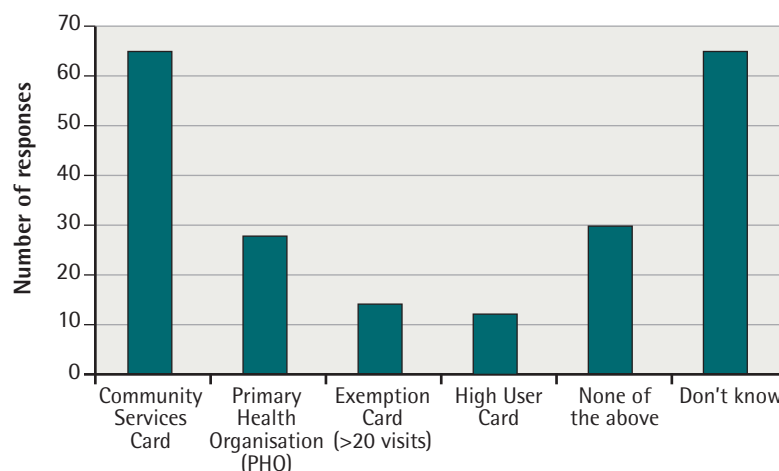


Figure 3. Reasons for unused medication



* Can choose more than one

Figure 4. Prescription subsidies



than 20% of those surveyed returned unused medication to a pharmacy, and that 54% added them to household waste and 35% disposed of them down the toilet or sink.¹²

Conclusion

While a degree of medication wastage is unavoidable due to compliance and other factors, the reasons for medication wastage and the types of medications need to be fully investigated to determine where this wastage can be minimised. This wastage has therapeutic, environmental and financial consequences.

As the main reason reported in this study for this wastage was 'changed to other treatment', prescribers may wish to consider monthly or 'trial prescribing' when initiating a new therapy. Additionally when prescribing a 'prn' medication, specifying a quantity rather than a period of supply may not only reduce the amount unused, but also allow the prescriber to more closely monitor the effectiveness of the chosen treatment.

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Competing interests

None declared.

Appendix 1



The School of Pharmacy (University of Otago) and New Zealand Pharmacy Education & Research Foundation are conducting a study to investigate why prescribed medicines are being disposed of.

Please answer the questions about the returned medicines. Answering the survey takes about three minutes. All information will be kept anonymous. This survey has obtained ethical approval and you can contact the researchers to request a copy of the results. Your time is much appreciated, thank you.

- What age group does the owner(s) of the medicine belong to?
(Tick more than one box if applicable)
☐ 20 or below ☐ 21–40 ☐ 41–60 ☐ 61–80 ☐ 81 or above
- Why was the medicine(s) not used? (Tick more than one box if applicable)

<input type="checkbox"/> Changed to other treatment	<input type="checkbox"/> Medicine labels had unclear instructions
<input type="checkbox"/> Condition improved/resolved	<input type="checkbox"/> Unsure why medicine was prescribed
<input type="checkbox"/> Excess quantity supplied	<input type="checkbox"/> Patient deceased
<input type="checkbox"/> Passed expiry date	
<input type="checkbox"/> Inconvenience/difficulty following instructions	
<input type="checkbox"/> Others (please specify):	
- If you ticked 'Changed to other treatment' in Question 2a, please answer this question, if not, please proceed to Question 3. Why was the medicine changed?
(Tick more than one box if applicable)

<input type="checkbox"/> Side effects of medicine	<input type="checkbox"/> Ineffective in treating condition
<input type="checkbox"/> Others (please specify):	
- Does the owner(s) of the medicine have/belong to?
(Tick more than one box if applicable)

<input type="checkbox"/> Community Services Card	<input type="checkbox"/> Primary Health Organisation (PHO)
<input type="checkbox"/> Exemption Card (> 20 visits)	<input type="checkbox"/> High User Card
<input type="checkbox"/> None of the above	
- What do you estimate the value of the returned medications to be (if there were no government subsidies)? (Tick one box)

<input type="checkbox"/> <\$10	<input type="checkbox"/> \$10–20	<input type="checkbox"/> \$21–50
<input type="checkbox"/> \$51–100	<input type="checkbox"/> \$101–200	<input type="checkbox"/> \$201 or above

Thank you for your participation!

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