

## Reminder packaging for improving adherence to self-administered long-term medications

**Review Question:** Does reminder packaging improve a person's adherence to self-administered long-term medications?

**Review Answer:** Reminder packaging has the potential to be a simple solution to issues related to incorrect medication usage, such as medication errors, low health literacy and forgetfulness.

### What is in this review?

#### *The Problem*

Medications are not taken as prescribed for a number of reasons: forgetfulness, poor health literacy, complex medication regimes and busy lifestyles. Approximately 40%-60% of people do not take medications properly, which may reduce medication effectiveness and affect clinical outcomes.

#### *The Intervention: What is reminder packaging?*

Reminder packaging has been highlighted as a strategy to improve medication adherence. Reminder packaging refers to the organisation of medications in a device.

These devices can come in many forms such as a pill box, bubble or blister pack, and guides users on the time and/or day a medication is to be taken. Such devices are more commonly used by people who face difficulties taking medications at home, such as the elderly.

#### *Main Findings*

The mean medication adherence among those using reminder packaging was 11% higher compared to those who did not use reminder packaging.

There is some evidence that use of reminder packaging can improve health related outcomes such as blood pressure and glycaemic level.

### Who is this summary for?

This evidence bulletin can be used by anyone making decisions surrounding how to improve medication adherence.

### What is a systematic review?

A systematic review aims to locate, appraise and synthesise all of the available evidence related to a specific research question. Authors adopt rigorous methods to minimise bias as a way of producing reliable findings with the ultimate goal of making the evidence more useful for practice.

### What does this Evidence Bulletin do?

This is a summary of a review by Mahtani and colleagues. It is published by the Cochrane Consumers and Communication Review Group.

It makes information found in this review more accessible and comprehensible to a broader audience.

### **Full citation for this review:**

[Mahtani KR, Heneghan CJ, Glasziou PP, Perera R. Reminder packaging for improving adherence to self administered long-term medications. \*Cochrane Database of Systematic Reviews\* 2011, Issue 9. Art. No.: CD005025.](#)

## Background

Adherence is described as the extent to which a person's behaviour matches recommendations of a healthcare professional. Several factors contribute to the likelihood of adherence: the condition being treated, the health system, the social and economic context and one's level of motivation. Adherence to medication involves taking the medication at the right time of day, at the right frequency, for the right duration of time.

Those who take medication for longer periods of time are more likely to take their medications incorrectly. Other factors that contribute to incorrect medicines use include forgetfulness, constantly changing medication schedules and a busy lifestyle. As a result, treatment benefits can be diluted and health outcomes can be compromised. There are also financial implications as a result of poor medication adherence, such as unused medication and increased health care utilisation as a result of illness. Reminder packaging has been identified as one strategy to improve one's unintentional medication non-adherence.

## Information about the review

This is an updated Cochrane systematic review by KR Mahtani, CJ Heneghan, PP Glasziou and R Perera. It was originally completed in 2006. This review was published in 2011.

### Population

People were included in the review if:

- They self-administer medication ('self-administer' refers to either giving medication to one's self or by a carer or family member);
  - Any type of medication is taken (including over the counter medications); and
  - Medications were taken for at least one month.
- No age limits were set.

### Intervention

Different forms of reminder packaging were used as the intervention in this review, such as pre-packaged blister packs and pill boxes. Blister packs are medicines prepared and pre-packaged under the supervision of a pharmacist and are sealed with foil. Other pre-packaged medications include single use containers with reminder systems. Pill boxes are usually prepared by the individual taking the medication or a carer/family member. Pill boxes usually have space for seven days of medication and contain different compartments for different days/times.

### Comparison

Reminder packaging devices were compared with no reminder packaging device.

### Outcomes

- Adherence (as measured by pill count and/or self reported adherence);
- Clinical outcomes: change in blood pressure, frequency of seizures, glycated haemoglobin levels (defined as the level of glucose in the blood over a long period of time);
- Effects on health service use (hospitalisation and readmission rates);
- Cost effectiveness of intervention; and
- Any harms, barriers to use and potential errors with use of reminder packaging.

## Methods

The following databases were searched: CENTRAL, DARE, MEDLINE, EMBASE, CINAHL and PsycINFO. The authors also searched the Internet and trials registers, contacted packaging companies and searched reference lists. Studies conducted in languages other than English were also included. The search date was up to September 2010.

Trials were *included* if:

- They were randomised controlled trials;
- They achieved more than 80% follow up;
- Results were not confounded; and
- The intervention was administered for at least one month.

Trials were *excluded* if:

- There was direct observation of medication adherence by a health professional; or
- The intervention was a multi-component intervention.

Where appropriate, data were combined for meta-analysis. Meta-analysis is the process of combining the numerical results of all included trials assessing a common outcome to produce an overall estimate.

## Main results

In total, 12 studies were included in this review, with 2196 participants. This updated review included an additional four studies. Of all included studies, ten were identified as having a high risk of bias.

- Six interventions in four studies showed that those using reminder packaging adhered to medication 11% more than those not using reminder packaging. In other words, there was an increase of 11 more pills taken out of 100. The 95% confidence interval shows that this result could lie anywhere between 6 to 17 more pills taken out of 100;
- Two studies showed that the mean diastolic blood pressure of those using reminder packaging was 5.89 mmHg lower compared to those who did not use reminder packaging. The 95% confidence interval shows

that this result could lie anywhere between a 6.70 to 5.09 mmHg reduction;

- Two studies showed that the glycated haemoglobin level was 0.72 HbA1c lower in those using reminder packaging compared to those who did not use reminder packaging. The 95% confidence interval shows that this

result could lie anywhere between a 0.83 to 0.60 Hb1Ac reduction; and

- Two studies reported on the costs associated with reminder packaging. The results of one study were non-significant and the other study identified the cost of using reminder packaging as US\$1.50 per week.

Outcome measured	Results (Confidence Interval)	Number of participants (studies)	Quality of the evidence (GRADE)#
Mean adherence (% of pills taken)	Mean increase of 11% (95% CI 6% to 17%)	772 (six interventions in four studies)	Low
Adherence (Self reported)	Non-significant reduction	339 (two studies)	Very low
Systolic blood pressure (mmHg)	Non-significant reduction	153 (two studies)	Very low
Diastolic blood pressure (mmHg)	The mean diastolic blood pressure in the intervention group was 5.89 mmHg lower (95% CI -6.70 mmHg to -5.09 mmHg)	153 (two studies)	Very low
Glycated haemoglobin levels (HbA1c)	Mean glycated haemoglobin level was 0.72% lower (95% CI -0.83% to -0.60%)	148 (two studies)	Very low

# For more information on the GRADE working group's rating of quality of evidence go to [www.gradeworkinggroup.org](http://www.gradeworkinggroup.org)

## Conclusions

The authors conclude that reminder packaging may be a simple method for improving adherence. There is some evidence that reminder packaging can also improve clinical outcomes such as diastolic blood pressure and glycated haemoglobin levels. These results should be interpreted with caution as the authors note that many of the studies included in this review were at a high risk of bias. They also note that there is a chance their review did not include all potential studies as some may not have been published. This could contribute to an over-estimation of the benefits of reminder packaging.

## What this review does not show

Overall, the authors indicate that there is insufficient evidence related to the costs of reminder packaging to health services and consumers, barriers to its use or patient satisfaction with this intervention. Insufficient information was

available to draw any conclusions about hospitalisation or re-admission rates. The authors also found a lack of evidence relevant to the elderly, which is interesting given that the elderly are frequent users of reminder packaging.

## Implications

Reminder packaging is potentially a simple solution to unintended medication non-adherence. While the authors call for further research in this area, they support the use of reminder packaging among certain populations. It was recognised that those with low literacy levels may find reminder packaging of particular use. There are several areas of further research that may help shed more light on the effectiveness of reminder packaging. These include: for which age groups and medical conditions reminder packaging are most effective; effectiveness of different types of reminder packaging and for different medications and schedules; and how cost effective different reminder packaging systems are.

### Health Knowledge Network

The Health Knowledge Network is the knowledge transfer function of the Centre for Health Communication and Participation. The Centre is funded by the Quality, Safety and Patient Experience Branch, Department of Health, Victoria, Australia.

The Health Knowledge Network summarises reviews published by the Cochrane Consumers and Communication Review Group.

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