

# Medication reconciliation is an essential role for the pharmacist

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## Abstract

Adverse drug events (ADEs) have been found to be a major cause of morbidity and mortality in healthcare systems around the world. More than 50% of ADEs are preventable, and have been demonstrated to be the result of an incomplete medication history, prescribing or dispensing error, and the over- or underuse of prescribed pharmacotherapy. The main aim of implementing medication reconciliation in a hospital setting is to avoid ADEs, a prevalent patient safety issue. Medication reconciliation is the process of creating the most accurate list possible of all medications a patient is taking, including drug name, dosage, frequency and route, and then comparing that list against the admission, transfer, and/or discharge orders. Medication reconciliation is one of World Health Organization's High 5s initiative to improve patient safety. The implementation of the International Standard Operating Procedure for Medication Reconciliation led to a 50% reduction in medication discrepancies in developed countries. Implementing the medication reconciliation in the hospitals of South Africa may reduce medication errors.

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## Introduction

An adverse drug event (ADE) is defined as an injury resulting from a medication intervention which is drug related.<sup>1</sup> ADEs have been found to be a major cause of morbidity and mortality in healthcare systems around the world.<sup>2,3</sup> ADEs from medicine use have been shown to be a significant cause of hospital readmissions, the increased cost of hospitalisation and increased morbidity in patients.<sup>4</sup>

Large proportions of ADEs have been attributed to poor communication between healthcare professionals, and often occur at the interface of care, i.e. when patients are transferred between wards or are discharged.<sup>3,5</sup> More than 50% of ADEs are preventable, and have been demonstrated to be the result of an incomplete medication history, a prescribing or dispensing error, and the over- or underuse of prescribed pharmacotherapy.<sup>6</sup> The ADE rate was revealed to be double that reported in studies carried out in developed countries<sup>4</sup> in a study conducted at the New Somerset Hospital in Cape Town, South Africa. Medication errors are defined as the process of ordering or delivering a medication which leads, or has the potential to lead, to harm to the patient. This can occur during any process of manufacturing or compounding, prescribing, transcribing (when relevant), dispensing, or through the administration of a drug to a patient.<sup>7</sup> More than 40% of medication errors occur as a result of inadequate reconciliation during the process of admission, transfer and discharge. A shocking 20% of these errors are alleged to result in harm to the patient.<sup>8</sup>

Medication reconciliation is the process of creating the most accurate list possible of all medications a patient is taking, including drug name, dosage, frequency and route, and then comparing that list against the admission, transfer, and/or discharge orders, while recognising any discrepancies and documenting any changes. This results in a complete list of medications which should be accurately communicated to the next provider of care.<sup>2,3,9</sup> Medication reconciliation is a strategy that is used to reduce medication discrepancies, and thereby decrease ADEs.<sup>10</sup> The aim of this consensus statement is to provide a reference on the use of a pharmacist-driven medicine reconciliation service during the admission, transfer and discharge of a patient.

## Strategies to reduce adverse drug events

### *The World Health Organization's High 5s initiative*

In 2006, the World Health Organisation (WHO) launched the High 5's project, utilizing the standard operating procedure that assures medication accuracy at transitions of care and with the ultimate goal to reduce medication discrepancies and improve patient safety. (WHO 2006).<sup>3</sup>

According to the High 5s initiative, each standard operating procedure targets a specific patient safety challenge, defines a standardised care process to address it, and prescribes an implementation plan which includes relevant measures and analytic procedures.

The High 5s initiative consists of five interventions:

- The prevention of patient care handover errors

- The prevention of wrong site and wrong procedure surgical errors
- The prevention of high-concentration drug errors
- The prevention of continuity-of-care medication errors via medication reconciliation
- The promotion of effective hand hygiene procedures.

These interventions serve to improve patient safety. Trials are performed around the world in various countries. Australia, Canada, Germany, the Netherlands, New Zealand, the UK and the USA joined the campaign in 2007. France, Saudi Arabia and Singapore have since joined the project. One of the interventions of the High 5s initiative is to improve the accuracy of medication at transitions of care through the use of medication reconciliation at various transitions in the healthcare system.<sup>5</sup>

## Medication reconciliation overview

### Main aim of medication reconciliation

The main aim of having medication reconciliation implemented in the hospital setting is to avoid ADEs which are becoming a prevalent patient safety issue. These events occur in 5-40% of hospitalised patients and in 12-17% of patients after hospital discharge.<sup>10</sup> This can prolong hospital stay, and may lead to emergency department visits, hospital readmission and the use of other healthcare resources in the post-discharge period. This places a strain on both the patient and the healthcare sector.

### Where should medication reconciliation take place?

Medication reconciliation should occur at transitions or interfaces of care, on admission, and during transfer between wards and at discharge, as these are the most vulnerable aspects of the healthcare process. Transitions between acute facilities and long-term facilities have also been demonstrated to be vulnerable, and place patients at high risk of medication discrepancies. Therefore, it is advisable to perform medication reconciliation at the different stages of the healthcare process. Medication reconciliation should not be limited to hospitalisation or to long-term care facilities. It should also be performed when patients visit their primary care provider.<sup>3,11</sup>

### Guiding principles for medication reconciliation

The following are principles to be followed when implementing medication reconciliation:

- A medication list which reflects the most recent pharmacotherapy for a patient is essential to ensure safe prescribing, regardless of the healthcare setting
- A formal process should be in place for medication reconciliation at interfaces of care
- Medication reconciliation performed on admission is the basis for the process performed throughout the episode of care
- The process should allow for shared accountability. Staff should be aware of their roles and responsibilities
- Medication reconciliation should be integrated into current institutional practices or medication management and patient flow
- Patients, their families or caregivers should be involved in the process of medication reconciliation

- Front-line staff members who perform medication reconciliation should be trained on how to develop a medication list and how to reconcile it.

### The medication reconciliation process

The pharmacist compares the medication brought from the patient's home, or by taking a medication history, with the medication list reflected on the in-patient medication chart and the discharge prescription.

The prescriptions should be evaluated for the following:

- New medication
- Discontinued medication
- Adjusted medication
- Unchanged medication to be continued
- Medication withheld in hospital
- New medication started on discharge
- Additional comments, as appropriate.<sup>12</sup>

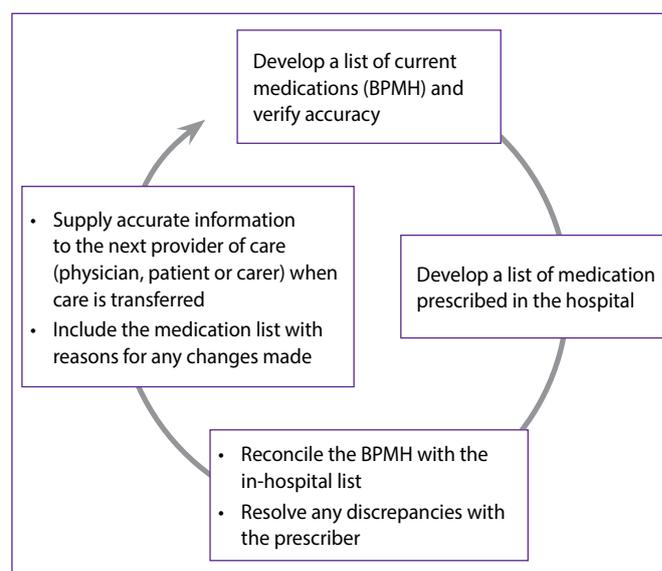
Discrepancies are defined as any unexplained documented change in the patient's medication list between sites. Unintentional discrepancies are defined as any omission, duplication or failure to revert to the original regimen, when indicated.<sup>13</sup>

Upon resolution of the discrepancies, the corrected version of the patient's prescription is known as a best possible medication plan, and should be communicated to the patient and his or her primary care physician.

Factors which affect medication reconciliation include, but are not limited to, staffing models, financial constraints, time constraints, the inability of patients to communicate during their hospital stay and the degree of the pharmacist's medication knowledge.<sup>12</sup>

### Medication reconciliation on admission

A best possible medication history (BPMH) is a medication history obtained by the healthcare professional which includes all



BPMH: best possible medical history

**Figure 1:** An overview of the medication reconciliation process on admission

medicines, including prescriptions and non-prescriptions which may be obtained from a variety of sources.<sup>8</sup> An overview of the medication reconciliation process on admission is provided in Figure 1.

The BPMH should reflect all of the following types of medication:

- All prescribed medicine
- All non-prescribed medicine, including over-the-counter medicine and herbal and traditional medicine
- All recreational or when-necessary medicine taken by the patient.

### How to obtain the best possible medical history

The BPMH differs from a routine medication history in that it is complete and takes into account all information available from the patient.<sup>3</sup>

The pharmacist may obtain the BPMH using the following sources:

- Patient and family interviews
- Medication vials and lists
- The government medication database, if available
- The community pharmacy profile
- Family physician records
- The patient medication list
- Previous healthcare records.

### When should the best possible medical history be taken?

Ideally, the BPMH should be taken within 24 hours of admission. However, if this is not possible, it should be noted that formal medication reconciliation is still of benefit, even if performed after the 24-hour window period.<sup>3</sup>

## Medication reconciliation at internal transfer

Medication orders are often changed at the interface of care. Therefore, it is imperative that medication reconciliation occurs at this interface.

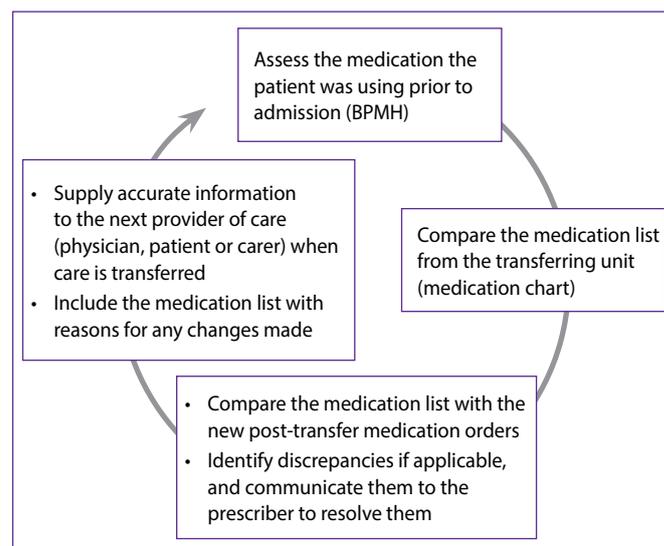
Internal transfer may be defined as:

- A change in the responsible medical service
- A change in the level of care (intensive care unit to ward, or vice versa)
- A postoperative transfer
- An internal transfer between the unit and ward.

The aim of performing medication reconciliation at internal transfer is to ensure that the patient's medication is appropriate to the new status of the patient.<sup>3</sup> This process is depicted in Figure 2.

## Reconciliation at discharge

Discharge from a hospital setting is a critical interface, at which patients are at high risk of medication discrepancies. The goal of medication reconciliation at hospital discharge is to compare the BPMH, in-hospital prescription and post-hospital prescriptions, and to formulate the best possible medication discharge plan (BPMDDP). This should prevent omissions, duplications and confusion. An overview of the whole process is provided in Figure 3.



BPMH: best possible medical history

**Figure 2:** Medical reconciliation process at internal transfer

The BPMDDP is formulated by evaluating:

- Adjusted medication
- Discontinued medication
- Medication withheld during hospitalisation
- New medication started at the point of discharge
- New medication initiated during the hospital stay
- Unchanged medication to be continued following discharge
- Additional comments on herbal, traditional or when-necessary medication to be used at the patient's discretion.<sup>3</sup>

## Who should be involved in medication reconciliation

### Healthcare professionals

It has been documented that hospital pharmacists are uniquely suited to perform medication reconciliation as a result of their education and expertise. Their involvement may result in more accurate reconciliation.<sup>14</sup>

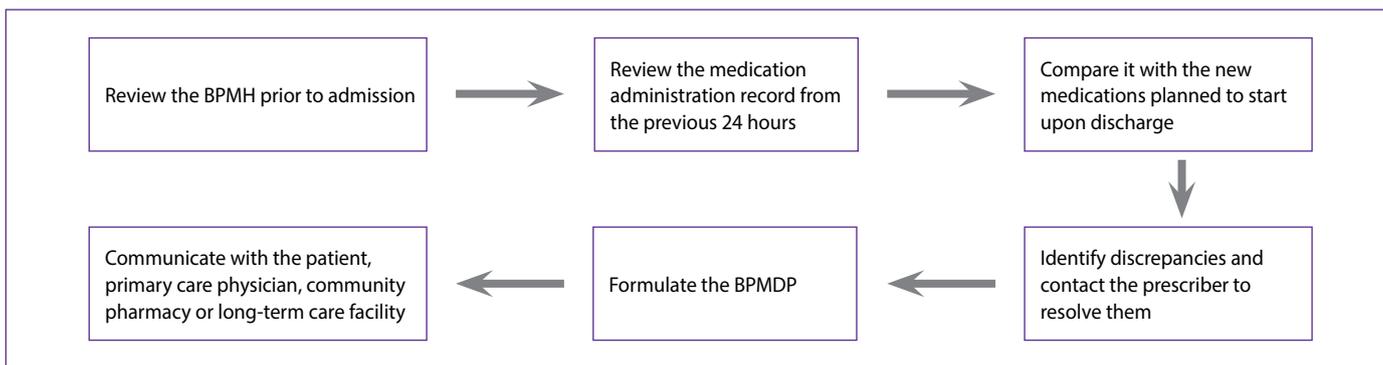
In addition, it has been demonstrated that a pharmacist-led medication reconciliation service yielded the largest benefits, while being the most cost effective, when quality-adjusted life year value was taken into consideration.<sup>14</sup>

### Patients

It has been demonstrated that the process of medication reconciliation is more efficient and effective if patients and their families are involved. As patients move through the healthcare system, they encounter numerous healthcare professionals. As such, they remain the only constant in the process. Patients and their families are central in this regard as they are able to provide medication lists, access to medication containers and advise on the patient's medication-taking practices.<sup>3</sup>

The medication reconciliation interview provides a unique opportunity for the healthcare professional to educate patients on:

- Keeping an up-to-date list of their medication and providing



BPMH: best possible medical history, BPMDP: best possible medication discharge plan

**Figure 3:** An overview of medication reconciliation at discharge

the same to the healthcare provider at primary (general practitioner, pharmacist or nurse) and secondary care level (hospital admission)

- Informing the healthcare provider if it is believed that a mistake has been made.

This may be achieved by the use of patient tools or education materials to ensure patient-directed maintenance of the medication list. The types of patient education materials which may be adopted and used to support medication reconciliation are listed in Table I.

Table I: Types of patient education materials	
Patient education materials	Tools to support the maintenance of medication lists
Posters	Medication list templates
Brochures	Medication list applications
Newsletters	Web-based, patient-accessible records or charts
Videos	Self-service automated medication history kiosks
Medication bags	Community pharmacy-based medication review programmes
Information sheets	Medication reconciliation research

## Common barriers to the implementation of medication reconciliation

The lack of established best practice and clear ownership with regard to medication reconciliation is a significant barrier to its implementation.<sup>11</sup>

Patients are required to present a standardised medication list on admission. However, usability, perceived value and portability are barriers to the adoption of a medication list.<sup>1,2</sup> The use of non-formulary medication and communication failure between healthcare professionals has been found to be an additional barrier.<sup>1</sup>

The patient's literacy, the possibility of a language barrier and cultural factors should be assessed as these may further complicate the communication process; fundamental to successful medication reconciliation.<sup>2</sup>

Access to a fully integrated, patient record information technology system has been highlighted as an important tool for performing medication reconciliation. This type of system would provide a medical record throughout the continuum of care, i.e. during the hospital stay, at community level and at long-term care facilities.<sup>11</sup> The lack of such a system, as is the case in South Africa, represents a further barrier to effective medication reconciliation.

## Improvements due to medication reconciliation

The implementation of the International Standard Operating Procedure for Medication Reconciliation in Canada led to a 50% reduction in medication discrepancies.<sup>5</sup> According to the Joint Commission on the Accreditation of Healthcare Organizations<sup>15</sup> in the USA, the percentage of noncompliant hospitals with the medication reconciliation goal on admission is 4%, and rises to 8% for patients being transferred and discharged. Eighty-two of the respondents in a recent survey of over 1 400 practitioners indicated that medication reconciliation was of great value and importance to patient safety.

## High-risk patients

It has been established that elderly patients (> 65 years of age) are at higher risk of ADEs as a result of medication errors than patients in other age groups. This has been attributed to multiple co-morbidities, polypharmacy, decreased organ function and cognitive impairment.<sup>16</sup>

In addition, high-risk patients have been defined as those who use more than four prescription medicines, are hospitalised frequently, have chronic diseases for which frequent therapy changes are required, and those who are prescribed a large amount of in-hospital medication.<sup>14</sup>

## High-risk medicine

The following classes of drugs have been identified as high risk for potential drug errors. Therefore, when performing medication reconciliation, the focus should be on these drug classes.<sup>1</sup> An overview of the different classes of high-risk medication is provided in Table II.

**Table II:** Different classes of high-risk medication

Anticoagulants
Anticonvulsant drugs
Cardiovascular agents
Diuretics
Corticosteroids
Hypoglycaemics
Opioids
Psychoactive drugs

## Designing a hospital-based medication reconciliation programme

The approach should encompass all disciplines involved in the medication management process, e.g. nurses, pharmacists and other appropriate personnel. This should include, but not be limited to ambulatory, retail or community settings, inpatients and patient or family representatives.

The programme requires support from the institutional management team to guide the multidisciplinary team and overcome obstacles to the implementation of processes.

Each team member should have clearly defined roles and responsibilities to ensure the success of the programme.

The individual needs of the patient should be assessed and thereafter addressed. Special needs, as referred to previously, include but are not limited to, developmental stage, age, language or literacy level of the patient and/or his or her family or caregivers.

The process should be measured via the use of adherence to process steps and outcomes measures, e.g. a change in the number of ADEs, the number of ADEs prevented, and readmissions to hospital and emergency department visits, if applicable.

Process improvement should be guided by continuous feedback systems built into the process.

## Practical tips for performing medication reconciliation

The basis of effective medication reconciliation is the development, maintenance and communication of a complete and accurate medication list throughout the continuum of care.<sup>17</sup> This checklist (Table III) helps healthcare professionals to compile an accurate and precise medication reconciliation list.

## Conclusion

Medication reconciliation has been performed in many countries all over the world as part of the duties of the clinical pharmacist, and has been demonstrated to drastically improve medication safety. The healthcare system is severely constrained in South Africa, and does not permit lengthy patient-doctor discussions. Thus, medication reconciliation has the potential to bridge the communication gap between the healthcare team and the patient.

**Table III:** Checklist for accurate medication reconciliation

Checklist for medication reconciliation	Check (✓)
Attain the patient's past medical history, and gather as much information as possible on other co-morbid conditions and medication vials or lists prior to the interview with the patient	
Enquire about non-prescription categories, including over-the-counter drugs, vitamins, recreational drugs, and herbal and traditional medicine	
Ask questions on unique dosage forms, such as eyedrops, inhalers, patches and sprays	
Ask the patient about his or her medication-taking practices. (Do not make assumptions that patients follow dosing instructions as per the list or as per the label on the medicine container))	
Use open-ended questions, such as: "How do you take this medicine?", and "Are you on treatment for any chronic conditions?"	
Mention medical conditions listed on the patient's chart as a trigger for the patient to provide information on the treatment that he or she is taking for a specific condition	
Verify accuracy, if possible, through prescription charts and medical files, or interview care workers or family members	
Use a systematic process or interview guide, e.g. the BMPH, using an interview sheet which contains the efficient order and optimal phrasing of questions	

BMPH: best possible medical history

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