

**Why you should read this article:**

- To recognise the reasons why medicines-related harm remains an issue
- To refresh your knowledge of the aims of medicines optimisation
- To identify potential strategies that you could use in your area of practice to reduce the risk of medicines-related harm

# Using nurse-led patient monitoring to avoid medicines-related harm

Sue Jordan, Vera Logan, Adam Turner et al

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**Abstract**

Effective medicines optimisation involves the use of medicines to control disease while ensuring that adverse effects are kept to a minimum. However, medicines-related harm and symptom mismanagement represent significant risks to patients, particularly those with long-term conditions. These risks are accentuated by inadequate patient monitoring, with some nurses and other healthcare professionals being unaware of their responsibility to monitor patients and avoid medicines-related harm. This article explores strategies that will enable nurses to take an increasingly active role in medicines optimisation.

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**Keywords**

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Across all healthcare settings it has been estimated that 6% of patients will experience preventable harm, with medicines responsible in 25% of these cases (Panagioti et al 2019). Medicines are the primary treatment strategy for most patients and can have significant benefits. However, medicines can also have negative effects when they are ineffectively monitored, increasing the risk of medicines-related harm such as adverse drug reactions, which are defined as noxious and unintended responses to pharmacotherapy (European Union 2010).

Most adverse drug reactions are due to known side effects and are predictable, dose-dependent and potentially preventable (Aronson 2012). In this context, a side effect is defined as a dose-related, therapeutically unrelated adverse drug reaction (Edwards and Aronson 2000). Healthcare professionals, including nurses, also need to consider the consequences of adverse drug events (World Health Organization (WHO) 2017), which include subtherapeutic effects of a treatment (where doses of medicines do

not achieve the required therapeutic response), drug dependence, intoxication and untreated symptoms (Gyllenstein et al 2013).

Globally, adverse drug reactions affect one in six older hospitalised patients (Jennings et al 2020). This figure rises to 85% among older hospitalised patients with dementia, and of these cases more than 50% of the adverse drug reactions involved are preventable, while 60% are at least partly due to the administration of psychotropic medicines (Sakiris et al 2021).

In the UK, it has been identified that adverse drug reactions are responsible for between 5% and 8% of unplanned hospital admissions (National Institute for Health and Care Excellence (NICE) 2015a), rising to almost 9% in older people (Oscanoa et al 2017). In addition, adverse drug reactions that are attributable to error are estimated to cost the NHS £98.5 million per year, causing 712 deaths directly and contributing to another 1,708 deaths (Elliott et al 2018).

Among patients aged 70 years and over, the prevalence of adverse drug reactions may be as

high as 78%, including dizziness, unsteadiness, nocturia, constipation, fatigue and muscle pain (Cahir et al 2019). The burdens of medicines-related harm, polypharmacy (a patient routinely taking four or more medicines at the same time (WHO 2017)), and suboptimal prescribing also disproportionately affect older people and those from low socioeconomic backgrounds, with a higher level of preventable unplanned admissions in these populations compared with the general public (Payne et al 2013).

Increasing quantities of medicines are prescribed each year. For example, in England 1.12 billion prescription items were dispensed in the community during 2019, an increase of around 1% from 2018 (NHS Business Services Authority 2020).

### Medicines optimisation

Medicines optimisation is a multidisciplinary and patient-focused approach to achieving optimal patient outcomes from the use of medicines. It is an extension of medicines management, which focuses on the administration of medicines rather than their effects on patients (Royal Pharmaceutical Society (RPS) 2013, NICE 2015a). Medicines optimisation involves patients being monitored for any clinical changes that may be linked to medicines, and this information being shared among the multidisciplinary team (Jordan et al 2021). This shift in emphasis from medicines management to the patient-focused outcomes of medicines optimisation means increased engagement in pharmacotherapeutics for all healthcare professionals, including nurses; for example, medicines optimisation entails taking time to monitor the effects of medicines on patients (RPS 2013).

The Nursing and Midwifery Council (NMC), the RPS and Royal College of Nursing (RCN) all expect nurses to ensure patient safety and demonstrate competence in relation to medicines use, with the NMC (2018) stating that nurses should 'recognise and respond to adverse or abnormal reactions to medications'. This expectation reflects medicines optimisation policy documents from NHS England and NHS

Improvement (2019), the Care Quality Commission (CQC) (2019), and nurses' regulatory bodies globally, for example the Australian Nursing and Midwifery Federation (2013). However, none of these documents specify how adverse drug reactions are to be identified, or by whom.

### Persistent medicines-related harm

Despite recommendations aimed at promoting medicines optimisation, medicines-related harm persists among patients. Risk minimisation measures – such as laboratory monitoring and education for patients and healthcare professionals – have not achieved their full potential (Yasuoka et al 2019). Electronic prescribing initiatives and decision support programmes have been shown to improve prescribing, but there is little evidence that they improve clinical outcomes (Monteiro et al 2019) or prevent adverse drug reactions (O'Mahony et al 2020). For example, Rieckert et al (2020) undertook a large trial that used an electronic decision support tool to reduce polypharmacy in people aged 75 years and over with chronic diseases. The researchers reported fewer hospital admissions in the intervention group but a small increase in falls and fractures compared with the control group.

Cautionary advice has been provided for prescribers in relation to various medicines, such as the recommendation by the Department of Health and Social Care to reduce the use of antipsychotics in people with dementia (Banerjee 2009). However, some medicines continue to result in persistent medicines-related harm. For example, in one study examining patients attending emergency departments, 85% of older patients who had fallen had been prescribed hypnotic medicines (Díaz-Gutiérrez et al 2018). Another study found that when being discharged from hospital, 20% of older people were prescribed at least one potentially inappropriate medicine (Parekh et al 2019), with the benefits of such medicines often outweighed by the risks of adverse drug reactions (American Geriatrics Society 2019).

### Finding solutions to medicines-related harm

The WHO (2019) has suggested that medicines safety will not improve without a redesign of healthcare services and the implementation of processes that will enable healthcare professionals to manage their workloads in response to increasing prescribing levels. For example, the ongoing WHO (2017) campaign Global Patient Safety Challenge: Medication Without Harm seeks to develop systems for medicines management that would halve avoidable medicine-related harm by 2022. Both the RPS (2013) medicines optimisation guidance and the WHO's (2017) proposed approach emphasise the importance of monitoring the effects of medicines on patients' outcomes and experiences.

### Monitoring patients for avoidable medicines-related harm

Monitoring patients is integral to medicines administration because it can enable potential medicines-related harms to be identified. For example, it is important to check the patient's pulse before administering digoxin, since this medicine can lead to life-threatening arrhythmias (Huynh et al 2016). Nurses have a crucial role in monitoring patients for adverse drug reactions. Figure 1 shows nurses' primary roles in medicines management and the areas where adverse drug reactions are most likely to occur (WHO 2017). These areas include high-risk situations such as acute clinical episodes, polypharmacy, and transitions in care such as when a patient moves between hospital and their home or care home.

In one study of healthcare professionals including 4,888 nurses across 17 European countries, most nurses (69%) reported monitoring patients for therapeutic or adverse effects of medicines in the past month (De Baetselier et al 2020). However, in the UK there have been reports of patients being seriously harmed when well-known adverse effects of long-term medicines were not observed and reported. For example, following deaths attributed to the antipsychotic medicine clozapine, two coroners wrote to England's secretary of

state for health and social care in 2018 stating that many staff were unaware of the medicine's potential side effects and warning signs for deterioration (Dyer 2018).

### Undertaking medication reviews

Iatrogenic harm refers to harm caused inadvertently during treatment, and is usually due to systems failures rather than the culpability of individual healthcare staff (Larouzee and Le Coze 2020). One strategy for reducing adverse drug reactions is a medication review, which usually involves prescribers or pharmacists undertaking a structured evaluation of a patient's medicines with the aim of optimising medicines use and improving health outcomes (WHO 2019). However, the form, quality and effectiveness of medication reviews vary (NICE 2015a), and they also do not require patient input (WHO 2019). In addition, despite advances in medicines management, the medicines of some patients in long-term care are only checked annually, which is the minimum requirement (NICE 2015b). Prescribers may also be reluctant to follow recommendations, citing an insufficient number of staff to monitor the effects of medicines and perceived resistance from care home staff or family members (Paque et al 2019, Disalvo et al 2020). For example, in one Finnish study of older people in care homes, deprescribing was recommended but not implemented in 50% of cases (Toivo et al 2019).

While pharmacist-led medication reviews have been shown to improve prescribing practice (Hill-Taylor et al 2016, Rankin et al 2018), one systematic review of 31 clinical trials found minimal evidence that medication reviews improved patient outcomes (Huiskes et al 2017). However, Gray et al's (2017) meta-analysis of 13 trials involving 6,198 older patients indicated that medication reviews reduced the risk of patients experiencing adverse drug reactions.

### Assessing the appropriateness of medicines

The prescribing of potentially inappropriate medicines is

associated with adverse drug reactions, hospital admissions (Xing et al 2019), emergency department attendances, functional decline and deteriorating quality of life (Liew et al 2019). Examples of potentially inappropriate medicines include those that should be avoided in older people, such as the sedative zolpidem tartrate, which is not recommended in older people because of the increased risk of protracted sedation and ataxia (condition that affects coordination and balance) (American Geriatrics Society 2019).

Improved prescribing procedures do not necessarily improve patient outcomes or well-being. For example, if used alone, the approach of checking the patient's prescriptions against a list of high-risk medicines does not take into account the patient's clinical condition. Detailed decision tools such as the STOPP-START medication review tool (Moody et al 2017), require more extensive clinical information than that available on medicines charts and laboratory reports, for example vital signs or falls history (Carvalho et al 2019). However, such tools do not identify patient-specific signs and symptoms such as anorexia, weight changes, dehydration or suboptimal oral health, all of which can affect

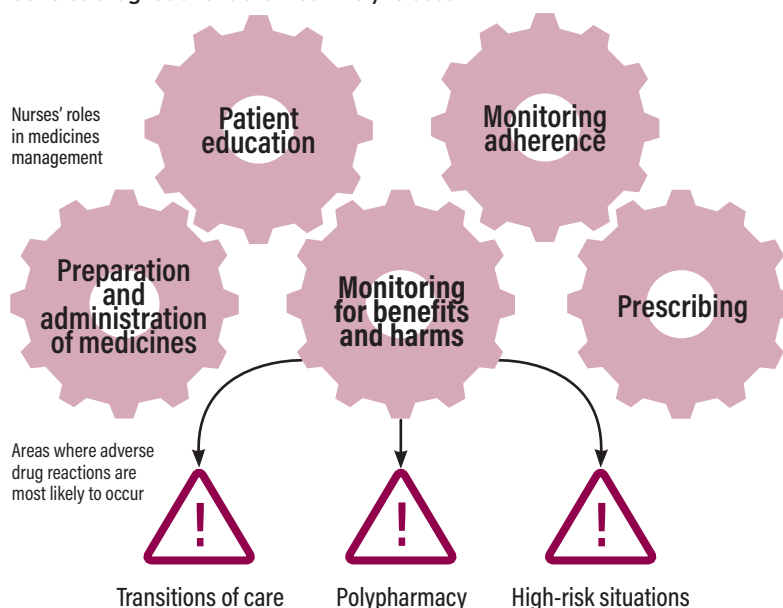
## Key points

- Most adverse drug reactions are due to known side effects, and are predictable, dose-dependent and potentially preventable
- The shift from medicines management to the patient-focused outcomes of medicines optimisation means increased engagement in pharmacotherapeutics for all healthcare professionals, including nurses
- Despite the recommendations aimed at promoting medicines optimisation, medicines-related harm persists among patients
- Potential strategies for reducing medicines-related harm include monitoring patients, structured multidisciplinary working, patient involvement and promoting a nurse-led approach

patients' well-being. In addition, there is no evidence that such tools improve patients' quality of life (Hill-Taylor et al 2016, Huiskes et al 2017).

**Structured multidisciplinary working and patient involvement**  
Prioritising medicines optimisation is crucial to patient safety (RCN 2020). However, it has been identified that despite the publication of numerous policy

**Figure 1.** Nurses' primary roles in medicines management and the areas where adverse drug reactions are most likely to occur



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documents, some nurses and doctors still consider monitoring the effects of medicines to be the role of another professional group (Jordan 2002, RPS and RCN 2019, De Baetselier et al 2020).

Multidisciplinary collaboration can result in individualised care, careful monitoring of outcomes, and increasingly frequent reviews of medicines and adherence (RPS 2013). The NHS (2021) has indicated that a structured medication review should take prescribers at least 30 minutes. A structured, multifaceted and multidisciplinary medication review would mitigate the risk of medicines-related harm, notably in community care, where the lack of patient safety interventions is most acute (WHO 2019). However, existing interventions aimed at meeting the WHO's (2017) Global Patient Safety Challenge focus on high-risk medicines and single-profession initiatives such as laboratory monitoring (Peek et al 2020), rather than increased patient involvement in medicines optimisation and measures aimed at reducing and monitoring polypharmacy (Garfield et al 2020).

The General Medical Council (2021) advises doctors that whether they are prescribing repeat prescriptions or on a 'one-off' basis, they must make sure that 'suitable arrangements are in place for monitoring, follow-up and review', and that 'any repeat prescription you sign is safe and appropriate'. However, the CQC (2019) reported

that some patients who were prescribed high-dose antipsychotic medicines, for example, 'were not monitored because there were no systems to support the process' and professional responsibilities were not defined.

### Promoting a nurse-led approach

The adverse drug reaction profile (ADRe) is a monitoring system that is designed to complement medication reviews (Swansea University 2021). The ADRe enables nurses or carers to collaborate with patients to check through a structured list of signs and symptoms that are related to the patient's prescription medicines, before sharing any findings with pharmacists and prescribers. This enables any links between the patient's signs and symptoms, and the known adverse effects of specific medicines to be identified. There are four main sections of the ADRe documentation, which prompt nurses to (Jordan et al 2021):

- » Observe the patient's vital and physical signs.
- » Review the patient's symptoms, medicines intake and adherence to treatment.
- » Seek to understand the patient's perspective.
- » Review any prescribed or over-the-counter medicines, and any laboratory tests the patient has undergone.

Figure 2 describes the stages of the ADRe and its practical application.

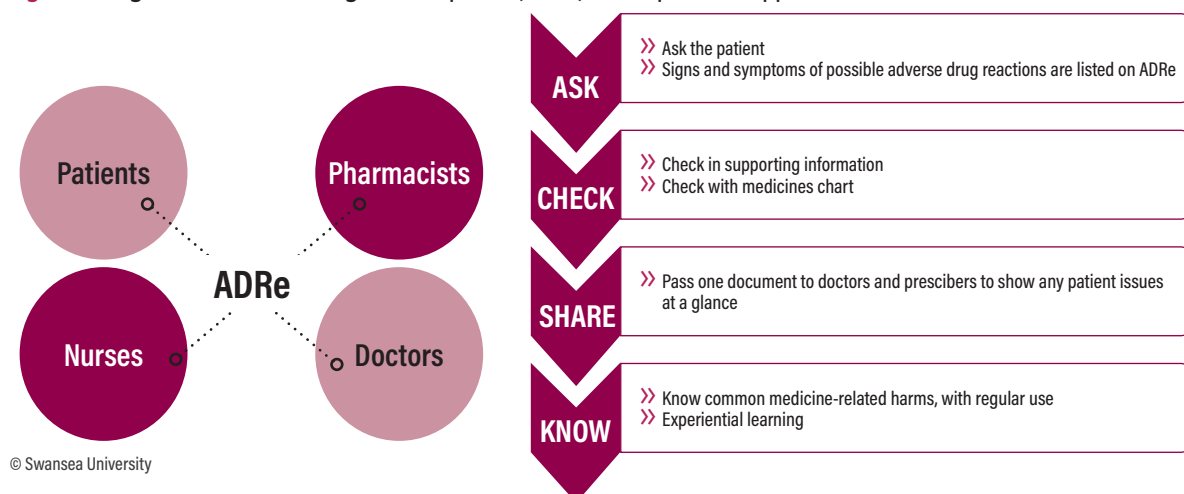
By ensuring that the members of the multidisciplinary team

who are involved in the patient's medication review have access to comprehensive patient information, the ADRe assists in identifying and addressing a variety of symptoms of medicines-related harm – including pain, sedation, agitation, nausea, stiffness, breathing difficulties, dizziness and suboptimal eyesight – that are otherwise easily overlooked, particularly in patients with communication challenges (Jordan et al 2002, 2015, 2019, 2021). The results of the ADRe can also be used as a basis for discussing possible prescription changes with pharmacists and prescribers. Table 1 provides some examples of case reports where medicines-related harm was identified and resolved using the ADRe.

The time that nurses spend monitoring patients using a structured approach such as the ADRe can be regained by reduced care demands; for example, when antipsychotics are deprescribed, patients may become calmer and less aggressive (Jordan et al 2019, NHS 2021). One Belgian study showed that nurses' enhanced involvement in monitoring for adverse drug reactions resulted in planned medicine changes for 21% of nursing home residents (Dilles et al 2013).

Medicines-related harms may present as subtle symptoms that require attention before they escalate. Structured patient monitoring enables nurses and carers to identify issues and discuss medicines optimisation measures

**Figure 2. Stages of the adverse drug reaction profile (ADRe) and its practical application**



**Table 1. Case reports where medicines-related harm was identified and resolved using the adverse drug reaction profile (ADRe)**

These case reports detail clinical episodes where nurses or carers used the ADRe to check for potential medicines-related harm, and shared the results with other members of the multidisciplinary team. Further details can be found in the referenced publications.

Clinical area	Patient description	Issues identified	Action	Reference
Care home	<ul style="list-style-type: none"> <li>» Male</li> <li>» Aged over 80 years</li> <li>» Dementia and suboptimal communication</li> </ul>	<ul style="list-style-type: none"> <li>» Falls</li> </ul>	<ul style="list-style-type: none"> <li>» The pharmacist discontinued the patient's zopiclone and promethazine hydrochloride, since these are known to contribute to falls</li> <li>» The patient's dose of aripiprazole was halved and it was administered at night to reduce the risk of faints, stiffness and issues with vision</li> </ul>	Jordan et al (2021)
Care home	<ul style="list-style-type: none"> <li>» Male</li> <li>» Aged over 60 years</li> <li>» Severe stroke, confined to wheelchair and with impaired speech</li> </ul>	<ul style="list-style-type: none"> <li>» Seizures</li> <li>» Diarrhoea</li> <li>» Frustration</li> </ul>	<ul style="list-style-type: none"> <li>» Laxatives that had been administered 'as required' were discontinued</li> <li>» It was noted that the patient was experiencing dental pain, and a tooth extraction was arranged</li> </ul>	Jordan et al (2021)
Care home	<ul style="list-style-type: none"> <li>» Female aged over 80 years</li> <li>» Dementia</li> </ul>	<ul style="list-style-type: none"> <li>» Restlessness</li> <li>» Irritability</li> </ul>	<ul style="list-style-type: none"> <li>» In response to the nurses' documentation, the psychiatrist changed the patient's haloperidol prescription to 'as required'</li> </ul>	Jordan et al (2019)
Care home	<ul style="list-style-type: none"> <li>» Male</li> <li>» Aged over 60 years</li> <li>» Traumatic brain injury and alcohol dependence</li> </ul>	<ul style="list-style-type: none"> <li>» Tremor</li> <li>» Aggression</li> <li>» Violence</li> <li>» Irritability</li> </ul>	<ul style="list-style-type: none"> <li>» In response to the nurses' documentation, the psychiatrist reduced the patient's risperidone dose</li> <li>» The patient subsequently became calmer and increasingly amenable to care</li> </ul>	Jordan et al (2015)
Community mental health setting	<ul style="list-style-type: none"> <li>» Male</li> <li>» Aged over 50 years</li> <li>» Schizoaffective disorder</li> </ul>	<ul style="list-style-type: none"> <li>» Pancreatitis, including: <ul style="list-style-type: none"> <li>— Severe abdominal pains</li> <li>— Tachycardia</li> <li>— Tremor</li> <li>— Hypertension</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>» After the nurse discussed the patient with the medical consultant, semisodium valproate was recognised as the cause of pancreatitis and discontinued</li> <li>» The patient was subsequently pain-free and calmer</li> </ul>	Jones et al (2016)

such as deprescribing with other members of the multidisciplinary team, while ensuring that patients and carers have a 'voice' in any medicines-optimisation decisions. This person-centred, shared decision-making should also explore the balance between symptom relief and medicines-related harms; for example, the pain relief provided by ibuprofen should be measured

against the potentially negative long-term effects on patients' kidney function and cardiovascular health (RPS 2013).

## Conclusion

Many healthcare professionals, including nurses, are often unclear about their responsibility to monitor patients for medicines-related harms. In addition, while prescribed

medicines are often used to manage serious long-term conditions, their potential for harm is often not fully acknowledged. To ensure medicines optimisation, nurses should be involved in monitoring patients' signs and symptoms using a structured checklist such as the ADRe to identify and address any medicines-related harms.

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