

Quality use of  
medicines alert

WRONG ROUTE ADMINISTRATION OF  
ORAL LIQUID MEDICINES

<b>Attention</b>	Chief executive officers (CEOs), directors of medical services, doctors, nurses and pharmacists		
<b>Alert</b>	ORAL LIQUID MEDICINES administered via the WRONG ROUTE can be FATAL or cause SERIOUS HARM		
<b>Date</b>	February 2008	<b>Issue</b>	Vol.1. No.1
<b>Further information</b>	<a href="http://www.health.vic.gov.au/vmac/projects/hrm.htm">www.health.vic.gov.au/vmac/projects/hrm.htm</a>		

**Case studies**

**How oral medicines administered via the wrong route can be fatal or cause serious harm**

**Australian case examples**

An order for oral liquid potassium chloride (KCl) was drawn up in a syringe to be given to a patient via an enteral feeding tube. IV medications were also drawn up in syringes and taken to the patient's bedside in the same kidney dish. Two nurses prepared and checked this patient's medication. The second nurse was called away. The nurse attending the patient proceeded to give the oral KCl through the IV line instead of the feeding tube. The patient required resuscitation and spent five days in the intensive care unit.<sup>2</sup>

A woman with a medical history of epilepsy was hospitalised and commenced on IV fluids for gastrointestinal complications. A jejunostomy was performed to facilitate feeding and administration of oral medications including oral liquid phenytoin. Complications developed and the patient was commenced on total parenteral nutrition.

**Introduction**

Critical incidents have occurred when oral liquid medicines have been administered via both the intravenous (IV) and subcutaneous (SC) routes.

**Error – an example**

A dose of a liquid medicine intended for oral administration was measured using an IV syringe and inadvertently administered via the IV route.

**Contributing factors**

- Devices designed specifically for accurate measurement of doses of oral liquid medicines may not be readily available on the ward.
- Syringes used to prepare oral liquid medicines are easily connected to access devices for other routes of administration, for example, IV cannulas, IV tubing.
- Multiple formulations of the same drug are available for different routes of administration.
- Interruptions may occur between preparing a dose and administering it to a patient.
- Patients may have nasogastric (NG) and IV lines running simultaneously.
- Oral and IV medications are transported to the patient's bedside in the same container.

**Recommendations**

1. Identify devices for measuring oral liquid doses as 'oral dispensers' not oral syringes.
2. Oral dispensers should:
  - be clearly distinguished from IV syringes by colour and shape
  - be clearly labelled for ORAL/ENTERAL USE ONLY
  - not be able to be connected to IV access devices
  - be able to be connected to all enteral tubing (if not, an adaptor may be required. Ensure the adaptor cannot be connected to IV tubing)
  - be readily available on wards, preferably near oral liquids and away from intravenous syringes.
3. Oral dispensers should be used for:
  - All oral liquid doses where the volume is too small to be measured in a measuring cup or there is a need for strict accuracy
  - all oral liquid medicines to be administered via an enteral line
  - all oral liquid medicines which are also available in IV formulations
  - all oral liquid medicines administered to patients that also have IV access devices in situ.

## WRONG ROUTE ADMINISTRATION OF ORAL LIQUID MEDICINES

### Case studies

#### How oral medicines administered via the wrong route can be fatal or cause serious harm

##### Australian case examples continued

Her oral medication orders were changed to IV orders. About two weeks later a nurse who had previously administered oral medications to the patient prepared two IV medications and had these checked.

The nurse then obtained the oral phenytoin liquid, measured 5mL into a cup and then drew it into a syringe. She administered the medications to the patient including the oral phenytoin liquid via central venous catheter (CVC).

The patient complained of pain at the injection site and commenced dry retching before losing consciousness. Staff commenced resuscitation but the woman could not be revived.<sup>3</sup>

##### An overseas case example

A pharmacy dispensed Nimodipine liquid capsules. Administration required the liquid be extracted from the capsules and given via nasogastric tube. Instruction on how to prepare the dose was not provided to the nursing staff. The capsules were subsequently softened in hot water and drawn up and administered IV instead of via the NG tube.

*The patient decompensated immediately and subsequently died.<sup>4</sup>*

Note: Oral dispensers may not be appropriate for use with viscous oral liquid medicines or crushed medicines prepared into slurries. Guidelines for alternative methods of preparation should be considered at your organisation for these oral liquid medicines.

4. Provide a forcing function<sup>1</sup>, where possible, to ensure nurses and patients use oral dispensers to prepare oral liquid medicines. Connection devices, such as bottle adaptor caps and straws, fulfil this function. Consider the practical issues with the following oral liquid medicines:
  - suspensions, medicines that need to be shaken
  - bottles that may leak when inverted
  - medicines that require tamper evident seals and childproof lids
  - medicines that need to be drawn up from an ampoule for oral administration
  - medicines for inhalation, for example, sodium chloride solutions.
5. Consider the method and quantity of oral dispensers to be supplied to each ward area.
6. Consider whether your facility will require oral dispensers in sterile packaging, for single use or for single patient use.
7. Consider a second verification 'at the bedside' for any oral liquid medicines that could potentially be measured in a syringe rather than a measuring cup, for patients that also have IV access, to prevent wrong route administration.
8. Oral dispensers should be supplied to all patients (or their carers) to enable them to safely administer oral liquid medicines at home if the patient has IV access site in situ. Consider providing a patient information sheet on the rationale and method of use of oral dispensers.

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### References

- <sup>1</sup> Institute of medicine, 2000 '*To err is human- building a safer health system*', Second print, Kohn.L, Corrigan.J, Donaldson.M (Eds), National Academy Press, Washington DC pp.171
- <sup>2</sup> Riskwatch 2005, Department of Human Services, Victoria, Volume 3, Issue 1
- <sup>3</sup> Coronial Communique, 2005, State Coroner Victoria. Volume 3, Issue 1
- <sup>4</sup> 'Steps taken to avoid inadvertent IV administration of Nimodipine.' Institute of Safe Medication Practice. Medication Safety Alert. July 2005

## Moving from potential harm to safe care

Many facilities have already implemented safety controls for wrong route errors; however it is recommended that all facilities evaluate their current practices using the following action list.

### Actions

Successful safety improvements require the development and implementation of sustainable procedures that are reviewed regularly and have commitment from the range of personnel involved in administering medicines via the oral route.

### Roles and responsibilities

#### CEO

- Disseminate this alert to the relevant committees that have the responsibility to review and action these recommendations where appropriate. These committees may include clinical governance, quality use of medicines, drug and therapeutics, medication safety committees, as well as directors of medical services, doctors, nurses and pharmacists.
- Ensure results of regular reviews from the relevant committees are made available to relevant hospital staff on the progress towards improving and maintaining systems for safe oral route administration.

#### Clinical governance, quality use of medicines, medication safety, drug and therapeutics committees and medicine, pharmacy and nursing directors

1. Assess the benefits and risks of current practices for oral route administration in your organisation and review these practices in accordance with the recommendations of this alert.
2. Develop guidelines appropriate for your organisation for the dispensing, distributing and administering of oral liquid medicines in accordance with the recommendations of this alert.
3. Guidelines require that oral dispensers are supplied with oral liquid medicines dispensed at discharge to patients with IV access in situ.
4. Ensure a formal process exists for approving guidelines and information sheets before they are used in your organisation.
5. Guidelines and procedures should become part of your organisation's training and competency assessment programmes. They should be included at orientation and continuing education sessions for relevant clinical staff.
6. Ensure that adequate supplies of oral dispensers and associated adaptors and connectors are maintained in clinical areas.
7. Assess safe storage locations for oral dispensers in clinical areas. Ensure they are readily accessible to clinicians and that they are aware of their location.
8. Communicate changes to processes for the preparation and administration oral liquid medicines effectively to all relevant staff.
9. Use the 'Wrong route administration of oral liquid medicines audit tool' to evaluate oral route administration practice in your organisation. The audit tool provides a step-by-step process and documents the actions and reviews made towards improving oral liquid medicine administration. The audit tool can be found at: [www.health.vic.gov.au/vmac/projects/hrm.htm](http://www.health.vic.gov.au/vmac/projects/hrm.htm)
10. Use the findings of the audit to provide regular review and feedback to committees that have the responsibility for implementing the recommendations.
11. Ensure a reporting process is designed to capture 'wrong route' administration errors. Use reported events to develop error prevention strategies.

## WRONG ROUTE ADMINISTRATION OF ORAL LIQUID MEDICINES

### Acknowledgements:

- 'Promoting safer measurement and administration of liquid medicines via oral and other enteral routes', 2007, National Patient Safety Agency, London, Alert 19
  - Personal correspondence. Penny Thornton, Editor Medication Safety, Journal of Pharmacy Practice and Research, Pharmacy Services Manager, The Children's Hospital at Westmead, NSW.
  - Medication Safety 2005, 'Potassium oral mixture in an IV syringe' *Journal of Pharmacy Practice and Research* Medication Safety, Australia, Volume 35, no 3
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