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SNOMED CT-AU

Clinical Scenarios with Medicine Orders

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1 Introduction

1.1 Purpose

This document provides some example clinical scenarios and associated dose-based and pack-based medicine orders that could be constructed within electronic medication management systems during the provision of healthcare in Australia.

This document aims to illustrate where elements of medicine orders can be codified using SNOMED CT-AU (the Australian edition of SNOMED CT) and the Australian Medicines Terminology (AMT).

The adoption of clinical terminologies lays a foundation for improving the reuse and sharing of coded information between electronic systems in a standardised way.

This is a non-technical document, designed to enable users to understand and assess the suitability of SNOMED CT-AU and AMT content to assist their current medication management needs.

1.2 Intended audience

This document is intended primarily for business and clinical stakeholders who are assessing the suitability of SNOMED CT-AU and the AMT for use within their clinical products.

Prior to reading this document, readers should be reasonably familiar with the contents of the SNOMED CT-AU and AMT concept models and clinical hierarchies, which are described in the following documents:

- *AMT Concept Model and Business Use Cases* [1]
- *SNOMED CT Editorial Guide* [2]

Technical implementation guidance for the use of SNOMED CT-AU and the AMT is included in the *SNOMED CT-AU Australian Technical Implementation Guide* [3].

1.3 Scope

1.3.1 In scope

This document builds on the topics covered in the *AMT Concept Model and Business Use Cases* [1] by illustrating the national terminology components (SNOMED CT-AU and the AMT) that can be used to encode portions of clinical data intended for ordering or prescribing.

The scope of prescribable products as described in this document is restricted to products as contained in the AMT. The examples in this document include the following types of medicine orders:

- Regular or routine
- Once only
- When required
- Loading dose

- Reducing dose
- Variable/sliding scale dose
- Intravenous fluids:
 - Simple intravenous fluid orders
 - Incorporation of fluid additives to complete an order.

A brief definition of these medicine order types is included in the Glossary.

1.3.2 Out of scope

- 1 This document **must not** be construed as providing recommendations regarding:
 - Clinical practice
 - Diagnosis and treatment
 - Good prescribing practice
 - Legal or regulatory requirements
 - Decision support alerts or algorithms for medication management
- 2 This document does not stipulate or mandate a new prescribing approach or standard. It also does not represent a new national information model for prescribing or machine-readable dose, nor make recommendations on software system design.
- 3 Nor does this document cover examples of SNOMED CT-AU and AMT encoding beyond prescribing at present. Guidance on the usage of national terminologies to support other clinical activities are in scope for future iterations.
- 4 The document also does not include detailed prescribing rules on specific product types that require some special handling, for example orders for nifedipine, tramadol and certain scheduled products like drugs of addiction. Implementers should follow jurisdictional and local requirements, and clinical guidelines for these products.
- 5 The creation of more complex medicine orders is not currently fully supported, such as for:
 - Complex total parenteral nutrition products
 - Complex intravenous protocols
 - Chemotherapy protocols
 - Clinical trials
 - Extemporaneous products and their preparation
 - Intensive care protocols and other high dependency areas including dialysis
 - Medical devices and consumables
 - Patient Controlled Analgesia (PCA)

1.4 Overview

1.4.1 Clinical scenarios

This document represents common scenarios that are encountered in a range of clinical settings, including hospital inpatient, residential aged care facility and community pharmacy. These scenarios provide the context for the associated medicine orders.

Scenarios 1 to 5 include medicine orders within an inpatient setting. To align with how these orders are recorded, and unless otherwise specified, titles and subheadings for these scenarios are based on:

- sections within the National Inpatient Medication Chart (NIMC) [4], or
- the type of order placed.

1.4.2 Medicine orders

The medicine orders in these clinical scenarios represent different prescribing workflows. A dose-based order of a medicine specifies a dose that does not directly translate to any single specific product strength and may be supported by a combination of commercially available products. In comparison, a product-based order or pack-based order has a commercially available product specifically selected within its *Medicine* element, as either a product pack or a unit of use.

As part of the prescribing process, medicine orders generally do not contain detailed administration instructions or always include maximum allowable daily doses. It is expected that this information will be derived from clinical decision support (or knowledge base) applications and displayed where appropriate in the prescribing, dispensing and administration cycle. In some cases, additional administration information may be included but this may not always be supported by SNOMED CT-AU.

More detailed information on dose-based prescribing and pack-based prescribing can be found in the *SNOMED CT-AU Guide for Terminology Use in Prescribing* [5].

The format of the medicine orders is based on the structure used by the Australian Commission on Safety and Quality in Health Care in the *National Guidelines for On-screen Display of Clinical Medicines Information* [6]. These national guidelines consolidate the principles from a variety of sources such as the Common User Interface project [7], international publications, and Australian standards and recommendations, to be used as a basis for application to Australian electronic medications management (eMM).

The structure is as follows (single ingredient):

Active ingredient – Strength – Brand Name – Form – Route – DOSE (label) – Dose – Administration duration – Frequency – Frequency Qualifier – Indication – Additional instructions – Duration of treatment for full course – SUPPLY (label) – Supply.

Note: Not all elements are always required. For example, “SUPPLY (label)” and “SUPPLY” are only required for a dispense amount relating to a pack-based prescription.

One of the main use cases for the AMT and SNOMED CT-AU is to support the prescribing process. Within each clinical scenario, some medicine orders are presented as an illustration such as the following.

active ingredient – strength – *Brand Name* – form – route – **DOSE** – **dose** – administration duration – frequency – frequency qualifier – indication – additional instructions – duration of treatment for full course

Figure 1: Structure of a sample medicine order

Although not shown in the illustration above, a link between the order element and the suitable SNOMED CT-AU and AMT concept (ID and Preferred Term)¹ is given to show where terminology can encode elements of the medicine order. A key to the “reference set” that contains these concepts is also provided.²

Alternative orders are shown where applicable, to indicate that medicine orders may be described in different ways.

A sequence number is used to describe multiple orders that are part of a series of orders that should be given in a certain sequence.

There are different ways that SNOMED CT-AU and the AMT can be implemented into clinical information systems. The example orders provided could be constructed by:

- Selecting from an AMT product concept (such as *Medicinal Product Unit of Use*), and extracting the attributes to populate the relevant fields such as active ingredient, strength and form; or
- Allowing the user to individually select each element of the order.

Therefore, the order element may not appear be an exact match to the AMT Preferred Term in the examples. Contact the National Clinical Terminology Service (NCTS) for further guidance about implementing SNOMED CT-AU and the AMT.

¹ Concept IDs and Preferred Terms included in this document were correct and active at time of publication.

² A Reference set is a mechanism for maintaining and distributing a targeted set of SNOMED CT components (i.e. concepts, descriptions and relationships). One way they can be used is to constrain data entry in a specified field of a clinical information system to members of a particular reference set.

2 Clinical Scenario 1 – Intravenous heparin orders

This scenario shows an example of an order for a loading dose followed by maintenance therapy.

2.1 Summary

Mary is a 48 year old woman who presented to hospital with dyspnoea and pleuritic chest pain after a long distance plane journey. She has a history of Factor V Leiden mutation and was found to have a segmental pulmonary embolus on CT Pulmonary Angiogram (CTPA), without indications for thrombolysis.

Mary was managed as an inpatient for two days with an IV heparin infusion with an initial loading dose of heparin. The order is recorded in the hospital IV heparin chart with separate sections for the loading dose (sequence 1) and continuous infusion (sequence 2).

2.2 Example of terminology encoding

2.2.1 IV heparin orders - inpatient

2.2.1.1 Sequence 1

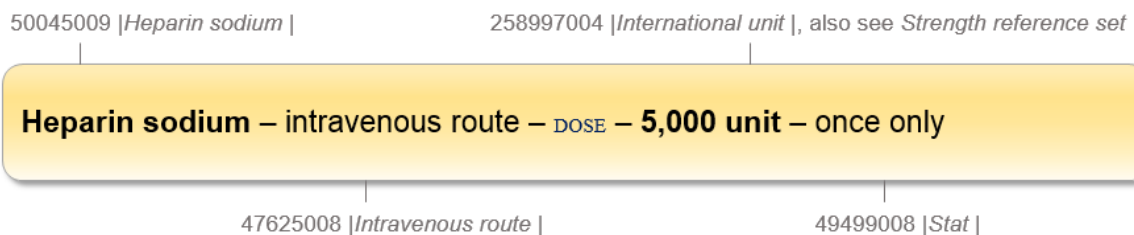


Figure 2: Encoding an order for 5,000 units of heparin sodium, intravenous

2.2.1.2 Sequence 2

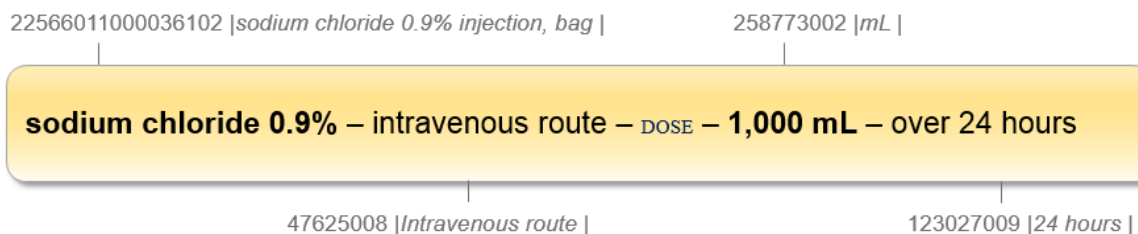


Figure 3: Encoding an order for 0.9% sodium chloride, intravenous

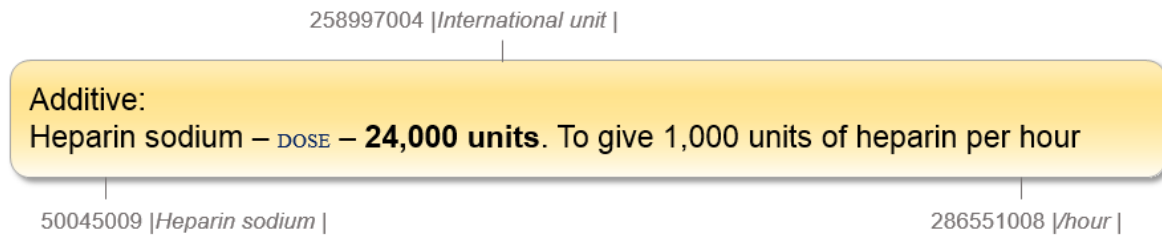


Figure 4: Encoding an order for 24,000 units of heparin sodium as an additive

Table 1: Reference sets containing the terminology codes in Figures 2-4

Order element	Concept ID and Preferred Term	Reference set	Comment
Active ingredient	50045009 Heparin sodium	Substance foundation reference set	
Route	47625008 Intravenous route	Dose based prescribing route of administration reference set	
Dose	258997004 International unit	- Dose unit of measure reference set - Strength reference set (a preconfigured Dose quantity is supported when the Dose is the same as the Strength value of a suitable MPUU concept)	International unit is the Preferred Term for the stand-alone Unit of Measure qualifier. It is acknowledged that a more simplified entity may be required to be developed (for example “unit”)
Administration duration	49499008 Stat	Dose based prescribing medication course type reference set	A once-only order specifies a medicine intended to be administered in a single occurrence and immediately. This is also known as a “Stat order”.

Order element	Concept ID and Preferred Term	Reference set	Comment
Active ingredient	22566011000036102 sodium chloride 0.9% (9 g/L) injection, bag	Medicinal product unit of use reference set	Since a strength has also been specified along with an ingredient, the closest single concept describing an ingredient and strength is an MPUU concept. Note: The MPUU concept selected has more information than the original medicine text specified, and the alternate strength representation of "0.9%" is not atomically accessible in the current AMT data. It is acknowledged that a more simplified entity may be required to be developed (for example, "sodium chloride 0.9%").
Dose	258773002 mL	Dose unit of measure reference set	
Administration duration	123027009 24 hours	Qualifier value foundation reference set	
Additional instructions	286551008 /hour	Qualifier value foundation reference set	/hour is the Preferred Term and per hour is an acceptable synonym.

3 Clinical Scenario 2 – National Inpatient Medication Chart (acute)

This scenario includes examples of regular and once-only orders and provides an example of where the dose is part of an actual product with the remainder being discarded, a morphine 2.5 mg dose from a 5 mg/2 mL ampoule, in accordance with the schedule protocols.

3.1 Summary

Dawn, a 78 year old female resident in an aged care facility, was transported to hospital with a productive cough and dyspnoea, and fell down during a coughing fit which resulted in bruised ribs. This required a strong pain killer, which was carefully titrated from the morphine ampoule (only half of the ampoule was used). She was diagnosed with community acquired pneumonia (CAP) and was managed as an inpatient over an eight day period. Dawn is in the early stages of dementia and had to be initially sedated after becoming distressed due to the unfamiliar surroundings and staff in hospital. Once her condition was stable she was then discharged and transferred back to the residential aged care facility.

Her medical history revealed the following:

- Osteoporosis
- Osteoarthritis-knees
- Hypertension
- Type 2 diabetes mellitus
- No known allergies.

The management plan developed consisted of:

- Oxygen to maintain saturations above 95%
- Intravenous ceftriaxone and oral azithromycin
- Salbutamol 5 mg/2.5 mL nebulisation unit
- Continue metformin
- Continue Coveram 5 mg/10 mg, 1 tablet once a day.

3.2 Example of terminology encoding

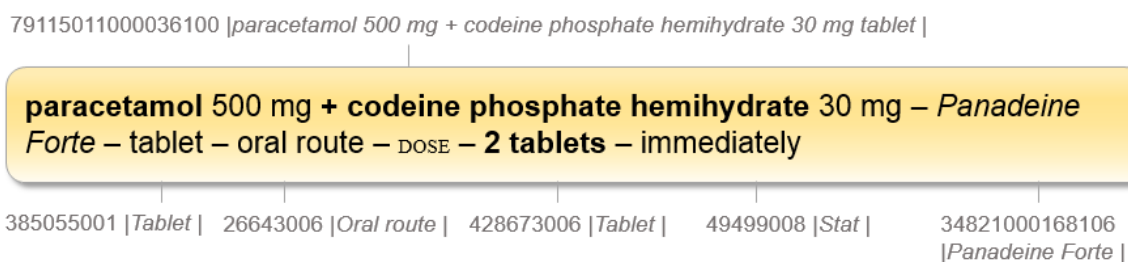


Figure 5: Encoding an order for two tablets of Panadeine Forte

Table 2: Reference sets containing the terminology codes in Figure 5

Order element	Concept ID and Preferred Term	Reference set	Comment
Active ingredient	79115011000036100 paracetamol 500 mg + codeine phosphate hemihydrate 30 mg tablet	Medicinal product unit of use reference set	The use of MPUU or BoSS for orders with 2-3 active ingredients depends on the configuration of the clinical information system.
Brand name	34821000168106 Panadeine Forte	Trade product reference set	
Form	385055001 Tablet	Dose based prescribing dose form reference set	This element could be selected as an individual entity or derived from the MPUU.
Route	26643006 Oral route	Dose based prescribing route of administration reference set	
Dose	428673006 Tablet	Dose unit of measure reference set	
Administration duration	49499008 Stat	Dose based prescribing medication course type reference set	A once-only order specifies a medicine intended to be administered in a single occurrence and immediately. This is also known as a “Stat order”.

3.3 Medicine orders

3.3.1 Once-only and nurse-initiated medicines and pre-medications – inpatient

- 1 Panadeine Forte – tablet – oral route
DOSE – 2 tablets – immediately.

Alternative order:

*Paracetamol 500 mg + codeine phosphate hemihydrate 30 mg – tablet – oral route
DOSE – 2 tablets – immediately.*

- 2 Morphine sulfate pentahydrate – subcutaneous route
DOSE – 2.5 mg – immediately.
- 3 Lorazepam – tablet – oral route
DOSE – 1-2 mg – up to a maximum of 4 mg per day if sedation score³ SS < or = 2.
- 4 Olanzapine – wafer – oral route
DOSE – 5-10 mg – up to a maximum 15 mg per day if SS < or = 2.

³ A common sedation scoring system is:

0. Wide awake
1. Easy to rouse
2. Easy to rouse but cannot stay awake
3. Difficult to rouse.

- 5 Sodium chloride 0.9% – intravenous route
DOSE – 1,000 mL – over ten hours.

3.3.2 Regular medicines – inpatient

- 1 Metformin hydrochloride – oral route
DOSE – 500 mg – twice a day.
- 2 Panadol Osteo – 665 mg – modified release tablet – oral route
DOSE – 2 tablets – three times a day.
Warning: Withhold if Panadeine Forte is administered continuously.
Note: Dose could also be expressed as 1,330 mg of paracetamol
- 3 Colecalciferol – oral route
DOSE – 1,000 units – once a day.
- 4 Coveram 5 mg/10 mg (perindopril arginine/amlodipine) – oral route
DOSE – 1 tablet – once a day.
- 5 Salbutamol 5 mg/2.5 mL inhalation solution, ampoule – inhalation route
DOSE – 5 mL – four times a day.
- 6 Ceftriaxone – intravenous route
DOSE – 1 g – once a day.
- 7 Azithromycin – oral route
DOSE – 500 mg – once a day.
- 8 Sodium chloride 0.9% – intravenous route
DOSE – 1,000 mL – over ten hours.

3.3.3 Regular medicines – discharge

- 1 Coveram 5 mg/10 mg (perindopril arginine/amlodipine) – oral route
DOSE – 1 tablet – once a day.
- 2 Metformin hydrochloride – oral route
DOSE – 500 mg – twice a day.
- 3 Panadol Osteo – 665 mg – modified release tablet – oral route
DOSE – 2 tablets – three times a day.
Note: Dose could also be expressed as 1,330 mg of paracetamol
- 4 Colecalciferol – oral route
DOSE – 1,000 units – once a day.

4 Clinical Scenario 3 – Warfarin dosing

This scenario contains regular orders together with an example of where multiple products are required, for example, a dose of warfarin 7 mg would require the use of 5 mg and 2 mg tablets.

4.1 Summary

Ellen is an 81 year old female who presented to hospital with exacerbation of congestive heart failure (CHF). She has a background of atrial fibrillation managed with rate control and anticoagulation.

There was significant peripheral oedema to above her knees bilaterally, with fluid oozing through her skin. Her ECG and serial troponins showed no signs of new ischaemia. Her electrolytes were normal. She was managed as an inpatient over a five day period without complications.

Her medical history revealed the following:

- Atrial fibrillation diagnosed in 2009;
- Angiography results: CHF – left ventricular function normal, mild to moderate pulmonary hypertension, and early right ventricular dysfunction; and
- Her GP had increased the dose of bisoprolol to 7.5 mg daily and decreased the dose of frusemide 2 weeks ago.

The management plan developed was as follows:

- Increase frusemide dose back to 80 mg morning/40 mg lunchtime;
- Continue bisoprolol 7.5 mg daily as 1 tablet once a day;
- Commence Slow-K 1 tablet twice daily;
- Continue digoxin 125 microgram daily;
- Commence variable warfarin dosing with daily INR target range of 2 to 3; and
- Trans-thoracic echocardiogram (TTE) – query progression of disease.

4.2 Example of terminology encoding

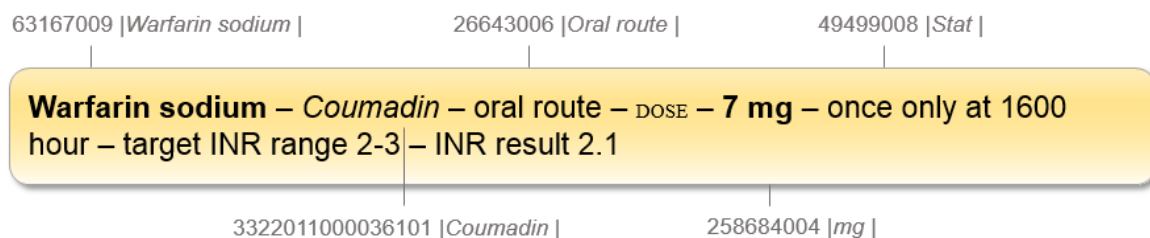


Figure 6: Encoding an order for 7 mg Coumadin

Table 3: Reference sets containing the terminology codes in Figure 6

Order element	Concept ID and Preferred Term	Reference set	Comment
Active ingredient	63167009 Warfarin sodium	Substance foundation reference set	
Brand name	3322011000036101 Coumadin	Trade product reference set	
Route	26643006 Oral route	Dose based prescribing route of administration reference set	
Dose	258684004 mg	Dose unit of measure reference set	
Administration duration	49499008 Stat	Dose based prescribing medication course type reference set	A once-only order specifies a medicine intended to be administered in a single occurrence and immediately. This is also known as a "Stat order".

4.3 Medicine orders

4.3.1 Regular medicines: warfarin – inpatient

- 1 Warfarin sodium – Coumadin – oral route
DOSE – 7 mg – once only at 1600 hour – target INR range 2-3 – INR result 2.1.

4.3.2 Regular medicines – inpatient

- 1 Bisoprolol fumarate – oral route
DOSE – 7.5 mg – once a day.
- 2 Perindopril 5 mg + amlodipine 10 mg – tablet – oral route
DOSE – 1 tablet – once a day.

Alternative order:

Coveram 5 mg/10 mg (perindopril arginine/amlodipine) – oral route
DOSE – 1 tablet – once a day.

- 3 Digoxin – oral route
DOSE – 125 microgram – once a day.

Alternative order:

Lanoxin PG 62.5 microgram – oral route
DOSE – 2 tablets – once a day.

- 4 Potassium chloride – modified release tablet – oral route
DOSE – 600 mg – twice a day.

Alternative order:

Slow-K – oral route
DOSE – 600 mg – twice a day.

- 5 Furosemide (*Frusemide*) – oral route
DOSE – 80 mg – once a day in the morning.
- 6 Furosemide (*Frusemide*) – oral route
DOSE – 40 mg – once a day at midday.
- 7 Magnesium aspartate dihydrate – oral route
DOSE – 500 mg – twice a day.

4.3.3 As required PRN medicines

- 1 Metoclopramide hydrochloride – oral route
DOSE – 10 mg – three times a day – when required for nausea.
- 2 Ondansetron – oral route or intravenous route
DOSE – 4 mg – every eight hours – when required for nausea and unable to take metoclopramide.
- 3 Coloxyl with Senna – tablet – oral route
DOSE – 1-2 tablet – twice a day – when required for constipation.
- 4 Lactulose – oral liquid – oral route
DOSE – 20 mL – twice a day – when required for constipation.

Alternative order:

Lactulose – oral liquid – oral route

DOSE – 13.36 g (20 mL) – twice a day – when required.

5 Clinical Scenario 4 - Reducing dose orders

This scenario shows a series of orders for a reducing dose of salbutamol or prednisolone.

5.1 Summary

Jonathan is a 3 year old boy weighing 15 kg who is otherwise healthy. Jonathan presented at a major city paediatric hospital with a moderate exacerbation of asthma requiring inpatient management.

He was managed over a three-day period with salbutamol and prednisolone using regular and reducing doses through an ancillary metered dose inhaler with a well-sealed face mask for wet and dry regimens. The order is recorded on the hospital inhalation chart.

5.2 Example of terminology encoding

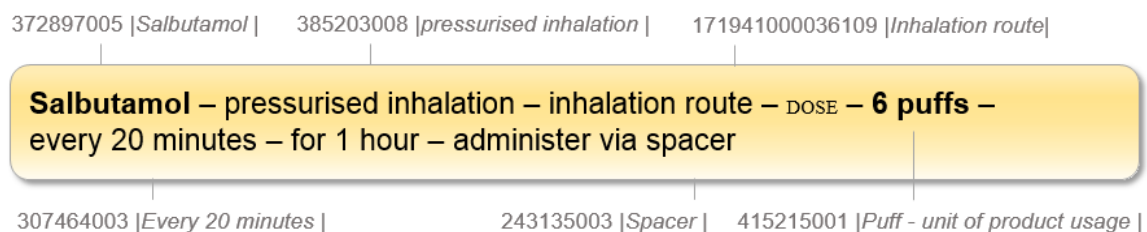


Figure 7: Encoding an order for salbutamol inhaler

Table 4: Reference sets containing the terminology codes in Figure 7

Order element	Concept ID and Preferred Term	Reference set
Active ingredient	372897005 Salbutamol	Substance foundation reference set
Form	385203008 pressurised inhalation	Medication form reference set
Route	171941000036109 Inhalation route	Dose based prescribing route of administration reference set
Dose	415215001 Puff - unit of product usage	Qualifier value foundation reference set
Frequency	307464003 Every 20 minutes	Dose based prescribing dose frequency and interval reference set
Additional instructions	243135003 Spacer	Physical object foundation reference set

5.3 Medicine orders

5.3.1 Reducing dose orders – salbutamol

5.3.1.1 Sequence 1

Salbutamol – pressurised inhalation – inhalation route
DOSE – 6 puffs – every 20 minutes – for 1 hour – administer via spacer.

5.3.1.2 Sequence 2

Salbutamol – pressurised inhalation – inhalation route
DOSE – 6 puffs – every 1 hour – for 2 hours – administer via spacer.

5.3.1.3 Sequence 3

Salbutamol – pressurised inhalation – inhalation route
DOSE – 6 puffs – every 2 hour – for 4 hours – administer via spacer.

5.3.1.4 Sequence 4

Salbutamol – pressurised inhalation – inhalation route
DOSE – 6 puffs – every 4 hour – for 1 day – administer via spacer.

5.3.1.5 Sequence 5

Salbutamol – pressurised inhalation – inhalation route
DOSE – 6 puffs – every 6 hour – for 1 day – administer via spacer.

5.3.2 Reducing dose orders – prednisolone

5.3.2.1 Sequence 1

Prednisolone – oral route
DOSE – 30 mg – once a day in the morning for 1 day.

5.3.2.2 Sequence 2

Prednisolone – oral route
DOSE – 15 mg – once a day in the morning for 2 days.

6 Clinical Scenario 5 - Intravenous fluid dose orders

This scenario highlights intravenous fluid orders as well as subcutaneous orders and some regular orders. The intravenous orders include an example of where more than one product is required, sodium chloride and magnesium. An example of a sliding scale medication order for insulin is also included.

6.1 Summary

Sam is a 69 year old male with type 2 diabetes mellitus and was admitted as an inpatient at a major capital city teaching hospital. He received post-operative care following a bowel resection. He received DVT prophylaxis during his stay and was discharged after a nine day period.

The nurses regularly assessed his pulse rate, blood pressure, blood glucose levels, breathing rate, temperature and oxygen saturation levels. Regular assessment was also made of the amount of urine he was producing, the amount of fluid coming out into any drains, his pain levels and the amount of bowel fluid coming into his colostomy bag.

On his third day of post-operative care he had not yet passed wind (flatus) nor had he had a bowel movement. He was prescribed a mild laxative to help with his bowel.

6.2 Example of terminology encoding

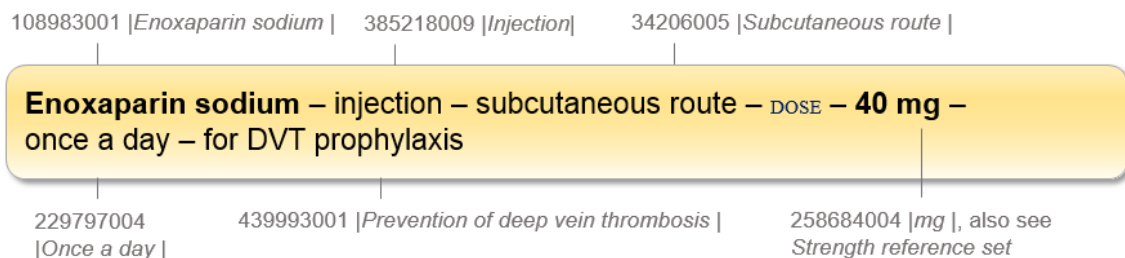


Figure 8: Encoding an order for 40 mg enoxaparin sodium injection

Table 5: Reference sets containing the terminology codes in Figure 8

Order element	Concept ID and Preferred Term	Reference set
Active ingredient	108983001 Enoxaparin sodium	Substance foundation reference set
Form	385218009 Injection	Dose based prescribing dose form reference set
Route	34206005 Subcutaneous route	Dose based prescribing route of administration
Dose	258684004 mg	- Dose unit of measure reference set - Strength reference set (a preconfigured Dose quantity is supported when the Dose is the same as the Strength value of a suitable MPUU concept)

Order element	Concept ID and Preferred Term	Reference set
Frequency	229797004 <i>Once a day</i>	<i>Dose based prescribing dose frequency and interval reference set</i>
Indication	439993001 <i>Prevention of deep vein thrombosis</i>	<i>Procedure foundation reference set</i>

6.3 Medicine orders

6.3.1 Medications administered intravenously

A. IV fluid orders plus electrolyte replacement:

6.3.1.1 Sequence 1

Sodium chloride 0.9% – intravenous route

DOSE – 1,000 mL – over 8 hours.

Additive:

Magnesium sulfate heptahydrate

DOSE – 10 mmol.

6.3.1.2 Sequence 2

Glucose 5% – intravenous route

DOSE – 1,000 mL – over 8 hours.

6.3.1.3 Sequence 3

Compound Sodium Lactate (Hartmann's) (Baxter) – intravenous route

DOSE – 1,000 mL – over 8 hours

Alternative order:

Hartmann's – *injection – intravenous route*

DOSE – 1,000 mL – over 8 hours.

B. Intermittent IV orders:

- 1 Cefazolin – intravenous route
DOSE – 1 g – every 8 hours.
- 2 Metronidazole – intravenous route
DOSE – 500 mg – every eight hours – while nil oral.
- 3 Morphine sulfate pentahydrate – intravenous route
DOSE – 2.5 mg – when required.

6.3.2 Medications administered subcutaneously

- 1 Enoxaparin sodium – injection – subcutaneous route
DOSE – 40 mg – once a day – for DVT prophylaxis.
- 2 Insulin glargine 100 units/mL – Lantus – injection – subcutaneous route
DOSE – 10 units (0.1 mL) – once a day at night.
- 3 Insulin aspart 100 units/mL – Novorapid – injection – subcutaneous route
DOSE – 4 units (0.04 mL) – with food.

- 4 Insulin aspart 100 units/mL – Novorapid – injection – subcutaneous route sliding scale
DOSE – 2 units (0.02 mL) if Blood Glucose Level 10-12 mmol/mL
4 units (0.04 mL) if Blood Glucose Level 12-14 mmol/mL
6 units (0.06 mL) if Blood Glucose Level 14-16 mmol/mL
8 units (0.08 mL) if Blood Glucose Level 16-18 mmol/mL
10 units (0.1 mL) if Blood Glucose Level 18-20 mmol/mL.

Note: This makes no assumptions re: presentation of insulin - vial, cartridge etc.

6.3.3 Medications administered orally when oral route is available

- 1 Paracetamol – oral route
DOSE – 1 g – four times a day to a maximum dose 4 g per 24 hours.
Note: this will replace the previous intravenous order for IV Morphine.
- 2 Oxycodone hydrochloride – oral route
DOSE – 5 mg – every 4 hours.

7 Clinical Scenario 6 – Prescribing and dispensing in General Practitioner (GP) setting

This scenario shows an example of a dose based prescribing and dispensing in a GP clinical setting.

7.1 Summary

Mr Mike Graham (58 years old) attends his local GP Dr James Hollaway in autumn. Mr Graham's intention is to review his type 2 diabetes mellitus with the practice nurse and Dr Hollaway. Mr Graham also is intending to obtain new prescriptions for his ongoing medications.

While at this consultation, Mr Graham mentions a painful swollen left great toe, having 2 days earlier stabbed his great toe with a gardening fork.

Mr Graham also reports having developed constipation in the last 3 days.

During the nurse and Dr Hollaway's examinations, Mr Graham is noted to:

- Have an infected left great toe, and has a small amount of purulent discharge, in need of both antibiotic treatment and a tetanus vaccination booster. The tetanus booster is given at the surgery.
- Have inadequate blood pressure control requiring an increase in the existing Ramipril medication from 2.5 to 5 mg daily.
- Have constipation needing treatment with an enema medication, Microlax, due to previous episodes.

Mr Graham is due for his annual influenza vaccination (2017), which is given at the GP surgery.

7.2 Example of terminology encoding

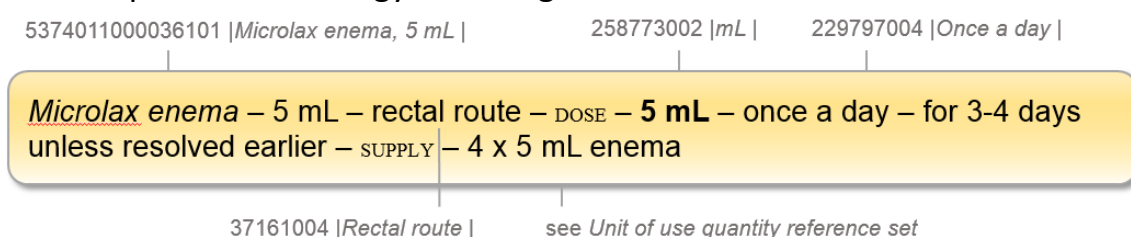


Figure 9: Encoding an order for Microlax enema

Table 6: Reference sets containing the terminology codes in Figure 9

Order element	Concept ID and Preferred Term	Reference set
Brand Name	5374011000036101 Microlax enema, 5 mL	Trade product unit of use reference set
Route	37161004 Rectal route	Dose based prescribing route of administration reference set

Order element	Concept ID and Preferred Term	Reference set
Dose	258773002 mL	<i>Dose unit of measure reference set</i>
Frequency	229797004 Once a day	<i>Dose based prescribing dose frequency and interval reference set</i>
Supply		<i>Unit of use quantity reference set (a preconfigured Supply quantity is supported when the Supply specified is the same as the Unit of use quantity value of the associated MPP concept)</i>

7.3 Medicine orders

7.3.1 Surgery clinical software recorded and initiated items

- 1 ADT Vaccine injection suspension, 0.5 mL syringe – intramuscular route
DOSE – 0.5 mL – once*

Alternative order:

*Diphtheria 2 units + tetanus vaccine 20 units vaccine injection, 0.5 mL syringe – intramuscular route
DOSE – 0.5 mL – once.**

- 2 Influenza quadrivalent adult vaccine 2017 injection, 0.5 mL syringe – intramuscular route
DOSE – 0.5 mL – once.*

**These were ordered and administered within the practice*

7.3.2 Once only medication orders

- 1 Augmentin Duo Forte 875/125 tablet – oral route
DOSE – 1 tablet – twice a day
SUPPLY 10
Dispense original and 0 repeat

Alternative order:

*Amoxicillin 875 mg + clavulanic acid 125 mg tablet – oral route
DOSE – 1 tablet – twice a day
SUPPLY 10
Dispense original and 0 repeat.*

- 2 Microlax enema – 5 mL – rectal route
DOSE – 5 mL – once a day – for 3-4 days unless resolved earlier
SUPPLY 4 x 5 mL enema
Dispense original and 0 repeat.

7.3.3 Ongoing medication orders – altered dosage (dose increased from 2.5 to 5 mg)

- 1 Ramipril 5 mg – tablet – oral route
DOSE – 5 mg – once a day in the morning
SUPPLY 30
Dispense original and 5 repeats.

7.3.4 Ongoing medication orders

- 1 Lantus Solostar 100 units/mL injection solution, cartridge – subcutaneous route
DOSE – 13 units – once a day in the morning
SUPPLY 5 x 3 mL cartridge
Dispense original and 1 repeat.
- 2 Furosemide (Frusemide) 40 mg – tablet – oral route
DOSE – 80 mg – once a day in the morning
DOSE – 40 mg – once a day at midday
SUPPLY 100
Dispense original and 1 repeat

Alternative order:

Furosemide (Frusemide) 40 mg – tablet – oral route
DOSE – 2 tablet – once a day in the morning
DOSE – 1 tablet – once a day at midday
SUPPLY 100
Dispense original and 1 repeat.
- 3 Lipitor 40 mg – tablet – oral route
DOSE – 40 mg – once a day in the morning
SUPPLY 30
Dispense original and 5 repeats.
- 4 Cartia 100 mg – enteric tablet – oral route
DOSE – 100 mg – once daily in the morning
SUPPLY 84
Dispense original and 1 repeat.
- 5 Nexium 20 mg – enteric tablet – oral route
DOSE – 20 mg – once daily at night
SUPPLY 30
Dispense original and 5 repeats.

7.4 Pharmacy visit for dispensing medications

Immediately after his consultation with Dr Hollaway, Mr Mike Graham attends his local pharmacy to get his prescriptions filled. The pharmacist, Dede Kalos, speaks to Mike and asks him if he would like to substitute the brands listed in his prescriptions for generic brands if they are available. Mr Graham states that he would like to leave them as they are.

The brand Urex was dispensed for the prescription for frusemide. All other medicines were dispensed as prescribed.

Acronyms

Acronym	Description
ADT	Diphtheria and Tetanus Vaccine, Adsorbed
AMT	Australian Medicines Terminology
BD	twice a day
GP	general practitioner
IV	intravenous
MPP	medicinal product pack
MPUU	medicinal product unit of use
PBS	Pharmaceutical Benefits Scheme
PRN	as required
SNOMED CT-AU	SNOMED CT, Australian release
TP	trade product
TPUU	trade product unit of use

Glossary

Term	Meaning
Australian Medicines Terminology	National terminology that identifies medicines used in Australia, using unique codes to deliver unambiguous, accurate and standardised names for both branded (trade) and generic (medicinal) products.
Dose-based order	A medicine order that specifies a dose that does not directly translate to any single specific product strength and may be supported by a combination of commercially available products.
Intravenous fluid order	A medicine order that specifies an intravenous administration of a fluid, usually to maintain appropriate fluid balance and rehydration. These fluids may be used as a vehicle for administration of other active ingredients intravenously.
Loading dose order	A medicine order that specifies an initial higher dose of a medicine that may be given at the beginning of a course of treatment before being reduced to a lower maintenance dose.
Medication order	For the purpose of this document, a medication order is the documented electronic set of instructions (usually on a medication chart) to inform carers regarding the administration of medicine to a person. It is not the same as a prescription although in some settings the document may also serve the purpose of a prescription.
Medicinal Product	Category of AMT concepts representing abstract formulated representations of therapeutic active ingredients used in treatment of human patients in Australia.
Medicinal Product Pack	Category of AMT concepts representing the abstract concept of generic medicinal entities available for patient use, devoid of brand and container type.
Medicinal Product Unit of Use	Category of AMT concepts representing abstract formulations containing active ingredient, strength and form in a single dose form or unit of use component of a multicomponent formulation, devoid of brand.
Once-only order	A medicine order that specifies a medicine intended to be administered in a single occurrence and immediately. Also known as a “Stat” order.
Pharmaceutical Benefits Scheme	Australian government subsidy system for medicines managed by the Department of Health’s Pharmaceutical Benefits Division.
Preferred Term	The preferred description for use when referring to a SNOMED CT-AU or AMT concept, which is the most appropriate term in the context of clinical use within the Australian healthcare system.

Term	Meaning
Prescription	A compliant document, produced by an authorised person, to be used by a pharmacist for the purpose of meeting the legal requirements for the supply of a medicine to an individual patient. Describes the medication that the prescriber (i.e. a doctor in most cases, though a nurse practitioner, pharmacist, or physiotherapist can also be prescriber) wants to be taken by the patient. It is input to the dispense process. Prescriptions are also used as input for the patient or the nurse on how to use the medication. A prescription is not the same as a medication order (see separate definition) although in some settings the same document may serve both purposes.
Product-based order	A medicine order that has a commercially available product specifically selected within its Medicine element, as either a product pack or a unit of use. If a product pack is specified, its quantity is the pack quantity of the commercially available presentation (such as 20 tablets). If a unit of use is specified, its quantity may reflect a single unit (such as 1 tablet) or multiples of the unit of use (such as 5 tablets).
Reducing dose order	A medicine order that specifies an initial higher dose of a medicine that may be given at the beginning of a course of treatment before being progressively reduced to one or more lower doses.
Reference set	A flexible standard approach used by SNOMED CT to support a variety of requirements for customisation and enhancement of SNOMED CT and national extensions. These include the representation of subsets, language preferences for use of particular terms and mapping from or to other code systems. Also commonly shortened to “Refset”.
Regular or routine order	A standing order for a medicine to be given on a regular frequency until a patient is discharged or the order is otherwise cancelled.
SNOMED CT	The international, parent clinical terminology of which SNOMED CT-AU and the AMT are national extensions. It is the most comprehensive and precise clinical health terminology product in the world, owned and distributed by SNOMED International. SNOMED CT is designed to underpin clinical data recording and meaning-based retrieval and use.
SNOMED CT-AU	The Australian edition of SNOMED CT, and of which the AMT is part of.
Trade Product	Category of AMT concepts representing product brand names.
Trade Product Unit of Use	Category of AMT concepts representing marketable formulations containing active ingredient, strength and form in a single dose form or unit of use component of a combination pack.
Unit of use	The Unit of Use describes the smallest possible constituent which can be handled. It is either a discrete unit (for example, tablet, capsule) or a continuous unit (for example, cream, liquid products).
Variable dose order	A medicine order that specifies a dose that vary according to a patient’s test results or certain observations and conditions being met.

Term	Meaning
When required order	A medicine order that specifies a medicine intended to be administered whenever the condition it was prescribed for arises. It has an irregular frequency and is distinct from the regular frequency of administration for a regular (or routine) order. Also known as a PRN order.

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