AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Selected best practices and suggestions for improvement for clinicians and health system managers

Hospital-Acquired Complication **10**

MEDICATION COMPLICATIONS

	HOSPITAL-ACQUIRED COMPLICATION	RATE[a]
1	Pressure injury	10
2	Falls resulting in fracture or intracranial injury	4
3	Healthcare-associated infections	135
4	Surgical complications requiring unplanned return to theatre	20
5	Unplanned intensive care unit admission	na[b]
6	Respiratory complications	24
7	Venous thromboembolism	8
8	Renal Failure	2
9	Gastrointestinal bleeding	14
10	Medication complications	30
11	Delirium	51
12	Persistent incontinence	8
13	Malnutrition	12
14	Cardiac complications	69
15	Third and fourth degree perineal laceration during delivery (per 10,000 vaginal births)	358
16	Neonatal birth trauma (per 10,000 births)	49

a per 10,000 hospitalisations except where indicated
b na = national data not available

Many hospital-acquired complications can arise as a consequence of medication use in hospital. This hospital-acquired complication focuses on the following three main diagnostic groups*:

- Medication-related respiratory complications/respiratory depression
- Haemorrhagic disorder due to circulating anticoagulants
- Hypoglycaemia

High-risk medicines include those referred to in the mnemonic:

A PINCH

Anti-infectives

P otassium

I nsulin and oral hypoglycaemics

N arcotics and sedatives

C hemotherapies

H eparin and anticoagulants

Why focus on medication complications?

Each year, patients in Australia experience a large number of medication-related complications, with 13,503 occurring in public hospitals in 2015–16.[1] The rate of hospital-acquired medication complications in Australian public hospitals was 30 per 10,000 hospitalisations in 2015–16.[1]

Hospital-acquired medication complications prolong the length of hospitalisation, which impacts on patients and their families. These complications increase the cost of admission incurred by the health service. This additional cost may be the result of an increased length of stay or more complex care requirements.[2] While there is an increased financial cost, the most significant cost is the pain and discomfort experienced by the patient.

Significant reductions in medication complication rates are being achieved in some hospitals through preventive initiatives. The rate for medication complications at Principal Referral Hospitals† was 35 per 10,000 hospitalisations in 2015–16. If all Principal Referral Hospitals above this rate reduced their rate to 35 per 10,000 hospitalisations, then 2,067 medication complications in these hospitals would have been prevented, and more when other types of facilities are considered.[1]

* The specifications for the hospital-acquired complications list providing the codes, inclusions and exclusions required to calculate rates is available on the Commission's website.

† Hospitals were classified in the Principal Referral Hospitals peer group for these purposes according to the Australian Institute of Health and Welfare's former definition of major city hospitals with more than 20,000 acute weighted separations and regional hospitals with more than 16,000 acute weighted separations.

What is considered best practice for preventing medication complications?

All hospital-acquired complications can be reduced (but not necessarily eliminated) by the provision of patient care that mitigates avoidable clinical risks to patients.

The **health service organisation** providing services to patients at risk of medication complications:

- Has systems for medication review and reconciliation consistent with best-practice guidelines
- Has systems for managing and monitoring high-risk medicines
- Ensures that equipment and devices are available to decrease the risk of medication complications; for example, insulin pumps, heparin pumps.

Clinicians caring for patients at risk of medication complications:

- Perform medication review and reconciliation
- Prescribe, administer and monitor the impact of high-risk medicines according to best practice clinical guidelines.

The National Safety and Quality Health Service (NSQHS) Standards (second edition), in particular the Comprehensive Care Standard[6], support the delivery of safe patient care.

The advice contained in the hospital-acquired complication fact sheets aligns with the criteria in this standard, which are as follows:

- Clinical governance structures and quality-improvement processes supporting patient care
- Developing the comprehensive care plan
- Delivering the comprehensive care plan
- Minimising specific patient harms.

DIAGNOSTIC GROUP 1: MEDICATION-RELATED RESPIRATORY COMPLICATIONS/ RESPIRATORY DEPRESSION

Respiratory depression and complications from inappropriate dosing and management of sedatives or narcotic medications are serious health concerns. Drowsiness, confusion, myoclonic jerking, and hallucinations may precede the onset of respiratory depression, and hypoxic brain injury and death may result from inappropriate dosing of these medications.

Narcotics and sedatives are recognised as high-risk medicines.[4,5] These medications carry significant risks of complications, including death, when administered in inappropriately high doses.[6]

Pain management and sedation are routine events in hospital and are part of good care. However, there are risks that these routine events may lead to serious hospital-acquired complications when the following medication-related errors occur:

- Doses titrated inappropriately for clinical requirement
- Lack of awareness of appropriate conversions between medications
- Variations between formulations in the strength and duration of action
- Staff inappropriately skilled in sedation resuscitation
- Incorrect or incomplete drug reversal management.[6]

Top tips for prevention and management of medication-related respiratory depression

The following provides key points for clinicians to consider to avoid this hospital-acquired complication

Conduct risk assessment

Conduct a comprehensive risk assessment.

Identify key risk factors such as:

- Impaired renal or hepatic function
- Age over 55 years
- History of COPD with CO2 retention
- Polypharmacy with agents that compromise renal or hepatic function
- Severely compromised status of health
- Smoker (>20 pack years)
- History of daytime somnolence or snoring
- Prolonged surgery (>2 hours)
- Thoracic or other large incision interfering with adequate ventilation.

For a patient at risk, develop a prevention plan as part of a comprehensive care plan

Develop prevention plan

Clinicians, patients and carers develop an individualised, comprehensive prevention plan to prevent medication-related respiratory depression that identifies:

- Goals of treatment consistent with the patient's values
- Any specific nursing requirements
- Any allied health interventions required
- Observations or physical signs to monitor and determine frequency of monitoring
- Laboratory results to monitor and determine frequency of monitoring
- If specialist assistance is required.

Deliver prevention plan

Clinicians, patients and carers work in partnership to deliver analgesia and sedation where clinically indicated.

If medication-related respiratory depression occurs, manage patients who have opioid or sedative toxicity according to best-practice guidelines.

Monitor

- Monitor the effectiveness of strategies to prevent opioid and sedative toxicity
- Review and update the pain management plan if it is not effective or is causing adverse effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.

Clinical governance structures and quality-improvement processes

to support best practice in preventing and managing medication-related respiratory depression

Health service organisations need to ensure systems are in place to prevent respiratory depression through effective clinical governance and quality improvement.

The NSQHS Standards (2nd ed.) describe actions that are relevant to the prevention and management strategies outlined below. These actions are identified in brackets.

Policies, procedures and/or protocols

Health service organisations ensure policies, procedures and/or protocols for analgesia and sedation are consistent with national evidence-based guidelines and legislation. **(1.27, 5.1a)**

Identification of key individuals/ governance groups

Health service organisations identify an individual or a governance group (such as Drug and Therapeutics Committee) that is:

- Responsible for monitoring compliance with the organisation's analgesia and sedation policies, procedures and protocols **(1.7b, 5.2a)**
- Responsible for presenting data on the performance of pain management and sedation systems to the governing body. **(1.9, 5.2c)**

Prescribing policies

Health service organisations:

- Consider policies to limit authority to prescribe high-strength opiates (such as fentanyl and hydromorphone) to staff of appropriate seniority or experience; for example, particular specialist groups such as Palliative Care, Anaesthetics and Intensive Care **(4.1a)**
- Consider an opioid stewardship program. **(4.15)**

Information technology

Health service organisations consider electronic medication management systems. **(1.16, 4.1, 4.2)**

Training requirements

Health service organisations:

- Identify workforce training requirements **(4.1c)**
- Train relevant staff on the use of analgesics and sedatives **(4.1c)**
- Ensure workforce proficiency is maintained. **(4.2)**

Monitoring the delivery of prophylaxis and care

Health service organisations ensure mechanisms are in place to:

- Report medication complications **(4.9)**
- Manage risks associated with analgesia and sedation **(4.1b)**
- Identify performance measures and the format and frequency of reporting **(1.9)**
- Set performance measurement goals **(1.8)**
- Collect data on compliance with policies and protocols **(1.7b)**
- Collect data on incidence and severity of medication-related respiratory complications **(4.8)**
- Provide timely feedback and outcomes data to staff. **(1.9b, 4.2c)**

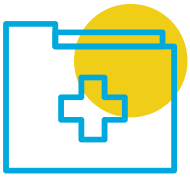
Quality-improvement activities

Health service organisations:

- Implement and evaluate quality-improvement strategies to reduce the frequency and harm from complications of analgesic and sedative use **(4.2)**
- Use audits of patient clinical records and other data to:
  - identify opportunities for improving medication review and reconciliation plans **(4.2)**
  - monitor the overall effectiveness of systems for prevention and management of medication-related respiratory depression **(1.11g, 1.13c, 1.14g)**
- Use audits of patient clinical records, transfer and discharge documentation and other data to:
  - identify opportunities for improving analgesic and sedative prescribing and administration (such as audit of junior medical officers' opioid prescribing and feedback to individuals) **(4.2)**
  - assess compliance with analgesic and sedation protocols **(4.2)**
  - identify strategies to improve the use and effectiveness of analgesic and sedation protocols. **(4.2)**

Equipment and devices

Health service organisations facilitate access to equipment and devices for the safe delivery of analgesics and sedatives, such as patient-controlled analgesia pumps. **(1.29b)**



Developing the patient's comprehensive care plan

to support best practice in prevention and management of medication-related respiratory depression

Clinicians should partner with patients, carers and families in assessing risk, in providing appropriate information to support shared decision making, and in planning care that meets the needs of patients and their carers.

Identifying risk factors for medication-related respiratory depression

Clinicians identify risk factors for medication-related respiratory depression, including:

- Impaired renal or hepatic function
- Age over 55 years
- History of COPD with CO_2 retention
- Polypharmacy with agents that compromise renal or hepatic function
- Severely compromised status of health
- Smoker (>20 pack years)
- History of daytime somnolence or snoring
- Prolonged surgery (>2 hours)
- Thoracic or other large incision interfering with adequate ventilation.

Clinical assessment

Clinicians routinely monitor physiological observations; for example, respiratory rate, oxygen saturation.

Clinicians comprehensively assess:

- Conditions
- Risk factors
- Medication use, history and allergies.

Clinicians document risks in clinical record.

Informing patients with a high risk

Clinicians provide information for patients at high risk and their carers about signs of opioid toxicity and escalation processes.

Collaborating and working as a team

Medical, nursing, pharmacy and allied health staff work collaboratively to perform clinical assessment.

Documenting and communicating the care plan

Clinicians document in the clinical record and communicate the findings of the clinical assessment process.

Delivering comprehensive care to prevent and manage medication-related respiratory depression

Safe care is delivered when the individualised care plan, that has been developed in partnership with patients, carers and family, is followed.

Collaborating and working as a team

Medical, nursing, pharmacy and allied health staff work collaboratively to deliver analgesia and sedation.

Delivering analgesia and sedation in partnership with patients and carers

Clinicians, patients and carers work in partnership to use the comprehensive care plan to deliver analgesia and sedation where clinically indicated.

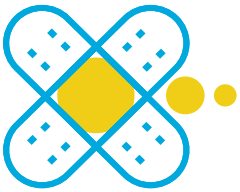
Delivering management in partnership

Clinicians, patients and carers work in partnership to manage patients who have opioid or sedative toxicity according to best-practice guidelines.

Monitoring and improving care

Clinicians should:

- Monitor the effectiveness of strategies to prevent opioid and sedative toxicity
- Review and update the pain management plan if it is not effective or is causing adverse effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.



Minimising specific patient harm

Patients at risk of specific harms are identified, and clinicians deliver targeted strategies to prevent and manage these harms.

Hydration

Clinicians should ensure the fluid requirements of the patient are planned, delivered and adjusted as appropriate and the patient's intake is monitored to prevent acute kidney injury which may impact opioid metabolism.

DIAGNOSTIC GROUP 2: HAEMORRHAGIC DISORDER DUE TO CIRCULATING ANTICOAGULANTS

Haemorrhagic disorder due to inappropriate dosing of anticoagulants can lead to excessive bruising or catastrophic bleeding in the form of localised haemorrhage, haematemesis, haemoptysis, malaena, and epistaxis, and may lead to circulatory collapse, shock, and even death. While anticoagulant overdose itself has no immediate clinical signs, the resulting sequelae of catastrophic bleeding and haemorrhage can occur in the context of common 'low-risk' surgical procedures (such as colonoscopy or dental extraction), accidental falls (such as intracranial haemorrhage) or existing comorbidities (such as gastrointestinal bleeding).

Anticoagulants are recognised as high-risk medicines.[4,5] The multiple indications and frequency of use of anticoagulants increase the risk of complications. These complications may be due to:

- Inappropriate prescribing, including duplication of anticoagulation prescribing
- Incorrect administration
- Inadequate monitoring
- Infuser malfunction.[7]

Top tips for prevention and management of haemorrhagic disorder due to circulating anticoagulants

The following provides key points for clinicians to consider to avoid this hospital-acquired complication

Conduct risk assessment

- Conduct a comprehensive risk assessment
- Identify risk factors such as:
  - Impaired renal or hepatic function
  - Coagulopathies or bleeding history (patient or family)
  - Recent bleeding (within 48 hours) or active bleeding
  - Comorbidities including history of hypertension or stroke
  - Active peptic ulcer or ulcerative gastrointestinal disease
  - Polypharmacy with interactions and incompatibilities
  - Concurrent use of other medicines known to increase the risk of bleeding (such as aspirin, non-steroidal anti-inflammatory drugs, clopidogrel, dipyridamole, enoxaparin, warfarin, dabigatran, rivaroxaban, apixaban) or to alter the metabolism of anticoagulants
  - History of heparin-induced thrombocytopaenia
  - Surgical procedure with high bleeding risk, such as intracranial surgery, head and neck surgery.

For a patient at risk, develop a prevention plan as part of a comprehensive care plan

Develop prevention plan

Clinicians, patients and carers develop an individualised, comprehensive prevention plan to prevent haemorrhagic disorder due to circulating anticoagulants that identifies:

- Goals of treatment consistent with the patient's values
- Any specific nursing requirements
- Any allied health interventions required
- Observations or physical signs to monitor and determine frequency of monitoring
- Laboratory results to monitor and determine frequency of monitoring
- If specialist assistance is required.

Deliver prevention plan

- Clinicians, patients and carers work in partnership to deliver anticoagulation and VTE prophylaxis where clinically indicated
- Patients who experience a bleed are managed according to best-practice guidelines.

Monitor

- Monitor the effectiveness of strategies to prevent excessive anticoagulation
- Review and update the anticoagulation plan if it is not effective or is causing adverse effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement
- Ensure appropriate follow-up has been attended.

Clinical governance structures and quality-improvement processes

to support best practice in preventing and managing haemorrhage due to circulating anticoagulants

Health service organisations need to ensure systems are in place to prevent haemorrhage due to circulating anticoagulants through effective clinical governance and quality improvement.

The NSQHS Standards (2nd ed.) describe actions that are relevant to the prevention and management strategies outlined below. These actions are identified in brackets.

Policies, procedures and/or protocols

Health service organisations ensure policies, procedures and/or protocols for anticoagulation and VTE prophylaxis are consistent with national evidence-based guidelines. **(1.27, 5.1a)**

Identify key individuals/ governance groups

Health service organisations identify an individual or a governance group (such as Drug and Therapeutics Committee) that is:

- Responsible for monitoring compliance with the organisation's anticoagulation and VTE prophylaxis, procedures and protocols **(1.7b, 5.2a)**
- Responsible for presenting data on the performance of anticoagulation and VTE prophylaxis systems to the governing body. **(1.9, 5.2c)**

Training requirements

Health service organisations:

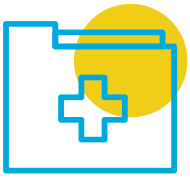
- Identify workforce training requirements **(1.20a)**
- Train relevant workforce on the use of anticoagulation and VTE prophylaxis **(1.20b, 1.20c)**
- Ensure workforce proficiency is maintained. **(1.20d, 1.22, 1.28b)**

Monitoring the delivery of prophylaxis and care

Health service organisations ensure mechanisms are in place to:

- Report medication complications **(1.9, 5.2)**
- Manage risks associated with anticoagulation and VTE prophylaxis **(5.1b)**
- Identify performance measures and the format and frequency of reporting **(1.8a)**
- Set performance measurement goals **(1.7b)**
- Collect data on compliance with policies and protocols **(1.7b)**
- Collect data on incidence and severity of haemorrhage due to circulating anticoagulants **(1.8, 5.2)**
- Provide timely feedback and outcomes data to staff. **(1.9)**

Quality-improvement activities	Health service organisations: • Implement and evaluate quality-improvement strategies to reduce the frequency and harm from complications of anticoagulants **(5.2)** • Use audits of patient clinical records and other data to: – identify opportunities for improving medication review and reconciliation plans **(5.2)** – monitor the overall effectiveness of systems for prevention and management of haemorrhage due to circulating anticoagulants **(5.2)** • Use audits of patient clinical records, transfer and discharge documentation and other data to: – identify opportunities for improving anticoagulation and VTE prophylaxis prescribing and administration (such as audit of VTE prophylaxis and anticoagulant prescribing and feedback to individual clinicians) **(5.2)** – assess compliance with anticoagulation and VTE prophylaxis protocols **(5.2)** – identify strategies to improve the use and effectiveness of anticoagulation and VTE prophylaxis protocols. **(5.2)**
Equipment and devices	Health service organisations facilitate access to equipment and devices for the safe delivery of anticoagulants, such as infusion pumps. **(1.29b)**
Information technology	Consider electronic medication management systems. **(1.16, 4.1, 4.2)**



Developing the patient's comprehensive care plan

to support best practice in preventing and managing haemorrhage due to circulating anticoagulants

Clinicians should partner with patients, carers and families in assessing risk, in providing appropriate information to support shared decision making, and in planning care that meets the needs of patients and their carers.

Identifying bleeding risk factors

Clinicians identify risk factors for bleeding which include:

- Impaired renal or hepatic function
- Coagulopathies or bleeding history (patient or family)
- Recent bleeding (within 48 hours) or active bleeding
- Comorbidities including history of hypertension or stroke
- Active peptic ulcer or ulcerative gastrointestinal disease
- Polypharmacy with interactions and incompatibilities
- Concurrent use of other medicines known to increase the risk of bleeding (such as aspirin, non-steroidal anti-inflammatory drugs, clopidogrel, dipyridamole, enoxaparin, warfarin, dabigatran, rivaroxaban, apixaban) or to alter the metabolism of anticoagulants
- History of heparin-induced thrombocytopaenia
- Surgical procedure with high bleeding risk, such as intracranial surgery, head and neck surgery.

Clinical assessment

Clinicians comprehensively assess:

- Conditions
- Bleeding risk
- Medication use, history and allergies
- Cognition.

Clinicians document risks in clinical record.

Informing patients with a high risk

Clinicians provide information about signs of haemorrhage and escalation processes to high-risk patients and their carers.

Collaborating and working as a team

Medical, nursing, pharmacy and allied health staff work collaboratively to perform clinical assessment.

Documenting and communicating the care plan

Clinicians document in the clinical record and communicate the findings of the clinical assessment process.

Delivering comprehensive care

to prevent and manage haemorrhage due to circulating anticoagulants

Safe care is delivered when the individualised care plan, which has been developed in partnership with patients, carers and family, is followed.

Collaborating and working as a team	Medical, nursing, pharmacy and allied health staff work collaboratively to deliver anticoagulation and VTE prophylaxis.
Delivering anticoagulation and VTE prophylaxis in partnership with patients and carers	Clinicians work in partnership with patients and carers to use the comprehensive care plan to deliver anticoagulation and VTE prophylaxis where clinically indicated.
Delivering management in partnership	Clinicians work in partnership with patients and carers work to ensure patients who experience a bleed are managed according to best-practice guidelines.
Monitoring and improving care	Clinicians should: • Monitor the effectiveness of strategies to prevent excessive anticoagulation • Review and update the anticoagulation plan if it is not effective or is causing adverse effects • Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement • Ensure appropriate follow up has been attended.

DIAGNOSTIC GROUP 3: HYPOGLYCAEMIA

The high prevalence of diabetes in our communities and hospitals, changes to oral intake during hospitalisation and the narrow therapeutic index of some hypoglycaemic agents predispose patients to hypoglycaemia. Hypoglycaemia causes symptoms such as anxiety, dizziness, nausea or vomiting, seizures and coma.[8]

Insulin and oral hypoglycaemics are recognised as high-risk medicines.[4,5]

Hospital-related factors, such as fasting for surgery or investigations, appetite fluctuations due to nausea and vomiting, and other changes to daily routines while in hospital, can all affect blood glucose levels. This can lead to potential complications. Errors such as dose omissions, over-dosage, or wrong-rate errors have also commonly been cited as some of the causes of complications related to insulin usage and resulting hypoglycaemia.[9]

Top tips for prevention and management of hypoglycaemia

The following provides key points for clinicians to consider to avoid this hospital-acquired complication

Conduct risk assessment

Conduct a comprehensive risk assessment.

Identify key risk factors such as:

- Illness that impacts on glycaemic activity and metabolism
- Comorbidities or treatment plans that impact on oral intake
  - pre-procedure/investigation fasting
  - emetigenic medications
  - emetigenic treatments (such as radiation)
- Polypharmacy with interactions and incompatibilities.

For a patient at risk, develop a prevention plan as part of a comprehensive care plan

Develop prevention plan

Clinicians, patients and carers develop an individualised, comprehensive prevention plan to prevent hypoglycaemia that identifies:

- Goals of treatment consistent with the patient's values
- Any specific nursing requirements
- Any allied health interventions required
- Observations or physical signs to monitor and determine frequency of monitoring
- Laboratory results to monitor and determine frequency of monitoring
- If specialist assistance is required.

Deliver prevention plan

- Clinicians, patients and carers work in partnership to deliver a comprehensive care plan to deliver optimal blood glucose management
- Manage patients who experience hypoglycaemia according to best-practice guidelines.

Monitor

- Monitor the effectiveness of strategies to maintain optimal blood glucose control
- Review and update the diabetes management plan if it is not effective or is causing adverse effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement
- Ensure the patient is referred for appropriate support services.

Clinical governance structures and quality-improvement processes

to support best practice in preventing and managing hypoglycaemia

Health service organisations need to ensure systems are in place to prevent hypoglycaemia through effective clinical governance and quality improvement.

The NSQHS Standards (2nd ed.) describe actions that are relevant to the prevention and management strategies outlined below. These actions are identified in brackets.

Policies, procedures and/or protocols

Health service organisations ensure policies, procedures and/or protocols for blood glucose management are consistent with national evidence-based guidelines. **(1.27, 5.1a)**

Identification of key individuals/ governance groups

Health service organisations identify an individual or a governance group (such as Drug and Therapeutics Committee) that is:

- Responsible for monitoring compliance with the organisation's policies, procedures and protocols regarding blood glucose management / insulins and oral hypoglycaemics **(1.7b, 5.2a)**
- Responsible for presenting data on the performance of blood glucose management systems to the governing body. **(1.9, 5.2c)**

Training requirements

Health service organisations:

- Identify staff training requirements **(1.20a)**
- Train relevant staff on the monitoring of blood glucose levels and the use of insulins and oral hypoglycaemics **(1.20b, 1.20c)**
- Ensure workforce proficiency is maintained. **(1.20d, 1.22, 1.28b)**

Monitoring the delivery of blood glucose management

Health service organisations ensure mechanisms are in place to:

- Report medication complications **(1.9, 5.2)**
- Manage risks associated with insulins and oral hypoglycaemics **(5.1b)**
- Identify performance measures and the format and frequency of reporting **(1.8a)**
- Set performance measurement goals **(1.7b)**
- Collect data on compliance with policies and protocols **(1.7b)**
- Collect data on incidence and severity of hypoglycaemic complications **(1.8, 5.2)**
- Provide timely feedback and outcomes data to staff. **(1.9)**

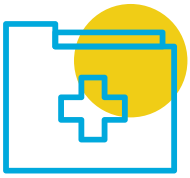
Quality-improvement activities

Health service organisations:

- Implement and evaluate quality-improvement strategies to reduce the frequency and harm from use of hypoglycaemic agents **(5.2)**
- Use audits of patient clinical records and other data to:
  - identify opportunities for improving medication review and reconciliation plans **(5.2)**
  - monitor the overall effectiveness of systems for blood glucose management **(5.2)**
- Use audits of patient clinical records, transfer and discharge documentation and other data to:
  - identify opportunities for improving insulin and oral hypoglycaemic prescribing and administration (such as audit insulin and oral hypoglycaemic prescribing, completion of insulin/diabetes management/blood glucose management charts and feedback to individuals) **(5.2)**
  - assess compliance with blood glucose management/insulin and oral hypoglycaemic protocols **(5.2)**
  - identify strategies to improve the use and effectiveness of blood glucose management/insulin and oral hypoglycaemic protocols. **(5.2)**

Equipment and devices

Health service organisations facilitate access to equipment and devices for the safe delivery of insulin, such as infusion pumps. **(1.29b)**



Developing the patient's comprehensive care plan

to support best practice in preventing and managing hypoglycaemia

Clinicians should partner with patients, carers and families in assessing risk, in providing appropriate information to support shared decision making, and in planning care that meets the needs of patients and their carers.

Identifying risk factors for hypoglycaemia

Clinicians identify risk factors for hypoglycaemia which include:

- Illness that impacts on glycaemic activity and metabolism
- Comorbidities or treatment plans that impact on oral intake:
  - pre-procedure / investigation fasting
  - emetigenic medications
  - emetigenic treatments (such as radiation)
- Polypharmacy with interactions and incompatibilities.

Clinical assessment

Clinicians comprehensively assess:

- Conditions
- Risk factors
- Medication use, history and allergies
- Cognition in the older patient.

Clinicians document risks in clinical record.

Informing patients with a high risk	Clinicians provide information about signs of hypoglycaemia and escalation processes to high-risk patients and their carers.
Collaborating and working as a team	Medical, nursing, pharmacy and allied health staff work collaboratively to perform clinical assessment.
Documenting and communicating the care plan	Clinicians document in the clinical record and communicate: • The findings of the clinical assessment process • The planned frequency of blood glucose management.

Delivering comprehensive care

to prevent and manage medicine-related hypoglycaemia

Safe care is delivered when the individualised care plan, which has been developed in partnership with patients, carers and family, is followed.

Collaborating and working as a team	Medical, nursing, pharmacy and allied health staff work collaboratively to deliver blood glucose management.
Delivering blood glucose management in partnership with patients and carers	Clinicians work in partnership with patients and carers to use the comprehensive care plan to deliver optimal blood glucose management.
Delivering management in partnership	Clinicians work in partnership with patients and carers to ensure patients who experience hypoglycaemia are managed according to best-practice guidelines.
Monitoring and improving care	Clinicians should: • Monitor the effectiveness of strategies to maintain optimal blood glucose control • Review and update the diabetes management plan if it is not effective or is causing adverse effects • Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement • Ensure the patient is referred for appropriate support services.

Additional resources

Medication Complications

Australian Commission on Safety and Quality in Health Care. Medication safety and quality education and training.

Australian Commission on Safety and Quality in Health Care. Medication reconciliation resources from Australian High 5s Project.

Clinical Excellence Commission (AU). Medication Safety and Quality.

Clinical Excellence Commission (AU). Medication Safety Self Assessment for Australian Hospitals. 2015.

Harris Y, Hu DJ, Lee C, Mistry M, York A, Johnson TK. Advancing Medication Safety: Establishing a National Action Plan for Adverse Drug Event Prevention. Joint Commission Journal on Quality and Patient Safety. 2015; 41(8):[351–60 pp.]

Institute for Healthcare Improvement (US). How-to Guide: Prevent Harm from High-Alert Medications. Cambridge, MA: Institute for Healthcare Improvement; 2012.

NSW Health. High-Risk Medicines Management Policy. NSW Health Policy Directive PD2015_029. Sydney: NSW Health; 2015.

National Institute for Health and Care Excellence (UK). Medicines optimisation: the safe and effective use of medicines to enable the best possible outcomes. NICE guideline [NG5] March 2015

National Co-ordinating Council for Medication Error Reporting and Prevention (NCCMERP). Factsheet: Contemporary View of Medication-Related Harm. A New Paradigm. (US) NCCMERP; 2015.

The Society of Hospital Pharmacists of Australia (SHPA). SHPA Quick Guide Assessment of current medication management. 2013.

Clyne W, Blenkinsopp A, Seal R. A Guide to Medication Review. Liverpool, UK: National Prescribing Centre; 2008.

Medication related respiratory complications/ respiratory depression

American Society of Anesthesiologists Task Force on Neuraxial Opioids and the American Society of Regional Anesthesia and Pain Medicine. Practice Guidelines for the Prevention, Detection, and Management of Respiratory Depression Associated with Neuraxial Opioid Administration. Anesthesiology. 2016;124(3):535–52.

Jarzyna D, Jungquist CR, Pasero C, Willens JS, Nisbet A, Oakes L, et al. American Society for Pain Management Nursing Guidelines on Monitoring for Opioid-Induced Sedation and Respiratory Depression. Pain Management Nursing. 2011;12(3):118–45.e10.

National Institute for Health and Care Excellence (UK). Controlled drugs: safe use and management. 2016.

Haemorrhagic disorder due to circulating anticoagulants

Clinical Excellence Commission (AU). Non-vitamin K Antagonist Oral Anticoagulant (NOAC) Guidelines. Sydney: Clinical Excellence Commission; 2016.

Cousins D, Harris W, Team SMP. Risk assessment of anticoagulant therapy. London: National Patient Safety Agency; 2006. Alternative link.

ISMP Canada. Appropriate Anticoagulant Use – A Patient Safety Priority. ISMP Canada Safety Bulletin 2006 December 30; 6(10).

ISMP Canada. Enhancing Safety with Unfractionated Heparin: A National and International Area of Focus. ISMP Canada Safety Bulletin. 2008 July 25; 8(5).

Jennings H, Miller E, Williams T, Tichenor S, Woods E. Reducing anticoagulant medication adverse events and avoidable patient harm. Joint Commission Journal on Patient Quality and Safety. 2008;34(4):196–200.

National Patient Safety Agency. Patient Safety Alert: Actions that can make anticoagulant therapy safer. London: National Patient Safety Agency; 2007.

Purdue University PharmaTAP. Anticoagulant Toolkit: Reducing Adverse Drug Events & Potential Adverse Drug Events with Unfractionated Heparin, Low Molecular Weight Heparins and Warfarin. Indianapolis, IN: Purdue University; 2008.

Scottish Intercollegiate Guidelines Network. Prevention and management of venous thromboembolism: A national clinical guideline. Edinburgh: Healthcare Improvement Scotland; 2010.

Hypoglycaemia

Canadian Patient Safety Institute. Altered Blood Glucose.

ISMP Canada. Insulin Errors. ISMP Canada Safety Bulletin. 2003; 3(4).

Stanisstreet D, Walden E, Jones C, Graveling A. The Hospital Management of Hypoglycaemia in Adults with Diabetes Mellitus. London: NHS; 2010.

Note on data

The data used in this sheet are for hospital-acquired complications recorded during episodes of care in Australian public hospitals in 2015–16. Data are included where hospitals were able to identify that the complication had arisen during an admission using the condition onset flag. Figures reported by the Independent Hospitals Pricing Authority (IHPA) may differ due to the IHPA's methodology, which applies different inclusion/exclusion criteria.

References

1. Independent Hospital Pricing Authority (AU). Activity Based Funding Admitted Patient Care 2015–16, acute admitted episodes, excluding same day.
2. Independent Hospital Pricing Authority, Pricing and funding for safety and quality – Risk adjustment model for hospital acquired complications – version 3, March 2018, IHPA: Sydney.
3. Australian Commission on Safety and Quality in Health Care. National Safety and Quality Health Service Standards (second edition). Sydney 2017.
4. Clinical Excellence Commission (AU). Medication Safety and Quality: High Risk Medicines. Available from: http://www.cec.health.nsw.gov.au/patient-safety-programs/medication-safety/high-risk-medicines.
5. Australian Commission on Safety and Quality in Health Care. Medication Safety Alerts and Notices. Available from: https://www.safetyandquality.gov.au/our-work/medication-safety/high-risk-medicines/.
6. National Health Service (UK). Rapid Response Report: Reducing risk of overdose with midazolam injection in adults. 2008; Available from: http://www.nrls.npsa.nhs.uk/resources/?entryid45=59896.
7. The Joint Commission (US). Preventing errors relating to commonly used anticoagulants. Sentinel Event Alert 41 [Internet]. 2008 September 24. Available from: http://www.jointcommission.org/assets/1/18/sea_41.pdf
8. ISMP Canada. Insulin Errors. ISMP Canada Safety Bulletin [Internet]. 2003; 3(4). Available from: http://www.ismp-canada.org/download/safetyBulletins/ISMPCSB2003-04Insulin.pdf.
9. Pennsylvania Patient Safety Authority. Medication Errors with the Dosing of Insulin: Problems across the Continuum. Pennsylvania Patient Safety Advisory [Internet]. 2010; 7(1):[9-17 pp.]. Available from: http://www.patientsafetyauthority.org/ADVISORIES/AdvisoryLibrary/2010/Mar7%281%29/Pages/09.aspx.

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