

RESPIRATORY 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

This hospital-acquired complication includes the diagnoses of respiratory failure and acute respiratory distress syndromes requiring ventilation and aspiration pneumonia.*



Why focus on respiratory failure?

Each year, patients in Australia experience more than 10,600¹ respiratory complications while in hospital. Patients with respiratory failure and acute respiratory distress syndromes experience profoundly distressing symptoms including increasing shortness of breath to the point of air hunger and overwhelming anxiety. Patients with aspiration pneumonia may also experience worsening shortness of breath, cough, purulent phlegm, fevers, sweats, fatigue and drowsiness.

The rate of hospital-acquired respiratory complications in Australian hospitals was 24 per 10,000 hospitalisations in 2015–16.¹ Hospital-acquired respiratory complications extend the length of hospitalisation, which impacts on patients and their families. These complications also 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.

In many cases, respiratory complications are preventable. Significant reductions in respiratory complications rates are being achieved in some hospitals through preventative initiatives. The rate for respiratory complications at Principal Referral Hospitals[†] was 30 per 10,000 hospitalisations in 2015–16.¹ If all Principal Referral Hospitals above this rate reduced their rate to 30 per 10,000 hospitalisations, then 1,555 respiratory complications during hospitalisation in these hospitals would have been prevented, and more when other types of facilities are considered.

* 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 respiratory complications?

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



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

- Has systems for prevention of respiratory complications and ventilatory failure management that are consistent with best-practice guidelines
- Ensures that equipment and devices are available to effectively manage respiratory complications.



Clinicians caring for patients at risk of respiratory complications:

- Conduct comprehensive assessments in accordance with best practice
- Provide aspiration prevention and care in accordance with best practice guidelines.



The National Safety and Quality Health Service (NSQHS) Standards (second edition), in particular the Comprehensive Care Standard³, 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.

Top tips for prevention and management of respiratory failure including acute respiratory distress syndromes requiring ventilation

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: chronic obstructive pulmonary disease, impaired mobility and inability to elevate head, recent surgery, abdominal and chest wounds, obesity, nutritional status and hydration, impaired swallow and/or cough reflex, recent chest infection with ongoing production of secretions, respiratory centre depressants, such as opioids, benzodiazepines and post anaesthetic, respiratory muscle weakness due to neuromuscular conditions and/or severely compromised states of health
- Undertake routine observations of respiratory function where appropriate, including respiratory rate and monitoring of oxygen saturation for patients at-risk of respiratory failure and document these observations in the clinical record.

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 respiratory failure that identifies:

- Goals of treatment consistent with the patient's values
- Any specific nursing requirements, including equipment needs
- Any allied health interventions required, including equipment needs
- 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

Deliver respiratory failure prevention strategies where clinically indicated, such as:

- Re-position and/or mobilise routinely
- Elevate bed head to sitting position
- Provide supplementary oxygen as per medical orders
- Active humidification for medical gases and appropriate administration of fluids according to the patients clinical history and situation
- Active and passive chest physiotherapy
- Manage pain effectively
- Monitor physiological status including oxygen saturation and auscultate chest routinely
- Establish baseline measures and diagnostic images for ongoing evaluation of the patient's respiratory status and lung fields
- Obtain sputum samples for microscopy and sensitivities to determine the most effective antibiotic regime when required.

Monitor

- Monitor the effectiveness of the respiratory failure prevention strategies , and reassess the patient if respiratory failure occurs
- Review and update the care plan if it is not effective or is causing side effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.

RESPIRATORY FAILURE INCLUDING ACUTE RESPIRATORY DISTRESS SYNDROMES REQUIRING VENTILATION



Clinical governance structures and quality-improvement processes

to support best practice in respiratory failure prevention and management

Health service organisations need to ensure systems are in place to prevent respiratory failure 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 protocols

Health service organisations ensure policies, procedures and protocols are consistent with national evidence-based guidelines for the risk assessment, prophylaxis and management of respiratory failure. **(1.27, 1.7, 3.19, 5.13f)**

Best-practice risk assessment and management

Health service organisations:

- Agree on the process and criteria for respiratory failure risk assessment **(3.4, 5.10)**
- Inform the clinical workforce of screening requirements **(5.1a, 5.1c)**
- Identify a format for respiratory action plans for high-risk patients **(5.1b, 5.7, 5.12, 5.13a)**
- Identify a management plan format for patients with respiratory failure **(5.12, 5.13a, 5.13e)**
- Apply criteria to trigger early recognition of deterioration and appropriate clinical intervention. **(8.1a, 8.4)**

Identification of key individuals/governance groups

Health service organisations identify an individual or a governance group that is responsible for:

- Monitoring compliance with the organisation's respiratory failure procedures and protocols **(1.25, 3.2)**
- Presenting data on the performance of respiratory failure prevention and management systems to the governing body **(1.25b, 1.9)**
- Overseeing the care of patients at risk of or with respiratory failure. **(5.14)**

Training requirements

Health service organisations:

- Identify workforce training requirements **(1.20)**
- Train relevant workers on the use of risk assessment, respiratory action plans, and respiratory failure management **(1.20, 3.1a)**
- Ensure workforce proficiency is maintained. **(1.20, 1.22, 1.28b)**

Monitoring the delivery of prophylaxis and care

Health service organisations ensure mechanisms are in place to:

- Report respiratory failure **(1.11)**
- Manage risks associated with prevention and management of respiratory failure **(3.4, 5.1b)**
- Identify performance measures and the format and frequency of reporting **(1.9, 5.2c)**
- Set performance measurement goals **(1.1, 1.3)**
- Collect data on compliance with policies **(1.7c)**
- Collect data about respiratory risk-assessment activities, including whether risk assessment is leading to appropriate action **(1.11, 5.1b, 5.2)**
- Identify gaps in systems for risk-assessing patients for respiratory failure, collect data on incidence and severity of respiratory failure **(5.2)**
- Provide timely feedback and outcomes data to staff. **(1.9)**

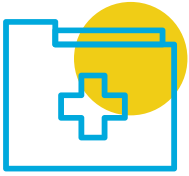
Quality-improvement activities

Health service organisations:

- Implement and evaluate quality-improvement strategies to reduce the frequency and harm from respiratory failure **(3.2)**
- Use audits of patient clinical records and other data to:
 - identify opportunities for improving respiratory action plans **(3.2c)**
 - identify gaps and opportunities to improve the use of respiratory action plans (such as increasing the number of at-risk patients who have respiratory action plans implemented) **(3.2c)**
 - monitor the overall effectiveness of systems for prevention and management of respiratory failure **(3.2c)**
- Use audits of patient clinical records, transfer and discharge documentation and other data to:
 - identify opportunities for improving respiratory action plans **(3.2c, 3.7)**
 - assess compliance with respiratory action plan requirements **(3.2c, 3.7)**
 - identify strategies to improve the use and effectiveness of respiratory action plans. **(3.2c, 3.7)**

Equipment and devices

Health service organisations facilitate access to equipment and devices for the prevention and management of respiratory failure. **(3.10)**



Developing the patient's comprehensive care plan

to support best practice in prevention and management of respiratory complications

Clinicians should collaborate 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 respiratory failure

Hospital-acquired type 1 respiratory failure occurs because of lung complications such as sputum retention, atelectasis, aspiration, fluid overload and nosocomial pneumonia that impair gas exchange and lung mechanics. This manifests as respiratory distress, falling oxygen saturation levels (SpO_2) and increasing requirements for supplemental oxygen.

Hospital-acquired type 2 respiratory failure (hypercapnoea, hypoxaemia) can occur because of the adverse effects on respiratory drive of narcotics, sedatives and high flow oxygen (in some patients) or because of respiratory muscle fatigue in patients with severe type 1 respiratory failure. The identification of type 2 respiratory failure is sometimes delayed because the main clinical feature can be drowsiness and low SpO_2 might be masked by supplemental oxygen. Arterial blood gases are required to diagnose type 2 respiratory failure.

Clinicians identify risk factors for respiratory failure which include^{4,5}:

- Chronic Obstructive Pulmonary Disease
- Impaired mobility and inability to elevate head
- Recent surgery, abdominal and chest wounds
- Obesity
- Nutritional status and hydration
- Impaired swallow and/or cough reflex
- Recent chest infection with ongoing production of secretions
- Respiratory centre depressants, such as opioids, benzodiazepines and post anaesthetic
- Respiratory muscle weakness due to neuromuscular conditions
- Respiratory muscle fatigue
- Severely compromised states of health.

Implement risk assessment screening

Clinicians use relevant risk-assessment processes at presentation to assess the risk of respiratory failure and requirements for prevention strategies.

Clinical assessment

Clinicians comprehensively assess:

- Conditions
- Medicines
- Risks identified through risk assessment process.

Clinicians undertake routine observations of respiratory function where appropriate, including respiratory rate and monitoring of oxygen saturation for patients at risk of respiratory failure and document these observations in the clinical record.

Informing patients with a high risk

Clinicians provide information for patients with high risk and their carers about prevention and management of respiratory failure.

Planning in partnership with patients and carers

Clinicians inform patients, family and carers about the purpose and process of developing a respiratory action plan and invite them to be involved in its development.

Collaboration and working as a team

Medical, nursing, pharmacy and allied health staff work collaboratively to perform respiratory failure risk-assessment and clinical assessment.

Documenting and communicating the care plan

Clinicians document in the clinical record and communicate:

- The findings of the risk assessment process
 - The findings of the clinical assessment process including routine observations of respiratory rate and oxygen saturation monitoring
 - The respiratory action plan.
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Delivering comprehensive care

to prevent and manage respiratory complications

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

Collaboration and working as a team

Medical, nursing, pharmacy staff and allied health staff collaborate to deliver prevention and management of respiratory failure.

Delivering respiratory failure prevention strategies in partnership with patients and carers

Clinicians work in partnership with patients and carers to use the comprehensive care plan to deliver respiratory failure prevention strategies where clinically indicated, for example by^{6,7,8,9}:

- Re-position and/or mobilise the patient routinely
- Elevate bed head to sitting position
- Provide supplementary oxygen as per medical orders
- Active humidification for medical gases and appropriate administration of fluids according to the patients clinical history and situation
- Active and passive chest physiotherapy
- Manage pain effectively
- Monitor physiological status including oxygen saturation and auscultate chest routinely
- Establish baseline measures and diagnostic images for ongoing evaluation of the patient's respiratory status and lung fields, including Arterial Blood Gas if risk of hypoventilation, and to assess ventilatory reserve
- Obtain sputum samples for microscopy and sensitivities to determine the most effective antibiotic regime when required
- Ventilatory support for ventilatory failure.

Delivering respiratory failure management in partnership

Clinicians work in partnership with patients and carers to manage patients who have respiratory failure according to best-practice guidelines.

Monitoring and improving care

Clinicians:

- Monitor the effectiveness of these strategies in preventing respiratory failure and reassess the patient if respiratory failure occurs.
- Review and update the care plan if it is not effective or is causing side effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.

Top tips for prevention and management of aspiration pneumonia

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 swallow and/or cough reflex
- Strokes or other neuromuscular conditions
- Cancers affecting cranial nerves or the recurrent laryngeal nerve
- Poorly controlled nausea and vomiting
- Excessive alcohol consumption.

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 aspiration pneumonia:

- Goals of treatment consistent with the patient's values
- Any specific nursing requirements, including equipment needs
- Any allied health interventions required, including equipment needs
- Observations or physical signs to monitor and determine frequency of monitoring, including temperature, respiratory rate and chest auscultation – and document findings in the clinical record
- Laboratory results to monitor and determine frequency of monitoring
- If specialist assistance is required.

Deliver prevention plan

Where clinically indicated, deliver aspiration pneumonia prevention strategies, such as:

- Speech pathology review
- Drinking thickened fluids
- Sitting upright when eating
- Safe swallowing strategies.

Monitor

- Monitor the effectiveness of the aspiration pneumonia prevention strategies, and reassess the patient if aspiration pneumonia occurs
- Review and update the care plan if it is not effective or is causing side effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.

ASPIRATION PNEUMONIA



Clinical governance structures and quality-improvement processes

to support best practice in aspiration pneumonia prevention and management

Health service organisations need to ensure systems are in place to prevent aspiration pneumonia 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 protocols

Health service organisations ensure policies, procedures and protocols are consistent with national evidence-based guidelines for the risk assessment, prophylaxis and management of aspiration pneumonia. **(1.27, 5.1a)**

Best-practice screening and management

Health service organisations:

- Agree on the process and criteria for aspiration risk screening **(5.7)**
- Inform the clinical workforce of screening requirements **(5.1c)**
- Develop and implement a work process for appropriate referral to allied health such as speech pathology for swallowing assessment for patients identified as at-risk of aspiration **(5.5, 5.6)**
- Identify a format for prevention plans for high-risk patients **(5.4)**
- Identify a management plan format for patients who are aspirating. **(5.4)**

Identification of key individuals/governance groups

Health service organisations identify an individual or a governance group that is responsible for:

- Monitoring compliance with the organisation's aspiration policies, procedures and protocols **(5.2a, 1.7b)**
- Presenting data on the performance of aspiration prevention and management systems to the governing body **(1.9, 5.2c)**
- Overseeing the outcomes of care of patients with aspiration and aspiration pneumonia. **(5.5b)**

Training requirements

Health service organisations:

- Identify workforce training requirements **(1.20a)**
- Train relevant staff on the use of risk screening, prevention plans and aspiration management plans **(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 aspiration pneumonia **(1.9, 5.2)**
- Manage risks associated with aspiration prophylaxis and management **(5.13)**
- Identify performance measures and the format and frequency of reporting **(1.8a)**
- Set performance measurement goals **(1.8a)**
- Collect data on compliance with policies **(1.7b)**
- Collect data about risk-screening activities for aspiration, including whether risk assessment is leading to appropriate action **(1.8, 5.1b, 5.2)**
- Identify gaps in systems for screening patients for aspiration, and collect data on incidence and severity of aspiration pneumonia **(5.2)**
- Provide timely feedback and outcomes data to staff. **(1.9)**

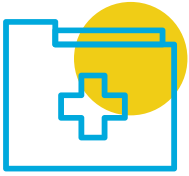
Quality-improvement activities

Health service organisations:

- Implement and evaluate quality-improvement strategies to reduce the frequency and harm from aspiration pneumonia **(5.2)**
- Use audits of patient clinical records and other data to:
 - identify opportunities for improving aspiration prevention plans **(5.2)**
 - identify gaps and opportunities to improve the use of aspiration prevention plans (such as increasing the number of at-risk patients who have aspiration prevention plans implemented) **(5.2)**
 - monitor the overall effectiveness of systems for prevention and management of aspiration pneumonia **(5.2)**
- Use audits of patient clinical records, transfer and discharge documentation and other data to:
 - identify opportunities for improving aspiration management plans **(5.2)**
 - assess compliance with aspiration management plan requirements **(5.2)**
 - identify strategies to improve the use and effectiveness of aspiration management plans. **(5.2)**

Appropriate nutrition

Health service organisations facilitate access to appropriately thickened beverages and foodstuffs for the prevention and management of aspiration. **(5.27, 5.28)**



Developing the patient's comprehensive care plan

to support best practice in prevention and management of respiratory complications

Clinicians should collaborate 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 aspiration pneumonia

Clinicians identify risk factors for aspiration pneumonia which include:

- Impaired swallow and/or cough reflex
- Strokes or other neuromuscular conditions
- Cancers affecting cranial nerves or the recurrent laryngeal nerve
- Poorly controlled nausea and vomiting
- Excessive alcohol consumption.

Implement risk assessment screening

Clinicians use relevant screening processes at presentation to assess the risk of aspiration and requirements for prevention strategies.

Clinical assessment

Clinicians comprehensively assess:

- Conditions
- Medicines
- Risks identified through screening process.

Clinicians undertake routine observations including temperature, respiratory rate and chest auscultation for patients at risk of aspiration, and document findings in the clinical record.

Informing patients with a high risk

Clinicians provide information for patients with high risk and their carers about aspiration prevention and management.

Planning in partnership with patients and carers

Clinicians inform patients, family and carers about the purpose and process of developing an aspiration management plan and invite them to be involved in its development.

Collaboration and working as a team

Medical, nursing, pharmacy and allied health staff, especially speech pathology and dietetics, work collaboratively to perform aspiration risk-assessment and swallowing assessments.

Documenting and communicating the care plan

Clinicians document in the clinical record and communicate:

- The findings of the screening process
- The findings of the clinical assessment process including where appropriate, the swallowing assessment
- The aspiration prevention plan including the thickness of fluid for consumption.



Delivering comprehensive care

to prevent and manage respiratory complications

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

Collaboration and working as a team

Medical, nursing, pharmacy staff and allied health staff, especially speech pathology and dietetics, collaborate to deliver aspiration prophylaxis and management.

Delivering aspiration prevention strategies in partnership with patients and carers

Clinicians, patients and carers work in partnership to use the comprehensive care plan to deliver aspiration prevention strategies where clinically indicated, for example by:

- Speech pathology review
- Drinking thickened fluids
- Sitting upright when eating
- Safe swallowing strategies.

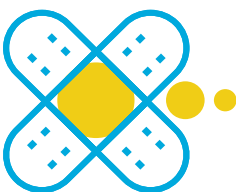
Delivering aspiration management in partnership

Clinicians work in partnership with patients and carers to ensure patients who have aspiration pneumonia are managed according to best-practice guidelines.

Monitoring and improving care

Clinicians:

- Monitor the effectiveness of these strategies in preventing aspiration pneumonia and reassess the patient if aspiration pneumonia occurs
- Review and update the care plan if it is not effective or is causing side effects
- Engage in reviewing clinical outcomes, identifying gaps and opportunities for improvement.

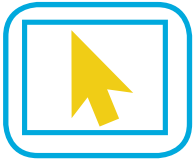


Minimising specific patient harm

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

Nutrition and hydration

Clinicians ensure the nutritional and fluid requirements of the patient are planned, delivered and adjusted as appropriate, and that the patient's intake is monitored.



Additional resources

Australian Commission on Safety and Quality in Health Care. [Track and trigger recognition and response systems](#). [🔗](#) Sydney.

Agency for Healthcare Research and Quality. [Postoperative Respiratory Failure](#). [🔗](#) Rockville (US).

National Institute for Health and Care Excellence. [Respiratory conditions](#). [🔗](#) London (UK).

Clinical Excellence Commission. [Between the flags – keeping patients safe: standard calling criteria](#). [🔗](#) Sydney (AU).

Sanchez D, Smith G, Piper A, Rolls K. [Non-invasive Ventilation Guidelines for Adult patients with Acute Respiratory Failure](#). [🔗](#) Chatswood: Agency for Clinical Innovation; 2014; 44.

Restrepo RD, Wettstein R, Wittnebel L, Tracy M. [Incentive spirometry: 2011](#). [Respiratory Care](#). [🔗](#) 2011 Oct; 56(10).

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.

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9. Kwong JC, Howden BP, Charles PGP. New aspirations: the debate on aspiration pneumonia treatment guidelines. *The Medical Journal Of Australia*. 2011;195(7):380–1.



