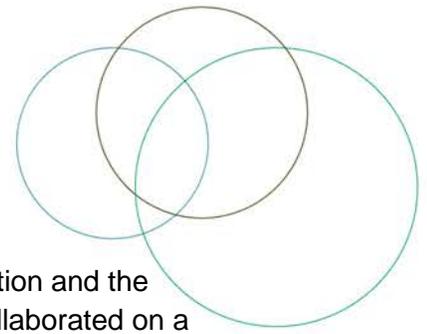


HOSPITAL HARM IMPROVEMENT RESOURCE

Aspiration Pneumonia



ACKNOWLEDGEMENTS



The Canadian Institute for Health Information and the Canadian Patient Safety Institute have collaborated on a body of work to address gaps in measuring harm and to support patient safety improvement efforts in Canadian hospitals.

The Hospital Harm Improvement Resource was developed by the Canadian Patient Safety Institute to complement the Hospital Harm measure developed by the Canadian Institute for Health Information. It links measurement and improvement by providing evidence-informed resources that will support patient safety improvement efforts.

The Canadian Patient Safety Institute acknowledges and appreciates the key contributions of Dr. Claudio Martin, MD FRCCP; Rosemary Martino, MA MSc PhD, and Andrea Hatherall, Reg. CASLPO, M.Cl.Sc. for the review and approval of this Improvement Resource.





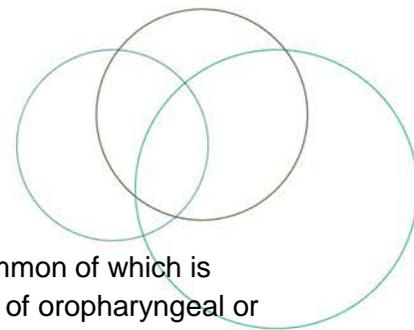
DISCHARGE ABSTRACT DATABASE (DAD) CODES INCLUDED IN THIS CLINICAL CATEGORY:

B16: Aspiration Pneumonia

Concept	Inflammation and infection of the lungs caused by aspiration of solids or liquids during a hospital stay.	
Notes	<ol style="list-style-type: none"> 1. When both aspiration pneumonitis and pneumonia are coded on the same abstract, the event will be included in this clinical group only. 2. This clinical group may include inflammation due to aspiration in the absence of infection. 3. Aspiration pneumonia due to methicillin-resistant <i>Staphylococcus aureus</i> (MRSA) or vancomycin-resistant enterococci (VRE) can also be included in B18: Infections Due to <i>Clostridium difficile</i>, MRSA or VRE. 	
Selection criteria	J69.–	Identified as diagnosis type (2) OR Identified as diagnosis type (3) AND J95.88 as diagnosis type (2) AND Y60–Y84 in the same diagnosis cluster
Exclusions	Abstracts with a length of stay less than 2 days	
Codes	Code descriptions	
J69.–	Pneumonitis due to solids and liquids	
Additional codes		
Inclusions		
T95.88	Other post procedural respiratory disorders <i>Includes:</i> Ventilator associated pneumonia (VAP)	
Y60-Y84	Complications of medical and surgical care (refer to Appendix 6)	

For the descriptions of external cause codes of complications of medical or surgical care (Y60–Y84), please refer to the technical notes: [Hospital Harm Indicator: Appendices to Indicator Library](#).





OVERVIEW

Nosocomial pneumonia can be classified into various subtypes, the most common of which is aspiration pneumonia (Marik, 2011). Aspiration is defined as the misdirection of oropharyngeal or gastric contents into the larynx and lower respiratory tract. Aspiration pneumonia then results when orogastric secretions colonized with bacteria produce an infectious response in the lungs. Aspiration of sterile contents causes chemical inflammation or aspiration pneumonitis (Marik, 2011).

There are three causes for aspirations that lead to aspiration pneumonia:

1. Orogastric secretions in patients with marked disturbance of consciousness. For example, acute neurological insult including stroke or head trauma.
2. Misdirected orally ingested liquids and/or foods due to swallowing difficulties secondary to a medical condition or intervention. For example, progressive neurological illnesses including Parkinson's disease, ALS as well as tumours of the head and neck or iatrogenic causes such as head and neck cancer treatments such as surgical ablation, chemoradiation therapy and damage to the laryngeal area following prolonged endotracheal intubation.
3. Misdirected orally ingested liquids and/or foods due to aging process.

Pneumonitis is best defined as acute lung injury following the aspiration of regurgitated gastric contents. This syndrome occurs in patients with a marked disturbance of consciousness, such as drug overdose, seizures, and anesthesia. Drug overdose is a common cause of aspiration pneumonitis, occurring in approximately 10 per cent of patients hospitalized following a drug overdose. The risk of aspiration increases with the degree of unconsciousness (as measured by the Glasgow Coma Scale). Historically, the syndrome most commonly associated with aspiration pneumonitis is Mendelson's syndrome (Marik, 2011).

Aspiration pneumonia occurs when regurgitated gastric contents or oropharyngeal secretions or food are inadvertently directed into the trachea and subsequently into the lungs. As the bacteria and other microorganisms become part of an infiltrate within the lung tissue, the resulting effect is an infection in the lung (Pace & McCullough, 2010). Approximately half of all healthy adults aspirate small amounts of oropharyngeal secretions during sleep. However, if the mechanical, humoral, or cellular mechanisms are impaired or if the aspirated inoculum is large enough, pneumonia may follow. Any condition that increases the volume and/or bacterial burden of oropharyngeal secretions when the host defense mechanism is impaired may lead to aspiration pneumonia (Marik, 2011). Healthy people commonly aspirate small amounts of oral secretions, but normal defense mechanisms usually clear the inoculum without sequelae. Aspiration of larger amounts, or aspiration in a patient with impaired pulmonary defenses, often causes pneumonia and/or abscess. Elderly patients tend to aspirate because of conditions associated with aging that alter the level of consciousness, sedative use, neurologic disorders, weakness and other disorders. Empyema also occasionally complicates aspiration (Sethi, 2014).



Aspiration Pneumonia

Paediatric populations have different causes of dysphagia than in adult populations. These causes include: cerebral palsy; acquired/traumatic brain injury; other neuromuscular disorders; craniofacial malformations; airway malformations; congenital cardiac disease; gastrointestinal disease; ingestional injuries; and preterm birth (Dodrill & Gosa, 2015; Lefton-Greif & Arvedson, 2007).

Risk Factors for Aspiration Pneumonia and Pneumonitis

(DiBardino, 2015; Marik, 2011, American Association of Neuroscience Nurses, 2006)

1. Dysphagia/swallowing.
2. Altered mental status or decreased alertness and attention span.
3. Esophageal motility disorders/vomiting.
4. Enteral (tube) feeding.
5. Poor oral hygiene, decrease in salivary clearance.
6. Increased impulsiveness or agitation.
7. Use of medications such as psychotropic, neuroleptic, antidepressants, anticholinergic, or phenothiazine drugs.
8. Hyperextended neck or contractures.
9. Facial or neck reconstruction, cancers and their treatments.
10. Long-term intubation.
11. Advancing age due to decreased muscle mass reducing pharyngeal contraction and bolus drive.
12. Supine position.

Paediatric Risk Factors for Aspiration Pneumonia

(Weir et al, 2007)

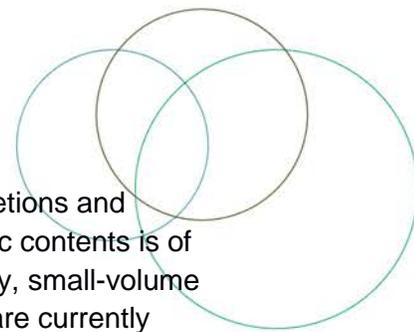
1. Trisomy 21.
2. Asthma.
3. Gastroesophageal reflux disease (GERD).
4. Lower respiratory tract infection.
5. Moist cough.
6. Multisystem diagnoses.

IMPLICATIONS

Aspiration pneumonia represents five per cent to 15 per cent of pneumonias in the hospitalized population (DiBardino, 2015). It has been suggested that dysphagia carries a seven-fold increase risk of aspiration pneumonia and is an independent predictor of mortality (Metheny, 2011).



Aspiration Pneumonia



Critically ill patients have an increased risk for aspirating oropharyngeal secretions and regurgitated gastric contents. For those who are tube-fed, aspiration of gastric contents is of greater concern. While witnessed large-volume aspirations occur occasionally, small-volume clinically silent aspirations are far more common. Because no bedside tests are currently available to detect microaspirations, efforts to prevent or minimize aspiration take on added importance (American Association of Critical-Care Nurses, 2016). Silent aspiration is frequent in the pediatric population (Lefton-Grief et al, 2006; Arvedson et al, 1994).

Aspiration pneumonia generally occurs in elderly, debilitated patients with dysphagia (Marik, 2011). Epidemiological studies have demonstrated that the incidence of pneumonia increases with aging, with the risk being almost six times higher in those over the age of 75, compared to those less than 60 years of age (Marik, 2011).

Aspiration pneumonia is the major cause of death in patients with dysphagia resulting from neurological disorders including cerebrovascular accidents, Parkinson's disease, and dementia (Marik, 2011).

GOAL

To prevent aspiration pneumonia and aspiration pneumonitis in hospitalized patients by implementing strategies known to reduce the incidence of aspiration pneumonia and pneumonitis.

IMPORTANCE FOR PATIENTS AND FAMILIES

Aspiration pneumonia and aspiration pneumonitis occurs when foreign material, such as food, drink, gastric secretions and secretions from the mouth are inhaled and cause inflammation in the lungs and bronchial tubes. Aspiration can often be prevented by dietary interventions for dysphagia e.g. adjusting texture, consistency and amount of food and fluids, frequent oral care, post-pyloric tube (tube passes through stomach and into small intestine) feedings, and the semi-recumbent (45 degree angle) position for mechanically ventilated patients (DiBardino, 2015).

Patient Story

A catalogue of mistakes by an out-of-hours GP service and a hospital contributed to the death of a young woman with physical and learning disabilities, the NHS ombudsman says in a highly critical report that has led to fresh claims of prejudicial attitudes leading to poor care for such vulnerable patients.

The report, by NHS ombudsman Dame Julie Mellor, finds that Tina Papalabropoulos, 23, died in Basildon hospital in Essex of aspiration pneumonia in 2009 after a series of blunders by two NHS organisations. <http://www.theguardian.com/society/2013/may/21/disabled-woman-nhs-blunders-ombudsman>





EVIDENCE INFORMED PRACTICE

Prevention of Aspiration Pneumonia and Pneumonitis in Patients Who Aspirate

(Marik, 2011)

1. Good oral hygiene and tongue cleaning.
2. Providing regular dental care and cleaning teeth with a toothbrush after each meal lowers the risk of aspiration pneumonia (Metheny, 2011):
 - a. The upper airway should be suctioned following a witnessed aspiration.
3. Endotracheal intubation should be considered in patients who are unable to protect their airway.
4. Although common practice, the prophylactic use of antibiotics in patients with suspected or witnessed aspiration is NOT recommended. However, antimicrobial therapy should be considered in patients with an aspiration pneumonitis that fails to resolve within 48 h.
5. Tube feeding is not essential in all patients who aspirate. Short-term tube feeding, however, may be indicated in elderly patients with severe dysphagia and aspiration in whom improvement of swallowing is likely to occur. Those patients whose dysphagia does not resolve may be candidates for placement of a PEG tube.
6. Sedative medication has been demonstrated to increase the risk of pneumonia in residents of long-term care facilities and should, therefore, be avoided.
7. The use of phenothiazines and haloperidol should be very carefully considered, as they reduce oropharyngeal swallow coordination, causing dysphagia.
8. Medications that dry up secretions, including antihistamines and drugs with anticholinergic activity, make it more difficult for patients to swallow and should, therefore, also be avoided.
9. Implement additional strategies to reduce aspiration in specific patient groups (see below).

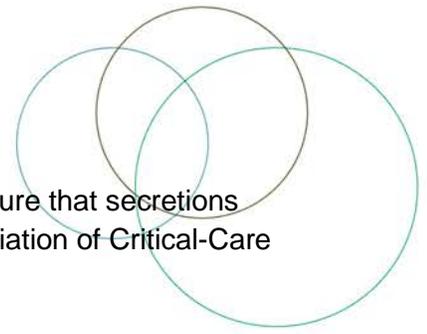
Preventing Aspiration in the Critically Ill

(American Association of Critical-Care Nurses, 2016)

1. Maintain head-of-bed elevation at an angle of 30° to 45°, unless contraindicated.
2. Use sedatives as sparingly as feasible.
3. For tube-fed patients, assess placement of the feeding tube at four-hour intervals.
4. For patients receiving gastric tube feedings, assess for gastro-intestinal intolerance to the feedings at four-hour intervals.
5. For tube-fed patients, avoid bolus feedings in those at high risk for aspiration.
6. Consult with provider about obtaining a swallowing assessment before oral feedings are started for recently extubated patients who have been intubated for more than two days.



Aspiration Pneumonia



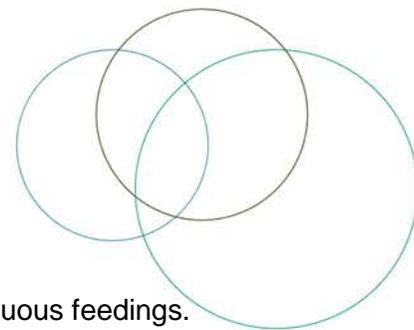
7. Maintain endotracheal cuff pressures at an appropriate level, and ensure that secretions are cleared from above the cuff before it is deflated. (American Association of Critical-Care Nurses, 2016)

Preventing Aspiration in the Older Adult with Dysphagia

(Metheny, 2011)

1. Risk Assessment – Patients should be screened for risk factors for aspiration or dysphagia, and evaluated for dysphagia if risk factors are present. Screening should be performed by a speech-language pathologist when possible.
2. Prevention of aspiration during hand feeding:
 - a. Provide a 30-minute rest period prior to feeding time; a rested person will likely have less difficulty swallowing.
 - b. Sit the person upright in a chair; if confined to bed, elevate the backrest to a 90-degree angle.
 - c. The chin-down or chin-tuck maneuver is widely used in dysphagia treatment although it does not have a precise anatomical definition. The extent to which this maneuver is effective is unclear. Swallowing studies may be needed to determine which individuals are most likely to benefit from this position.
 - d. Adjust rate of feeding and size of bites to the person's tolerance; avoid rushed or forced feeding.
 - e. Alternate solid and liquid boluses.
 - f. Vary placement of food in the person's mouth according to the type of deficit. For example, food may be placed on the right side of the mouth if left facial weakness is present.
 - g. Determine the food viscosity that is best tolerated by the individual. For example, some persons swallow thickened liquids more easily than thin liquids.
 - h. Be aware that some patients may find thickened liquids unpalatable and thus drink insufficient fluids.
 - i. Minimize the use of sedatives and hypnotics since these agents may impair the cough reflex and swallowing.
 - j. Medications that dry up secretions should be avoided since they make it more difficult for patients to swallow.
 - k. Evaluate the effectiveness of cueing, redirection, task segmentation and environmental modifications (minimizing distractions).
 - l. Oral care after meals and snacks (Clayton, 2012; Eisenstadt, 2010).





Preventing Aspiration during Tube Feedings

(Metheny, 2012; American Association of Critical-Care Nurses, 2016)

1. Keep the bed's backrest elevated to at least 30-degrees during continuous feedings.
2. Assess placement of the feeding tube at four-hour intervals.
3. Avoid bolus feedings in those at high risk for aspiration.
4. Ask patients able to communicate if any of the following signs of gastrointestinal intolerance are present: nausea, feeling of fullness, abdominal pain, or cramping. These signs are indicative of slowed gastric emptying that may, in turn, increase the probability for regurgitation and aspiration of gastric contents.
5. Measure gastric residual volumes every four to six hours during continuous feedings and immediately before each intermittent feeding. There is no convincing research-based information regarding how much gastric residual volume is 'too much.'
6. Use of a promotility agent should be considered when an adult patient has two or more gastric residual volumes ≥ 250 ml.

Note: The incidence of pneumonia is not different in patients with nasogastric tubes and percutaneous feeding tubes. However, a gastrostomy tube is more comfortable for the patient than is prolonged use of a nasogastric tube.

Preventing Aspiration in the Pediatric Population

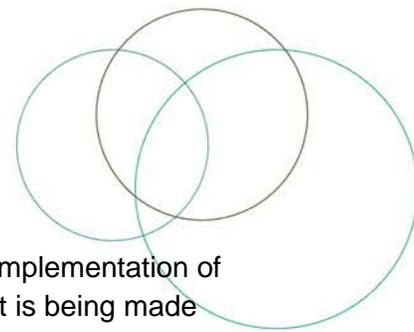
(Dodrill & Gosa, 2015)

1. Modified fluids – adding thickening agents or using naturally thick fluids (i.e., nectar).
2. Modified foods – adjusting the texture or size of solid foods.
3. Special feeding equipment - using different bottles, nipples, spoons, cups.
4. Altering positioning and/or seating equipment.
5. Altering pace of delivery of food.
6. Swallowing maneuvers (i.e., chin tuck).

A multidisciplinary approach to assessment and management of dysphagia and aspiration pneumonia prevention in the pediatric population is important (Dodrill & Gosa, 2015).

Note: See also Hospital Harm Improvement Resource - [Healthcare Associated Pneumonia](#) for details regarding Ventilator-Associated Pneumonia.





MEASURES

Vital to quality improvement is measurement, and this applies specifically to implementation of interventions. The chosen measures will help to determine whether an impact is being made (primary outcome), whether the intervention is actually being carried out (process measures), and whether any unintended consequences ensue (balancing measures).

Below are some recommended measures to use, as appropriate, to track your progress. In selecting your measures, consider the following:

- Whenever possible, use measures you are already collecting for other programs.
- Evaluate your choice of measures in terms of the usefulness of the final results and the resources required to obtain them; try to maximize the former while minimizing the latter.
- Try to include both process and outcome measures in your measurement scheme.
- You may use different measures or modify the measures described below to make them more appropriate and/or useful to your particular setting. However, be aware that modifying measures may limit the comparability of your results to others.

Posting your measure results within your hospital is a great way to keep your teams motivated and aware of progress. Try to include measures that your team will find meaningful and exciting (IHI, 2011).

For more information on measuring for improvement contact the Canadian Patient Safety Institute Central Measurement Team measurement@cpsi-icsp.ca

Outcome Measures

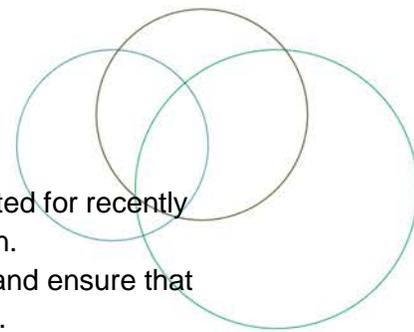
1. Incidence of documented aspiration pneumonia and pneumonitis in critical care patients.
2. Incidence of documented aspiration pneumonia and pneumonitis in the older adult with dysphagia.
3. Incidence of documented aspiration pneumonia and pneumonitis in patients who are tube fed.

Process Improvement Measures

1. Percent of patients with risk assessment for aspiration pneumonia and pneumonitis.
2. Percent of patients at high risk for aspiration pneumonia and pneumonitis with an individual plan of care.
3. Percent of critically ill patients meeting the following prevention bundle criteria:
 - a. Maintain head-of-bed elevation at an angle of 30 to 45 degrees, unless contraindicated.
 - b. Use sedatives as sparingly as feasible.
 - c. Meet tube feeding protocol (see below).

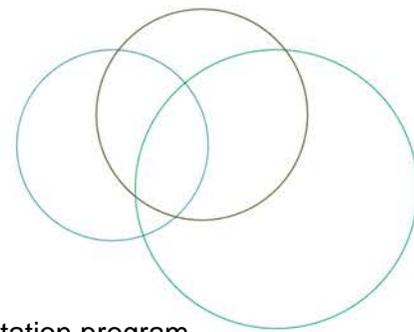


Aspiration Pneumonia



- d. Obtain a swallowing assessment before oral feedings are started for recently extubated patients who have experienced prolonged intubation.
 - e. Maintain endotracheal cuff pressures at an appropriate level, and ensure that secretions are cleared from above the cuff before it is deflated.
4. Percent of older adults with dysphagia meeting the following bundle criteria for aspiration prevention during feeding:
- a. Provide a 30-minute rest period prior to feeding time.
 - b. Sit the person upright in a chair; if confined to bed, elevate the backrest to a 90-degree angle.
 - c. Use the chin-down or chin-tuck maneuver in patients for whom swallowing studies have determined to be beneficial.
 - d. Adjust rate of feeding and size of bites to the person's tolerance.
 - e. Alternate solid and liquid boluses.
 - f. Vary placement of food in the person's mouth according to the type of deficit.
 - g. Use the food viscosity that is best tolerated by the individual.
 - h. Minimal use of sedatives and hypnotics.
 - i. Avoid medications that dry up secretions.
 - j. Avoid distraction while feeding.
5. Percent of tube fed patients meeting the following bundle criteria for aspiration prevention during tube feeding:
- a. Keep the bed's backrest elevated to at least 30 degrees during continuous feedings.
 - b. Assess placement of the feeding tube at four-hour intervals.
 - c. Assess patients for signs of gastrointestinal intolerance at four hour intervals.
 - d. Measure gastric residual volumes every four to six hours during continuous feedings and immediately before each intermittent feeding.
 - e. Use a promotility agent when an adult patient has two or more gastric residual volumes \geq 250 ml.
 - f. Avoid bolus feedings in those at high risk for aspiration.
 - g. Percent of pediatric patients with dysphagia meeting the following bundle of criteria for aspiration prevention during feeding:
 - i. Use of appropriate positioning or seating equipment.
 - ii. Use of appropriate feeding tools.
 - iii. Appropriately modified texture and size of food.
 - iv. Appropriately modified consistency of liquids.
 - v. Appropriately paced introduction of boluses.





STANDARDS AND REQUIRED ORGANIZATIONAL PRACTICES

Accreditation Canada Standards

Acute Stroke Services Distinction is a rigorous and highly specialized accreditation program based on in-depth clinical performance measures and protocols. Stroke Distinction is for organizations and programs that demonstrate excellence and leadership in stroke care.

- Requires the use of a testing protocol to screen and document a client's swallowing ability, as part of the initial assessment and prior to oral intake of food, fluids, or medications.
- Requires the referral of clients with features indicating dysphagia or pulmonary aspiration for assessment of their swallowing ability by a speech-language pathologist for advice on their swallowing ability and consistency of diet and fluids.

GLOBAL PATIENT SAFETY ALERTS

[Global Patient Safety Alerts](#) (GPSA) provides access and the opportunity to learn from other organizations about specific patient safety incidents including alerts, advisories, recommendations and solutions for improving care and preventing incidents.

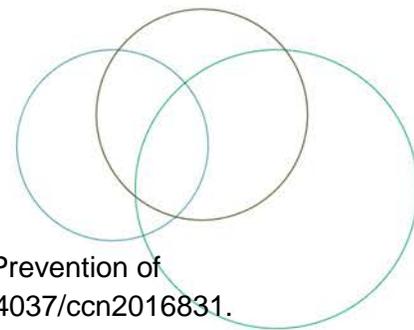
Recommended search terms:

- Aspiration
- Aspiration Pneumonia
- Dysphagia
- Swallowing
- Ventilator-Associated Pneumonia (VAP)

SUCCESS STORIES

If you have a success story, please share it with us.



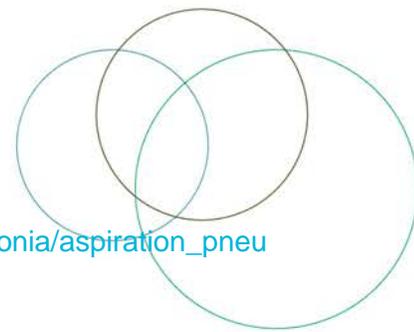


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ASPIRATION PNEUMONIA RESOURCES

Professional Associations and Helpful Websites

- Dysphagia Research Society www.dysphagiaresearch.org
- American Board of Swallowing and Swallowing Disorders. www.swallowingdisorders.org
- NHS Patient Safety Resources. www.nrls.npsa.nhs.uk/resources/?entryid45=59823

Clinical Practice Guidelines

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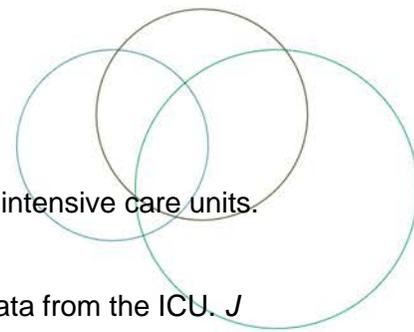
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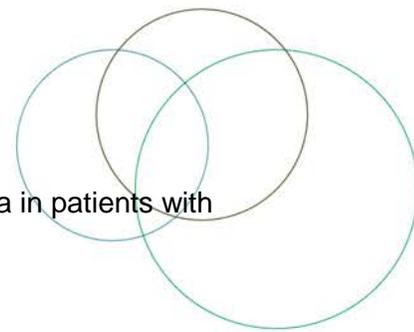
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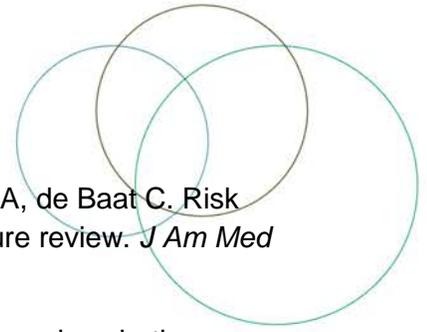
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