

NONINVASIVE VENTILATION

PROVIDED BY: MONASH HEALTH LIBRARY

DATE: 21 MAY 2024

Please find following a summary of a literature search and relevant results. All articles can be provided in full - email library@monashhealth.org for a list of the articles you require.

QUESTION

What is the current best practice for the management of non-invasive ventilation in hospitalised adult patients?

RESULTS

ONLINE RESOURCES (GREY LITERATURE)

CLINICAL DECISION SUPPORT TOOLS

UpToDate. (2024).

- **Noninvasive ventilation in adults with acute respiratory failure: Benefits and contraindications.** [Web link.](#)
- **Noninvasive ventilation in adults with acute respiratory failure: Practical aspects of initiation.** [Web link.](#)
- **Nocturnal ventilatory support in COPD.** [Web link.](#)
- **COVID-19: Respiratory care of the nonintubated hypoxemic adult (supplemental oxygen, noninvasive ventilation, and intubation).** [Web link.](#)
- **Noninvasive positive airway pressure therapy for the obesity hypoventilation syndrome.** [Web link.](#)

Therapeutic Guidelines. (2020). **Noninvasive ventilation.** [Web link.](#)

GOVERNMENT DOCUMENTS

Intensive Care NSW. (2023). **Clinical Guide Non-invasive ventilation for patients with acute respiratory failure - February 2023.** [Web link.](#)

- p. 3 Indications for use of NIV
- p. 5 Contraindications for NIV

Agency for Clinical Innovation. (2020). **Aerosol generating respirating therapies Non-invasive ventilation (NIV).** [Web link.](#)

- Specific to acute respiratory viral illness (including COVID-19)

Australian Government Department of Health and Aged Care Therapeutic Goods Administration. (2020). **Information for clinicians on ventilators and alternative strategies when in short supply during COVID-19.** [Web link.](#)

- Evidence suggests that NIV (non-invasive ventilation) and HFNO (high flow nasal oxygen) should not be used when the patient has severe respiratory failure suggesting that invasive

ventilation is inevitable. In these circumstances, patients should be transitioned to intubation and invasive ventilation without delay.

HEALTH SERVICE DOCUMENTS

South Eastern Sydney Local Health District. (2022). **Continuous Positive Airway Pressure (CPAP) and NonInvasive Ventilation (NIV) Domiciliary Device use by Inpatients with previously diagnosed obstructive sleep apnoea / sleep related breathing disorder.** [Web link.](#)

- Discusses identifying patients who use CPAP and how they can continue to use it safely while hospitalised.

Canberra Health Services. (2021). **Non-invasive ventilation management for adult patients outside the ICU/HDU.** [Web link.](#)

- Details inclusion and exclusion criteria (p. 3), monitoring requirements (p. 6), weaning and ceasing of NIV (p. 8).

The Royal Hospital for Women. (2020). **Noninvasive ventilation using the Respironics v60 machine.** [Web link.](#)

- p. 2 staffing requirements
- p. 4 monitoring and mask fit
- p. 5 ongoing care
- p. 6 weaning or cessation of NIV

MANUFACTURER GUIDELINES

Fisher & Paykel Healthcare. (2024). **Preventing Pressure Ulcers.** [Web link.](#)

- How pressure ulcers form and how to prevent pressure ulcers from developing during NIV.

Hamilton Medical. (2024). **A comprehensive guide to noninvasive ventilation (NIV).** [Web link.](#)

- Discusses NIV Modes, CPAP, NIV (PSV), NIV-ST, BPAP, indications and recommendations for NIV.

PEER-REVIEWED LITERATURE – MOST RECENT FIRST

Articles are grouped by theme:

- COVID-19
- Pressure Injuries
- Specific Conditions
- End-of-life Care
- Oral & Nutritional Support

Each article summary contains excerpts from the abstract and an online link.

COVID-19

Brusić, J., et al. (2024). **Use of CPAP Ventilation in Non-ICU Wards May Influence Outcomes in Patients with Severe Respiratory COVID-19.** *Medicina (Kaunas, Lithuania)*, 60(4), 582. [Click for full-text.](#)

he introduction of the CPAP non-invasive ventilation method as a means of hypoxic respiratory failure treatment in non-intensive care units has decreased the strain, overall number of admissions, and CRC patient mortality.

Al Lawati, A., et al. (2021). **Risk of COVID-19 Infection in Healthcare Workers Exposed During Use of Non-invasive Ventilation in a Tertiary Care Hospital in Oman.** *Oman medical journal*, 36(2), e236. [Click for full-text.](#)

NIV poses a significant risk for SARS-CoV-2 transmission within hospital settings if appropriate infection control measures are not taken.

Ashish, A., et al. (2020). **CPAP management of COVID-19 respiratory failure: a first quantitative analysis from an inpatient service evaluation.** *BMJ open respiratory research*, 7(1), e000692. [Click for full-text.](#)

CPAP is a simple and cost-effective intervention. It has been established for care of other respiratory disorders but not for COVID-19 respiratory failure. This evaluation establishes that CPAP as a potentially viable treatment option for this group of patients during the first days of hospital admission

Dobler, C. C., et al. (2020). **Noninvasive Positive Pressure Ventilation in Patients With COVID-19.** *Mayo Clinic proceedings*, 95(12), 2594–2601. [Click for full-text.](#)

It is reasonable to assume that patients with COVID-19 will benefit from CPAP therapy. However, as many patients with COVID-19 and severe respiratory failure are obese and may therefore have risk factors for hypercapnia, including obstructive sleep apnea and obesity hypoventilation syndrome, BiPAP therapy should be considered on a case-by-case basis.

PRESSURE INJURIES

Celik, S., et al. (2023). **Medical Device-Related Pressure injuries in adult intensive care units.** *Journal of clinical nursing*, 32(13-14), 3863–3873. [Click for full-text.](#)

It was found that MDRPI developed the most in the nose (26.8%) and mouth (15.9%) regions of the patients. It was determined that MDRPI was diagnosed in 28% of the patients within 3-5 days. It was determined that mostly orthopaedic devices (plaster, cervical collar, splint) (62.5%), fasteners (57.1%), non-invasive ventilation/oxygen masks (51.2%) caused the development of MDRPI.

Yalçın, M., & Güneş, Ü. (2023). **A point prevalence study of medical device-associated pressure injuries: A cross-sectional study.** *Journal of clinical nursing*, 32(19-20), 7618–7625. [Click for full-text.](#)

The study findings suggest that MDRPI developed in approximately one of three patients hospitalised in the intensive care unit, and the length of hospital stay and mechanical ventilator support were important determining risk factors. The high prevalence of MDRPI may indicate inadequate nursing care quality. Therefore, it is recommended that nurses be aware of risk factors and evaluate the suitability and safety of medical devices.

Dang, W., et al. (2022). **Risk factors of medical device-related pressure injury in intensive care units.** *Journal of clinical nursing*, 31(9-10), 1174–1183. [Click for full-text.](#)

The prevalence rate of MDRPI caused by CPAP or BiPAP masks (25%) was highest.

Lovegrove, J., et al. (2022). **Effectiveness of interventions to prevent pressure injury in adults admitted to intensive care settings: A systematic review and meta-analysis of randomised controlled trials.** *Australian critical care*, 35(2), 186–203. [Click for full-text.](#)

Only prophylactic sacral and heel dressings demonstrated effectiveness in preventing pressure injury in adults admitted to intensive care settings, including those using NIV.

SPECIFIC CONDITIONS

Teno, J. M., et al. (2022). **Survival and Healthcare Costs with Invasive Mechanical Ventilation versus Noninvasive Ventilation in Patients with Dementia Admitted with Pneumonia and Respiratory Failure.** *Annals of the American Thoracic Society*, 19(8), 1364–1370. [Click for full-text.](#)

Among patients with advanced dementia hospitalized with pneumonia or septicemia with pneumonia, improvement in 30-day survival for those treated with IMV compared with NIV must be weighed against lack of 1-year survival benefit and substantially higher costs.

Wheatley, I. (2021) **Use of non-invasive ventilation for respiratory failure in acute care.** *Nursing Times*, (117)3, 18-22. [Click for full-text.](#)

Non-invasive ventilation can be used to treat acute or chronic respiratory failure. Delivered through a face mask, it provides positive pressure to increase a patient’s lung volume, reduce the work of breathing and improve overall gas exchange. The procedure, although less invasive than intubation, can be a frightening experience for patients so explaining the therapy can reduce anxiety. Ceilings of care should be discussed early and patient consent obtained.

Berbenetz, N., et al. (2019). **Non-invasive positive pressure ventilation (CPAP or bilevel NPPV) for cardiogenic pulmonary oedema.** *The Cochrane database of systematic reviews*, 4(4), CD005351. [Click for full-text.](#)

Non-invasive positive pressure ventilation (NPPV) is a safe intervention with similar adverse event rates to standard medical care alone (SMC). Additional research is needed to determine if specific subgroups of people with acute cardiogenic pulmonary oedema have greater benefit of NPPV compared to SMC.

END-OF-LIFE CARE

Ramazzotti, D., et al. (2019). **Withholding or withdrawing invasive interventions may not accelerate time to death among dying ICU patients.** *PloS one*, 14(2), e0212439. [Click for full-text.](#)

We found that the reduction in the use of invasive treatments over time in patients with very poor prognosis did not shorten the time-to-death. These findings may be useful for goals of care discussions.

Rantala, H. A., et al. (2020). **Survival and end-of-life aspects among subjects on long-term noninvasive ventilation.** *European clinical respiratory journal*, 8(1), 1840494. [Click for full-text.](#)

Survival among subjects starting NIV in this real-life study varied greatly depending on the disease and degree of functional impairment. Subjects frequently died in the hospital after admission through the emergency department. A comprehensive treatment approach with timely advance care planning is therefore needed, especially for those needing help with activities of daily living and those with both NIV and long-term oxygen therapy.

ORAL & NUTRITIONAL SUPPORT

Page, K., et al. (2024). **Nutrition practices in hospitalized adults receiving noninvasive forms of respiratory support: A scoping review.** *Nutrition in clinical practice*, 39(2), 344–355. [Click for full-text.](#)

There was a lack of consensus regarding the ideal method for nutrition assessment and route of nutrition. Oral nutrition was the route most frequently reported, yet calorie and protein delivery via this route were inadequate, and barriers to intake included poor appetite, fatigue, and patient cognition.

Johnny, J. D., et al. (2021). **Oral Care in Critically Ill Patients Requiring Noninvasive Ventilation: An Evidence-Based Review.** *Critical care nurse*, 41(4), 66–70. [Click for full-text.](#)

Oral care is a common preventive measure for non-ventilator-acquired pneumonia and may improve comfort. Adherence to oral care is lower for patients not receiving mechanical ventilation. Further research is needed to identify a standard of care for oral hygiene for patients receiving noninvasive ventilation and assess the risk of adverse events.

APPENDIX

SEARCH METHODOLOGY

A systematic search was conducted for literature. The results were screened by librarians using [Covidence](#).

SEARCH LIMITS

- English-language
- Published within the last 5 years

DATABASES SEARCHED

- Medline – index of peer reviewed articles across health sciences and medicine.
- Embase – index of biomed and pharmacological peer reviewed journal articles.
- Emcare – index of nursing, allied health, critical-care medicine and more.
- Cochrane Library – collection of databases containing high-quality independent evidence.
- UpToDate & BMJ Best Practice – synthesised evidence for patient care.
- Grey literature – Google, Google Scholar, Trip database, Biomed Central Proceedings.

SEARCH TERMS

Concept	MeSH headings	Keywords
Noninvasive ventilation	Continuous positive airway pressure; Intermittent positive pressure ventilation; Bilevel positive airway pressure; Positive pressure ventilation; exp Noninvasive ventilation	Non-invasive ventilation; Non invasive ventilation; Noninvasive ventilation; BIPAP; Biphasic positive airway pressure; CPAP; Continuous positive airway pressure
Inpatients	Hospital patient; Hospitalization	Hospitali(s)(z)ed; Hospital setting; Hospital environment; In(-)hospital; In(-)patient(s) General [within 1 word of] Medicine; Admission Hospitali(s)(z)ed or Hospital [within 1 word of] Patient(s)
Nursing care	exp Nursing Care; Nursing Staff, Hospital	Nurs(e)(es)(ing)(ed)

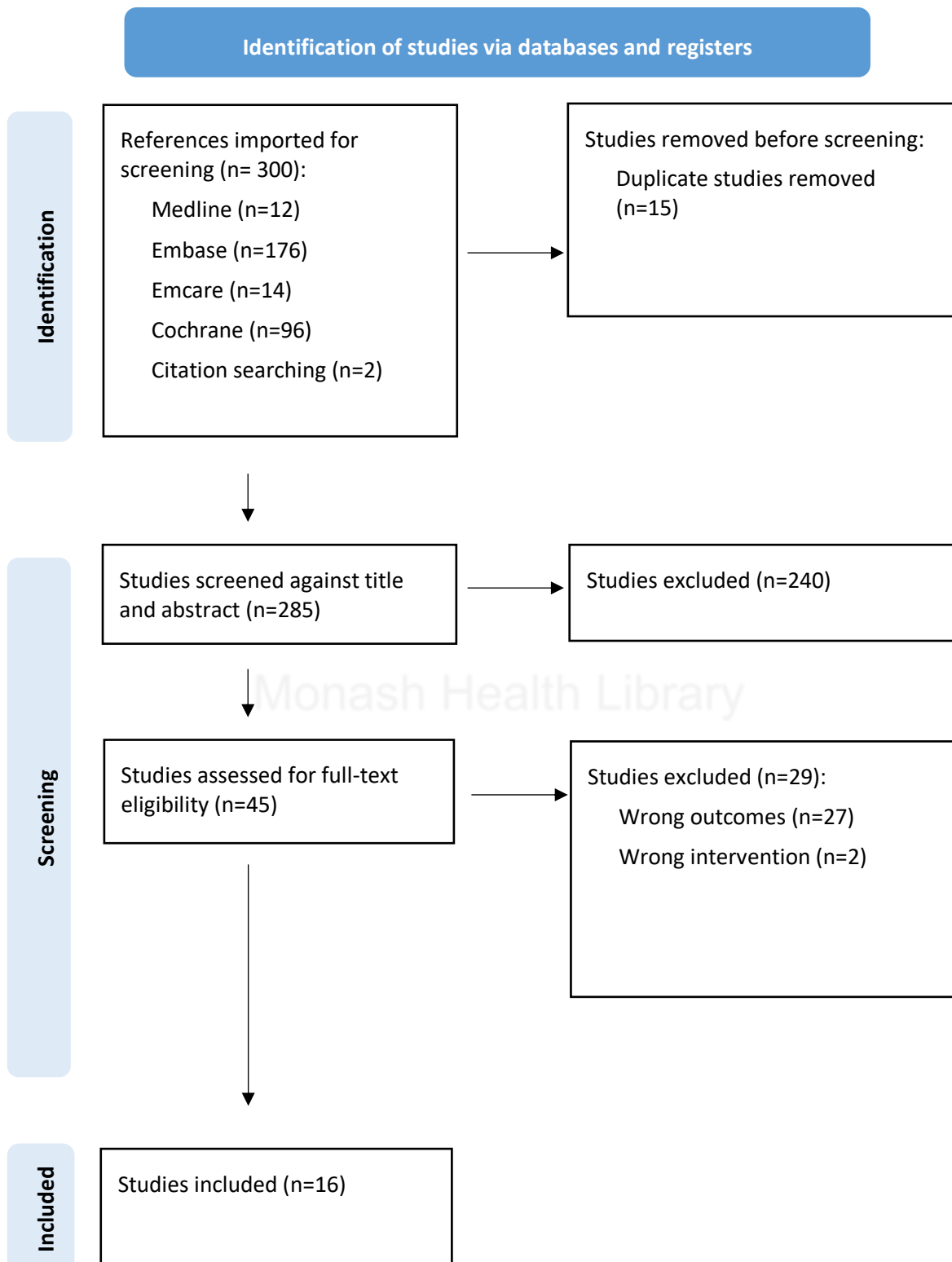
MEDLINE SEARCH STRATEGY

Ovid MEDLINE(R) ALL <1946 to May 10, 2024>

- 1 (non-invasive ventilation or non invasive ventilation or noninvasive ventilation or bipap or biphasic positive airway pressure or cpap or continuous positive airway pressure).ti,ab,kf. 23720
- 2 Continuous Positive Airway Pressure/ or Intermittent Positive-Pressure Ventilation/ or Positive-Pressure Respiration/ or Noninvasive Ventilation/ 32266
- 3 1 or 2 42708
- 4 (hospitali?ed or hospital setting or hospital environment or in?hospital or in?patient).mp. 283475
- 5 (general adj (medicine or admission)).mp. 6061
- 6 (in?patient* or (hospitali?ed adj patient*) or (hospital adj patient*)).mp.207147
- 7 hospital patient/ or hospitalization/ or Inpatients/ 166853
- 8 4 or 5 or 6 or 7 425014
- 9 adult*.mp. 6591941
- 10 exp adult/ 8061416
- 11 9 or 10 8840188
- 12 Nurs*.mp. 832689
- 13 exp Nursing Care/ or Nursing Staff, Hospital/ 181732
- 14 12 or 13 833249
- 15 3 and 8 and 11 and 14 37
- 16 limit 15 to (english language and last 5 years) 12

Monash Health Library

PRISMA CHART



This report contains curated literature results against a unique set of criteria at a particular point in time. Users of this service are responsible for independently appraising the quality, reliability, and applicability of the evidence cited. We strongly recommend consulting the original sources and seeking further expert advice.