The Hierarchy of Evidence

The Hierarchy of evidence is based on summaries from the National Health and Medical Research Council (2009), the Oxford Centre for Evidence-based Medicine Levels of Evidence (2011) and Melynyk and Fineout-Overholt (2011).

I Evidence obtained from a systematic review of all relevant randomised control trials.

II Evidence obtained from at least one well designed randomised control trial.

III Evidence obtained from well-designed controlled trials without randomisation.

IV Evidence obtained from well designed cohort studies, case control studies, interrupted time series with a control group, historically controlled studies, interrupted time series without a control group or with case- series

V Evidence obtained from systematic reviews of descriptive and qualitative studies

VI Evidence obtained from single descriptive and qualitative studies

VII Expert opinion from clinicians, authorities and/or reports of expert committees or based on physiology

Melynyk, B. & Fineout-Overholt, E. (2011). *Evidence-based practice in nursing & healthcare: A guide to best practice (2nd ed.).* Philadelphia: Wolters Kluwer, Lippincott Williams & Wilkins.

National Health and Medical Research Council (2009). *NHMRC levels of evidence and grades for recommendations for developers of guidelines* (2009). Australian Government: NHMRC. http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/evidence_statement_form.pdf

OCEBM Levels of Evidence Working Group Oxford (2011).*The Oxford 2011 Levels of Evidence*. Oxford Centre for Evidence-Based Medicine. http://www.cebm.net/index.aspx?o=1025

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Reference ***(include title, author, journal title, year of publication, volume and issue, pages)***	**Evidence level (I-VII)**	**Key findings, outcomes or recommendations**
Kumar, P., Denson, S.E., Mancuso, T.J. and Committee on Fetus and Newborn, Section on Anesthesiology and Pain Medicine, (2010) ***Pediatrics;*** **125(3); 608-616.** **http://pediatrics.aappublications.org/content/125/3/608.full.html**	II	• Several trails have demonstrated that premedication prior to intubation in newborns (term and preterm) improves intubating conditions (defined as good jaw relaxation, open and immobile vocal cords, suppression of pharyngeal and laryngeal reflexes), decreases the time and number of intubation attempts and minimises the potential for intubation-related airway trauma. • Premedication should be used for all non-emergent endotracheal intubations in newborns. Mediations with rapid onset and short duration are preferable.
Nemergut, M.E., Yaster, M., Colby, C.E. (2013) Sedation and analgesia to facilitate mechanical ventilation, 40; 539-558	II	• Intubation and mechanical ventilation are associated with physiologic changes consistent with pain and stress. • Recommendations: Sedatives and analgesics be utilized prior to elective intubation to mollify the stress response in newborns and improve intubation conditions.

Barrington, K. (2011), Premedication for endotracheal intubation in the newborn infant. *Paediatric Child Health* 16(3): 159-164.	II	• Premedication reduces the adverse physiological responses of bradycardia, systemic hypertension, intracranial hypertension and hypoxia, as well as decreasing the pain and discomfort associated with the procedure. • An optimal protocol for premedication for elective endotracheal intubation includes administration of a vagolytic agent, a rapid-acting analgesic and a short-duration muscle relaxant.
Schmölzer GM, Roehr CC. Techniques to ascertain correct endotracheal tube placement in neonates. Cochrane Database of Systematic Reviews 2014, Issue 9. Art. No.: CD010221. DOI: 10.1002/14651858.CD010221.pub2.	VI	• There were no randomized or quasi-randomised controlled trials found in this review that addressed the variety of techniques currently in use to confirm correct tracheal tube placement. • The gold standard test to confirm ETT position is chest radiography. • Additional use of clinical signs, respiratory function monitors or exhaled CO_2 detectors to assess correct ETT placement is based on evidence from observational studies and case reports.

Neoresus: The Victorian Newborn Resusitation Project Learning Resourses (May 2020) Endotracheal Intubation: https://www.neoresus.org.au/learning-resources/key-concepts/advanced-interventions/endotracheal-intubation/	II	• Chest X-ray is the gold standard for verifying ET Tube placement, although a pedicap will confirm placement in trachea (as opposed to the oseophagus) • Charts for ETT size and length and chart for estimating depth of oral and nasal ETT tube • Other signs of successful intubation: misting in the ETT, symmetrical chest movement

Trung. L, Kim. J.H, Kateria. A.C, Finer. N. N, Marc-Aurele. K, (March 2020) Haemodynamic Effects of Premedication for Neonatal Intubation: An Observational Study. Arch Dis Child Fetal Neonatal Ed, 105 (2): 123-127.	IV	• Pilot prospective Observational study on level 3 NICUs collecting HR, o2 sats, regional cerebral oxygenation, co2 and BP (35 infants of all gestational ages
		• 30% of infants dropped their BP by 20% or above after premed for elective intubation
		• Premedication has been shown to:
		  ○ Improve intubation conditions
		  ○ Minimize pain/ traumatic injury
		  ○ Decrease time to successful intubation
		  ○ Decrease number of attempts
		  ○ Improve physiogical stability

Scott. D. N, Else. MD, Pete. G, Kovatsisi, MD, (April 2020) A Narrative of Oxygenation During Pediatric and Airway Procedures, Pediatric Anesthesiology Vol 130 (4) 831-840.	II	• Children have a high rate of oxygen consumption for body mass as compared to adults. They also have a tendency to alveolar collapse and reduction in functional residual capacity under anaesthesia. • The National Emergency Airway Registry for Neonates reported an incidence of 42% in non-difficult and 75% in difficult intubations. • Apneic oxygenation- technique to delay the onset of hypoxemia after cessation of ventilation. • Adequate pre-oxygenation minimizes the partial pressure of nitrogen in the alveoli thereby maximizing for movement of oxygen from the airspace into the blood. • THRIVE- Transnasal Humidified Rapid Insufflation Ventilatory Exchange.
Ancora. G, Lago. P, Garetti. E, Merazzi. D, Levet. P.S, Bellieni. C.V, (July 2018) Evidence-based Clinical Guidelines on Analgesia and Sedation in Newborn Infants Undergoing Assissted Ventilation and Endotracheal Intubation, Acta Paediatrica, 108, pp 208-217.	II	• Use premedication before endotracheal intubation for a more rapid, less painful, less traumatic and safe maneuver. • Premed in both term and preterms facilitated procedures, reduced pain and stress and limited deterioration of vital parameters (such as heart rate, blood pressure oxygen saturation and intracranial pressure). • Morphine is not the drug of choice for this procedure due to its delayed onset of action compared with fentanyl. • Supports Fentanyl 2-5 mcg/kg combined with a muscle relaxant. • Atropine is useful for reducing bradycardias. (dosing 0.01-0.02 mg/kg)

Yamada. N.K, Kamlin. C.O.F, Halamek. L.P, (2018) Optimal Human and System Performance During Neonatal Resuscitation, Seminars in Fetal and Neonatal Medicine, 23 306-311.	IV	• Working with colleagues as a member of a coordinated team is an integral part of healthcare delivery in general and in neonatal resuscitation. • Strategies that decrease cognitive and technical workload could lead to a reduction in resuscitation errors. • Continuous display of data necessary to guide neonatal resuscitation as well as a combination of visual and auditory prompts.
Newborn Services Guideline, Endotracheal Management- NICU. Updated 2010. http://www.adhb.govt.nz/newborn/Guidelines/Respiratory/Intubation/ETT.htm	V	• Process for intubation explained (prepare and check equipment, position infant in supline position, Aspirate NGT/OGT, maintain warmth) • Suggests atropine, fentanyl and suxamethonium for neonatal inubation • Suxamethonium should be given presence of significant hyperkalaemia. • Suxamethonium se 1-3 mg/kg • Fentanyl should be given as a slow push duce side effect of chest wall rigidity
Sakhuja. P, Finelli. M, Howes, J, Whyte. H. (2016) Article: Is it time to review guidelines or ETT positioning in the NICU? SCEPTIC Survey of Challenges Encountered in Placement of Endotracheal Tubes in Canadian NICUs, International Journal of Pediatrics, Vol 2016 1-8.	VI	• Cross-sectional survey of a sample of healthcare professional involved in neonatal intubations • 207 responses and 85.5% completed • 93% used premeds • 91%- Mid trachea is the best position for ETT in a neonate • 51%- T2-T3 was the ideal position of an ETT on x-ray

Better Safer Care. Victorian Agency for Health Information: Intubation. Updated 20th Aug 19 https://www.bettersafercare.vic.gov.au/resources/clinical-guidance/maternity-and-newborn/intubation	II	• Premeds should be considered in less urgent intubations • Equipment required for intubation, including pictures • ETT size and length • Monitoring required during procedure • Supports the use of atropine, fentanyl and suxamethonium as premed for intubation • Clinical signs of tracheal intubation
ANZCOR Guideline 13.5: Tracheal Intubation and Ventilation of the Newborn Infant. Updated Aug 2016. file:///C:/Users/Andrew/Downloads/anzcor-guideline-13-5-aug16.pdf	II	• Laryngoscope and ETT size / depth of insertion • Equipment required • Verification of ETT in correct position (chest moves with each inflation, increase HR to above100/min, improving o2 sats
Government of Western Australia, North Metropolitan Health Services, Women and Newborn Health Service Neonatal Directive. Clinical Practice Guideline: Intubation, Updated 12th October 2017.	II	• Equipment preparation • Procedure and team preparation. Role allocation and "walk through" plan. • Nasal vs oral intubation • ETT selection and depth/ size