

## 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 (2<sup>nd</sup> 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](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>

Reference (include title, author, journal title, year of publication, volume and issue, pages)	Evidence level (I-VII)	Key findings, outcomes or recommendations
<p><b>Barrington, K. (2011), Premedication for endotracheal intubation in the newborn infant. <i>Paediatric Child Health</i> 16(3): 159-164.</b></p>	<p>V</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>
<p><b>Schmölzer GM, Roehr CC. Techniques to ascertain correct endotracheal tube placement in neonates. <i>Cochrane Database of Systematic Reviews</i> 2014, Issue 9. Art. No.: CD010221. DOI: 10.1002/14651858.CD010221.pub2.</b></p>	<p>VI</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• The gold standard test to confirm ETT position is chest radiography.</li> <li>• Additional use of clinical signs, respiratory function monitors or exhaled CO<sub>2</sub> detectors to assess correct ETT placement is based on evidence from observational studies and case reports.</li> </ul>

<p><b>Neoresus: The Victorian Newborn Resuscitation Project Learning Resources (May 2020) Endotracheal Intubation:</b>  <a href="https://www.neoresus.org.au/learning-resources/key-concepts/advanced-interventions/endotracheal-intubation/">https://www.neoresus.org.au/learning-resources/key-concepts/advanced-interventions/endotracheal-intubation/</a></p>	VII	<ul style="list-style-type: none"> <li>• Chest X-ray is the gold standard for verifying ET Tube placement, although a pedicap will confirm placement in trachea (as opposed to the oesophagus)</li> <li>• Charts for ETT size and length and chart for estimating depth of oral and nasal ETT tube</li> <li>• Other signs of successful intubation: misting in the ETT, symmetrical chest movement</li> </ul>
<p><b>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.</b></p>	IV	<ul style="list-style-type: none"> <li>• Pilot prospective Observational study on level 3 NICUs collecting HR, o2 sats, regional cerebral oxygenation, co2 and BP (35 infants of all gestational ages)</li> <li>• 30% of infants dropped their BP by 20% or above after premed for elective intubation</li> <li>• Premedication has been shown to: <ul style="list-style-type: none"> <li>○ Improve intubation conditions</li> <li>○ Minimize pain/ traumatic injury</li> <li>○ Decrease time to successful intubation</li> <li>○ Decrease number of attempts</li> <li>○ Improve physiological stability</li> </ul> </li> </ul>

<p><b>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.</b></p>	<p>II</p>	<ul style="list-style-type: none"> <li>• 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.</li> <li>• The National Emergency Airway Registry for Neonates reported an incidence of 42% in non-difficult and 75% in difficult intubations.</li> <li>• Apneic oxygenation- technique to delay the onset of hypoxemia after cessation of ventilation.</li> <li>• Adequate pre-oxygenation minimizes the partial pressure of nitrogen in the alveoli thereby maximizing for movement of oxygen from the airspace into the blood.</li> <li>• THRIVE- Transnasal Humidified Rapid Insufflation Ventilatory Exchange.</li> </ul>
<p><b>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 Assisted Ventilation and Endotracheal Intubation, Acta Paediatrica, 108, pp 208-217.</b></p>	<p>VII</p>	<ul style="list-style-type: none"> <li>• Use premedication before endotracheal intubation for a more rapid, less painful, less traumatic and safe maneuver.</li> <li>• 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).</li> <li>• Morphine is not the drug of choice for this procedure due to its delayed onset of action compared with fentanyl.</li> <li>• Supports Fentanyl 2-5 mcg/kg combined with a muscle relaxant.</li> <li>• Atropine is useful for reducing bradycardias. (dosing 0.01-0.02 mg/kg)</li> </ul>

<p><b>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.</b></p>	<p>IV</p>	<ul style="list-style-type: none"> <li>• Working with colleagues as a member of a coordinated team is an integral part of healthcare delivery in general and in neonatal resuscitation.</li> <li>• Strategies that decrease cognitive and technical workload could lead to a reduction in resuscitation errors.</li> <li>• Continuous display of data necessary to guide neonatal resuscitation as well as a combination of visual and auditory prompts.</li> </ul>
<p><b>Newborn Services Guideline, Endotracheal Management- NICU. Updated 2010.</b>  <a href="http://www.adhb.govt.nz/newborn/Guidelines/Respiratory/Intubation/ETT.htm">http://www.adhb.govt.nz/newborn/Guidelines/Respiratory/Intubation/ETT.htm</a></p>	<p>VII</p>	<ul style="list-style-type: none"> <li>• Process for intubation explained (prepare and check equipment, position infant in supine position, Aspirate NGT/OGT, maintain warmth)</li> <li>• Suggests atropine, fentanyl and suxamethonium for neonatal intubation</li> <li>• Suxamethonium should be given presence of significant hyperkalaemia.</li> <li>• Suxamethonium se 1-3 mg/kg</li> <li>• Fentanyl should be given as a slow push due side effect of chest wall rigidity</li> </ul>
<p><b>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.</b></p>	<p>VI</p>	<ul style="list-style-type: none"> <li>• Cross-sectional survey of a sample of healthcare professional involved in neonatal intubations</li> <li>• 207 responses and 85.5% completed</li> <li>• 93% used premeds</li> <li>• 91%- Mid trachea is the best position for ETT in a neonate</li> <li>• 51%- T2-T3 was the ideal position of an ETT on x-ray</li> </ul>

<p><b>Better Safer Care. Victorian Agency for Health Information: Intubation. Updated 20<sup>th</sup> Aug 19</b>  <a href="https://www.bettersafecare.vic.gov.au/resources/clinical-guidance/maternity-and-newborn/intubation">https://www.bettersafecare.vic.gov.au/resources/clinical-guidance/maternity-and-newborn/intubation</a></p>	VII	<ul style="list-style-type: none"> <li>• Premeds should be considered in less urgent intubations</li> <li>• Equipment required for intubation, including pictures</li> <li>• ETT size and length</li> <li>• Monitoring required during procedure</li> <li>• Supports the use of atropine, fentanyl and suxamethonium as premed for intubation</li> <li>• Clinical signs of tracheal intubation</li> </ul>
<p><b>ANZCOR Guideline 13.5: Tracheal Intubation and Ventilation of the Newborn Infant. Updated Aug 2016.</b> <a href="file:///C:/Users/Andrew/Downloads/anzcor-guideline-13-5-aug16.pdf">file:///C:/Users/Andrew/Downloads/anzcor-guideline-13-5-aug16.pdf</a></p>	VII	<ul style="list-style-type: none"> <li>• Laryngoscope and ETT size / depth of insertion</li> <li>• Equipment required</li> <li>• Verification of ETT in correct position (chest moves with each inflation, increase HR to above 100/min, improving O<sub>2</sub> sats)</li> </ul>
<p><b>Government of Western Australia, North Metropolitan Health Services, Women and Newborn Health Service Neonatal Directive. Clinical Practice Guideline: Intubation, Updated 12th October 2017.</b></p>	VII	<ul style="list-style-type: none"> <li>• Equipment preparation</li> <li>• Procedure and team preparation. Role allocation and “walk through” plan.</li> <li>• Nasal vs oral intubation</li> <li>• ETT selection and depth/ size</li> </ul>