

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>

Evidence table : Environmental Humidification for Premature Neonates

Reference	Evidence level (I-VII)	Key findings, outcomes or recommendations
<ul style="list-style-type: none"> • Agren, J., Sjors, G. & Sedin, G. (1998). Transepidermal water loss in infants born at 24 and 25 weeks of gestation. <i>Acta Paediatrica</i>. 87, 1185-1190. 	III	<ul style="list-style-type: none"> • Study to determine transepidermal water loss in 24-25 week gestation neonates, and relationship to postnatal age. • In these neonates, transepidermal water loss is high early after birth, and decreases with postnatal age.
<ul style="list-style-type: none"> • Agren, J., Sjors, G. & Sedin, G. (2006). Ambient humidity influences the rate of skin barrier maturation in extremely preterm infants. <i>The Journal of Pediatrics</i>. May, 613-617. 	II	<ul style="list-style-type: none"> • Demonstrates that the relative humidity of the environment significantly influences the rate at which the skin barrier forms after extremely premature birth • Transepidermal water flux is an important signal for establishment and recovery of skin barrier structure and function • A gradual reduction in incubator humidity from 85% to 50% after the first postnatal week would allow higher TEWL, therefore promoting skin barrier formation • This can be achieved without causing dehydration and hyernatraemia

<ul style="list-style-type: none"> • Allwood, M. (2011). Skin care guidelines for infants aged 23-30 weeks' gestation: a review of the literature. <i>Neonatal, Paediatric and Child Health Nursing</i>. 14(1), 20-27. 	<p>II</p>	<ul style="list-style-type: none"> • Underdeveloped stratum corneum in neonates 23-30 weeks • By 32 weeks epidermal development is mainly complete • In the first 2 weeks of life the stratum corneum matures at an accelerated rate for premature neonates; this development is less rapid for gestations below 27 weeks • Humidity decreases transepidermal water loss in premature neonates • Summary of small randomized controlled trial which showed that nursing neonates in humidity greater than 75% beyond 14 days of life may slow stratum corneum formation, and ideal humidity is 85% in first week followed by 50% humidity, adjusted over 12-24 hours, to allow stratum corneum formation
<ul style="list-style-type: none"> • Beath C. Humidified Incubator in NICU. <i>Kaleidoscope – The Children's Health Network. Clinical Guideline</i>. July 2011. 	<p>VII</p>	<ul style="list-style-type: none"> • Why premature neonates lose so much water through their skin by evaporation & problems caused when this needs to be replaced by IV fluids. • How a high level of environmental humidity decreases this water loss & helps to maintain fluid & electrolyte balance & also maintain temperature. • Premature skin develops rapidly in the first 2 weeks & humidity should be turned down after this period. To continue actually hinders maturation and development. • Amount of humidity required depends on the gestational age & skin integrity. The lower the gestational age the higher the humidity required. • Importance of maintaining constant level of humidity & ensuring room temperature around incubator is warm & draft free. • Risks and complications of humidity.
<ul style="list-style-type: none"> • Eastern Regional Neonatal Benchmarking Group. Humidity for infants < 30 weeks gestation. <i>Clinical Guideline</i>. February 2006 	<p>VII</p>	<ul style="list-style-type: none"> • Possible causes for hypo / hyperthermia when in humidity & management / investigations. • Suggested humidity guide for different gestations

<ul style="list-style-type: none"> • Fanaroff, A.A. Fanaroff, J.M. (2013). <i>Klaus & Fanaroff's Care of the High-Risk Neonate</i>. (6th ed). Philadelphia: Elsevier Saunders. 	<p>VII</p>	<ul style="list-style-type: none"> • Premature neonates have thin and fewer layers of stratum corneum than term neonates • Due to this there is increased permeability and transepidermal water loss, leading to evaporative heat loss, increased fluid requirement, and risk of toxicity from tolically applied substances • There is acceleration in the maturation of the stratum corneum during the first 10-14 days of life inpreature neonates, and decreased barrier function may last up to 28 days • Skin barrier function reaches mature levels more slowly in neonates born below 25 weeks gestation, and may take up to 8 weeks or to corrected gestation 32 weeks
<ul style="list-style-type: none"> • Flenady, V. & Woodgate, P.G. (2009). Radiant warmers versus incubators for regulating body temperature in newborn infants (Review). <i>The Cochrane Collaboration</i>. Wiley Publishers. 	<p>I</p>	<ul style="list-style-type: none"> • Review of 8 quasi-randomised or randomized trials in which radiant warmers were compared to incubators in neonates • Radiant warmers increase water loss in low birthweight babies when compared with incubators
<ul style="list-style-type: none"> • Modi, N. (2004). Management of fluid balance in the very immature neonate. <i>Archives of Diseases in Children Fetal Neonatal Edition</i>. 89, F108-F111 	<p>VII</p>	<ul style="list-style-type: none"> • Overview of fluid balance in extremely premature neonates, including transepidermal water loss, postnatal adaptation, sodium requirements, risk of hypernatraemia
<ul style="list-style-type: none"> • PICU Neonatal Group. Temperature Control in the Pre term Neonate. Birmingham Children's Hospital. <i>Newborn Clinical Guideline</i>. March 2005 	<p>VII</p>	<ul style="list-style-type: none"> • Factors effecting the amount of evaporative water loss / Transepidermal water loss (TEWL). • Amount of weight loss possible due to TEWL. • Suggested humidity guide for different gestations

<ul style="list-style-type: none"> • Sinclair, L., Crisp, J. & Sinn, J. (2009). <i>Variability in incubator humidity practices in the management of preterm infants</i>. <i>Journal of Paediatrics and Child Health</i>. 45, 535-540. 	<p>VII</p>	<ul style="list-style-type: none"> • Review of NICUs within Australia and New Zealand on the practice and availability of specific guidelines related to environmental humidity for premature neonates • There was wide variability in practice in regards to gestational age, level of humidity, length of time humidity was provided • Potential risks of humidity – hyperthermia and sepsis • Humidity reduces transepidermal water loss • There is lack of evidence regarding optimal level of humidity over time and when complete maturation of extremely premature skin occurs • Humidity above 70% after 14 days of age may increase transepidermal water loss
<ul style="list-style-type: none"> • Sinclair, L. & Sinn, J.K.H. (2009) higher versus lower humidity for the prevention of morbidity and mortality in preterm infants in incubators. <i>Intervention Protocol. Cochrane Neonatal Group</i>. 	<p>V</p>	<ul style="list-style-type: none"> • Systematic review of evidence in relation to incubator humidity to determine optimal levels and duration, associated benefits and risks
<ul style="list-style-type: none"> • Smith J. Small Baby Guideline. Management of infants < 27 weeks gestation. Royal Prince Alfred Hospital. <i>Newborn Care Guideline</i>. April 2010. 	<p>VII</p>	<ul style="list-style-type: none"> • Fluid & electrolyte imbalances in premature infants. • General monitoring & Nursing care including skin care.