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


### Evidence table: Environmental Humidification for Premature Neonates

<table>
<thead>
<tr>
<th>Reference</th>
<th>Evidence level (I-VII)</th>
<th>Key findings, outcomes or recommendations</th>
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● In these neonates, transepidermal water loss is high early after birth, and decreases with postnatal age. |
● 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 |


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### II

- 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

### VII

- 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.

- Possible causes for hypo / hyperthermia when in humidity & management / investigations.
- Suggested humidity guide for different gestations
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<th>Source</th>
<th>Volume</th>
<th>Notes</th>
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Due to this there is increased permeability and transepidermal water loss, leading to evaporative heat loss, increased fluid requirement, and risk of toxicity from topically applied substances  
There is acceleration in the maturation of the stratum corneum during the first 10-14 days of life in premature 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. |
| Flenady, V. & Woodgate, P.G. (2009). Radiant warmers versus incubators for regulating body temperature in newborn infants (Review). *The Cochrane Collaboration.* Wiley Publishers. | I      | 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. |
Amount of weight loss possible due to TEWL.  
Suggested humidity guide for different gestations. |
<table>
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<tr>
<th>Source</th>
<th>Notes</th>
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<tr>
<td>Sinclair, L., Crisp, J. &amp; Sinn, J. (2009). <em>Variability in incubator humidity practices in the management of preterm infants.</em> Journal of Paediatrics and Child Health. 45, 535-540.</td>
<td>VII 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.</td>
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