Purpose
Evidence based recommendations related to overall light, and provision of cycled lighting for premature and/or ill neonates to maximize their developmental outcomes.

Background
Development of the eye structure is genetically programmed. However, the premature infant’s retina and its’ vasculature are still developing at birth and are susceptible to retinal light injury. Photochemical injury can occur with exposure to very bright light over short periods of time or with exposure to less intense light over prolonged times. Preterm infants cannot limit the light entering their eyes because the eyelids are very thin, and the pupillary reflex is not functional at less than 30 weeks nor fully competent until about 34 weeks gestational age. Development of eye function is dependent on use and visual experience. While the visual (sensory) pathways are developing, protected periods of sleep within a darkened environment are required.

Recent literature suggests that exposure to cycled lighting shows outcome trends favouring cycled light compared with either continuous dim lighting or continuous bright light for premature infants greater than 28 weeks. Circadian rhythm development outcome trends include improved weight gain, shorter stays in hospital, earlier oral feeding, and more sleep. Lack of power in research studies precludes a clear recommendation for practice. However, there is no literature identifying any negative consequences of cycled lighting.

Policy Statement
Vision is poorly developed at a term birth and most visual functioning develops thereafter. The fetal environment is significantly different from extra-uterine conditions. Control of NICU lighting seeks to mimic the intrauterine environment to minimize adverse visual stimuli and support neuromaturation of the visual system.

Applicability
All Covenant Health Neonatal Nursery staff.
Procedure

- Use indirect lighting sources where available
- Cover incubator tops and cribs when indirect lighting is not available. Covers must allow the infant to be visible to parents and care givers at all times.
- Procedure lighting should not increase the lighting for adjacent infants. Shield the infant’s eyes when procedure lighting in use.
- Critically ill infants and those receiving phototherapy may require changes to lighting recommendations.
- During phototherapy, infant’s eyes are protected at all times with eye patches.
- Shield eyes from light following dilation for eye exam for a period of 12 hours.
- When awake, the infant needs adequate light to see, and interesting objects to look at, which are the parents faces ideally.
- Diurnal cycling of light is implemented when 32 weeks corrected gestational age and physiologically stable
  - From 0730-1930 provide subdued lighting (200-225 Lux). A light blanket covers the top of the incubator or shields the eyes of the infant in a crib.
  - From 1930-0730 a dark environment is provided (5-10 Lux). Dim overhead lights. Task lighting for staff that does not reach the infant’s eyes is needed. The incubator top is covered with a heavy blanket.
  - Ideally, tasks and procedures other than feeds and diaper changes should not occur during the darkened hours.

Definition

The lux is the SI unit of luminance or light intensity as perceived by the human eye measured as luminous power per square metre.

<table>
<thead>
<tr>
<th>Illuminance</th>
<th>Example</th>
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</thead>
<tbody>
<tr>
<td>0.27 lux</td>
<td>Full moon on a clear night</td>
</tr>
<tr>
<td>50 lux</td>
<td>Family living room</td>
</tr>
<tr>
<td>100 lux</td>
<td>Very dark overcast day</td>
</tr>
<tr>
<td>320–500 lux</td>
<td>Office lighting</td>
</tr>
<tr>
<td>10,000–25,000 lux</td>
<td>Full daylight (not direct sun)</td>
</tr>
<tr>
<td>32,000–130,000 lux</td>
<td>Direct sunlight</td>
</tr>
</tbody>
</table>

Supporting Policies

- Cue-Based Care
- Developmental Care
- Positioning
- Skin-to-Skin
- Sound Recommendations
References


Revisions

October 2012

November 2015
Signing

**Original Signed**

GAIL CAMERON  
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WOMEN'S & CHILD HEALTH  
COVENANT HEALTH  
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July, 2016

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