



CLINICAL GUIDELINE	
Phototherapy	
Scope (Staff):	Nursing/Midwifery and Medical Staff
Scope (Area):	NICU KEMH, NICU PCH & NETS WA, KEMH Postnatal Wards
Child Safe Organisation Statement of Commitment	
<p>The Child and Adolescent Health Service (CAHS) commits to being a child safe organisation by meeting the National Child Safe Principles and National Child Safe Standards. This is a commitment to a strong culture supported by robust policies and procedures to ensure the safety and wellbeing of children at CAHS.</p>	

This document should be read in conjunction with this [DISCLAIMER](#)

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Background

For a background to this clinical guideline, see [Jaundice](#).

Phototherapy

The aim of this treatment is to lower the bilirubin level and to avoid exchange transfusion. In commencing phototherapy one must consider the age of the infant in hours, risk factors, and the rate of rise of serum bilirubin (SBR).

Mechanism

Blue is the light range (420-470 nm) in which bilirubin most effectively absorbs light; when phototherapy is applied to bilirubin in the skin, the light absorbed causes several photochemical reactions. There are two major products from phototherapy which is a result of a reversible photoisomerization reaction converting the toxic native unconjugated 4Z,15Z-bilirubin into an unconjugated configurational isomer, 4Z,15E-bilirubin, which can then be excreted in bile without conjugation. The other major product from phototherapy is lumirubin, which is an irreversible structural isomer converted from native bilirubin that can be excreted by the kidneys in the unconjugated state.

Treatment Threshold Graphs

Click here to access [Threshold Graphs](#)

Phototherapy Units	
Phototherapy units that are available have differing energy outputs. The energy output is influenced by the age and type of the lights and is marked on each individual unit in microwatts per cm ² ($\mu\text{W}/\text{cm}^2$). The higher the ' $\mu\text{W}/\text{cm}^2$ ' the more efficient the unit is. Phototherapy light source degrades with use, and stated values below are nominal and assume new units.	
TYPE	STRENGTH
Giraffe PT Spot LED	18-45 $\mu\text{W}/\text{cm}^2/\text{nm}^{-1}$
Medela (blue/white light)	14-31 $\mu\text{W}/\text{cm}^2/\text{nm}^{-1}$
Bili blanket (fibre optic/LED)	large and small pads sizes are available 35-50 $\mu\text{W}/\text{cm}^2/\text{nm}^{-1}$
<p>The higher the SBR the more energy output will be required for successful treatment. When selecting a phototherapy unit or Bili blanket consider the following:</p> <ul style="list-style-type: none"> • LED is a cold light source therefore less likely to overheat the infant. • Direct contact provides the most efficient form of phototherapy treatment therefore choose the appropriate size lamp/pad 	

Dosage		
It is important to note that dosage of light is dependent on distance from patient. The closer the light source is to patient the more intense the irradiance becomes. Infants <26 weeks should be commenced on low dose irradiance phototherapy to avoid potentially serious adverse side effects.		
	Low Dose Irradiance 15-25 $\mu\text{w}/\text{cm}^2/\text{nm}^{-1}$	High Dose Irradiance 25-30 $\mu\text{w}/\text{cm}^2/\text{nm}^{-1}$
Blue Spot Giraffe lamp distance from infant	50-60cm (23cm from roof of omnibed)	40-50cm (almost touching roof of omnibed)
Medela lamp distance from infant	35-45cm	25-35cm
Bilisoft	Small 35 $\mu\text{w}/\text{cm}^2/\text{nm}^{-1}$	Large 50 $\mu\text{w}/\text{cm}^2/\text{nm}^{-1}$

Commencing Phototherapy	Procedure
<ul style="list-style-type: none"> Ensure infant maintains stable temperature regulation 	<ul style="list-style-type: none"> Nurse to take baseline temperature and then monitor often to ensure stability as therapy commences Maintain a NTE that is appropriate for the infant's age and gestation.
<ul style="list-style-type: none"> Ensure total fluid volume meets infants' requirements. Infants under phototherapy are at risk of increased insensible water loss. 	<ul style="list-style-type: none"> Weigh infant daily Monitor urine and stool output Medical team to adjust fluids, usually >10-15% Monitor SG, PGL, U&E's, urine as ordered by medical team
<ul style="list-style-type: none"> Maximise infant skins' exposure to light 	<ul style="list-style-type: none"> Nurse to remove infant clothing Nappy is left on
<ul style="list-style-type: none"> Protect infant's eyes from light 	<ul style="list-style-type: none"> Nurse to cover infant's eyes with appropriate size eye pad without applying excessive pressure or occluding the nares Remove cover every 4 hours, evaluate infant's eyes. Leave off whenever phototherapy unit is off i.e. parents visiting, feeding, care times Replace pads 24 hourly or as needed Eye toilets with N/saline and sterile cotton wool may be required
<ul style="list-style-type: none"> Ensure the correct intensity of light is applied 	<ul style="list-style-type: none"> Check phototherapy unit height; 40cms away from infant (Excluding BiliBlanket)

<ul style="list-style-type: none"> • Documentation 	<ul style="list-style-type: none"> • Report start time and type of unit in use on MR489/491
<ul style="list-style-type: none"> • Cares & Handling 	<ul style="list-style-type: none"> • Supportively position infant utilising positional aids. Reposition/cares as appropriate for gestation • Encourage parenteral contact and involvement. It is rarely necessary to cease suck feeds • If diarrhoea develops, maintain skin integrity with good hygiene

Complications

The complications of phototherapy include

- loose stools
- erythematous macular rash
- overheating
- dehydration
- hypothermia from exposure
- purpuric rash associated with transient porphyria
- benign condition called bronze baby syndrome (very rare complication, which occurs in the presence of direct hyperbilirubinemia)

- Once phototherapy commences then repeat estimations of the bilirubin are essential, as the skin colour will no longer be a guide to the level.
- Use clinical judgment considering Risk Factors, response to therapy and level of TSB to determine patient specific timing of repeat level (4 - 24 hourly)
- Early feeding assists the elimination of meconium, reducing the available bilirubin for reabsorption and thus interfering with the enterohepatic circulation.

Ceasing Phototherapy	Procedure
<ul style="list-style-type: none"> • Therapy can be ceased when SBR is >20µmol/L below the treatment line • The infant is old enough to handle the bilirubin load 	<ul style="list-style-type: none"> • Nursing staff to discontinue light and wipe unit with disinfectant wipes before returning to storage • Document date and time on MR489/491

Related CAHS internal policies, procedures and guidelines

Neonatology

[Jaundice](#)

[Exchange Transfusion](#)

[Jaundice: Immunoglobulin Infusion \(IVIg\) in Isoimmune Haemolytic Jaundice](#)


References and related external legislation, policies, and guidelines

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Useful resources (including related forms)

[Treatment Threshold Graphs](#)
[Jaundice – Follow –Up Letter](#)

This document can be made available in alternative formats on request for a person with a disability.

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