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Team Lead: Regional Director- Acute Care	Program Area: Obstetrics
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**PROCEDURE SUBJECT:**

Phototherapy

**PURPOSE:**

To promote optimal management and follow-up of the newborn with the potential for and/or hyperbilirubinemia.

**DEFINITIONS:**

**Standard Phototherapy:** Light therapy with a single light source that can deliver a minimum of 30  $\mu\text{W}/\text{cm}^2/\text{nm}$  (See information provided by light manufacturer).

Note: In the current Canadian Pediatric Society (CPS) guidelines this is referred to as intensive phototherapy.

**Intensive (Double) Phototherapy:** Light therapy that covers a minimum of 80% of the infant's skin surface area using one or more light sources that can deliver a minimum of 30  $\mu\text{W}/\text{cm}^2/\text{nm}$ . Requires two light sources.

**Transcutaneous bilirubin (TcB) meter:** a hand held meter that provides an estimate of circulating bilirubin obtained by making calculations which measure the difference between bilirubin in the skin and subcutaneous tissue and minimizes the impact of melanin (skin color) on the transcutaneous assessment. The result is expressed as the "TcB". The measurement range is **0 to 340  $\mu\text{mol}/\text{L}$** . Averages of 5 measurements are used. For meter operation see the Standard Operating Procedures for Draeger Jaundice Meter, or unit supplied at your facility.

**Total Serum (TSB)** – total serum or plasma bilirubin level including both direct (conjugated) and indirect (unconjugated) bilirubin.

## **IMPORTANT POINTS TO CONSIDER:**

Provide education and emotional support to parents.

## **PROCEDURE:**

### **Universal Screening of all Newborns:**

- TcB done on all newborns prior to discharge at 24hrs (may be done sooner if concern for pathologic jaundice). If the newborn is discharged prior to 24hrs a TcB shall be done and a repeat TcB or TSB done when the newborn returns to get the newborn screening done.
- All results are to be plotted on the Bhutani Nomogram (CLI.5810.SG.012.SD.01) or Guidelines for Intensive Phototherapy for infants of 35 or More Weeks Gestation (CLI.5810.SG.012.SD.03).
- On-line interactive calculators can be accessed at:  
[www.bilitool.org](http://www.bilitool.org) or [http://www.uptodate.com/contents/calculator-newborn-hyperbilirubinemia-assessment?source=see\\_link&utmPopup=true](http://www.uptodate.com/contents/calculator-newborn-hyperbilirubinemia-assessment?source=see_link&utmPopup=true)
- If reading is within 25umol/L of high risk zone the primary care provider is consulted and a Serum Bilirubin level drawn.
- **Decisions regarding phototherapy are made based on TSB results ONLY.**
- Initiate **standard** phototherapy on primary care provider's order when infant's TSB reaches threshold based on age and guideline.
- Once phototherapy has been initiated **TcB is no longer accurate** and all further assessments must be serum samples (TSB).

### **Establishing Phototherapy**

- Standard Phototherapy may be established with an overhead light source or a fiber optic blanket.
  - Infant should be exposed to phototherapy with only a low slung diaper to maximize skin exposure.
  - Avoid use of oil or creams to skin as it can cause burns when exposed to light.
- Effectiveness of the phototherapy depends upon the Area of skin exposed + Radiant energy + Wavelength of light used.

### **Conventional (Overhead) Fluorescent Light Phototherapy**

When using overhead light source for phototherapy infant temperature is maintained with an infant warmer or incubator. Feeding times should be kept to 20-30 minutes to maximize skin exposure.

#### 1. Unit setup:

- Place isolette in parent room and pre warm to 32.0 degrees Celsius.
- Place fluorescent lamp over isolette and plug in.
- Pour distilled water (H<sub>2</sub>O) into humidity reservoir of isolette.
- Instruct parents in how to help with infant care, and the importance of infant having as much exposure to the light source as possible to be effective.

#### 2. While receiving phototherapy, infants eyes are covered with appropriate sized eye covers at all times. Parents are taught the importance of maintaining eye protection to prevent potential retinal damage. Remove eye covers when out of the unit to

promote sensory input, bonding with parents. Cleanse eyes with normal saline as needed to reduce irritation.

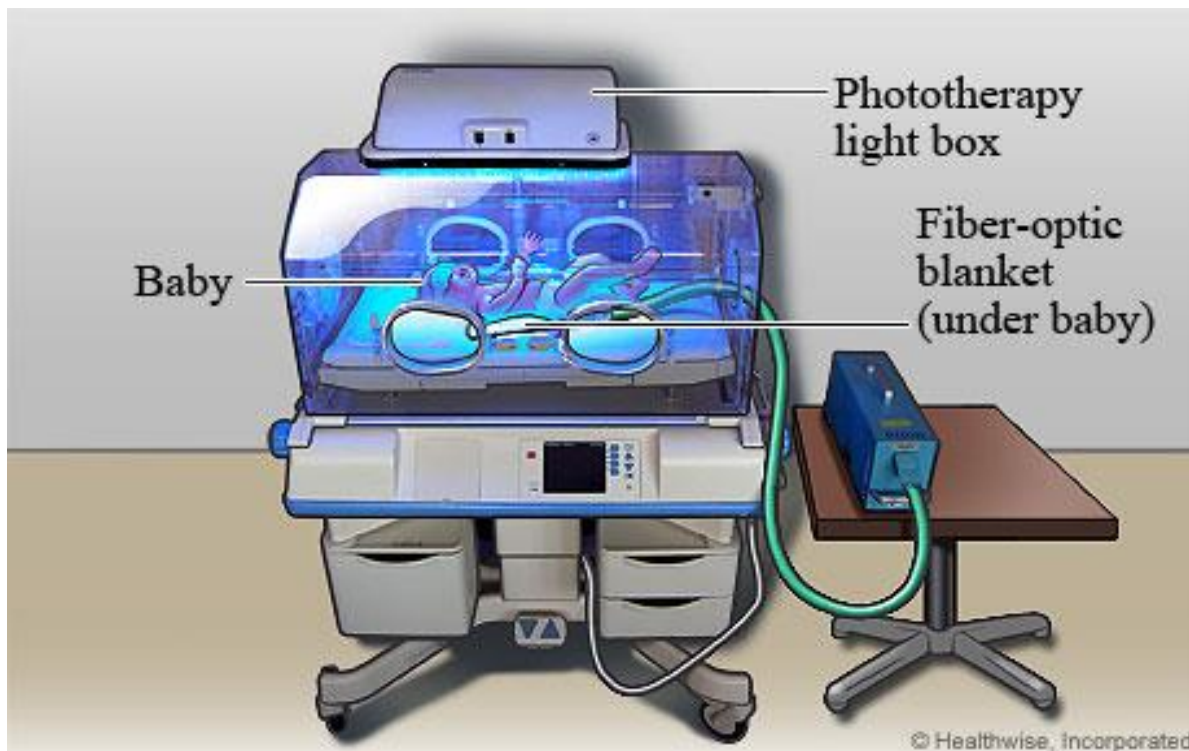
3. Place infant in the warmed isolette. Diaper may be worn or disposable pad placed under infant.
4. Isolette temperature must not exceed 32.0° Celsius. Attach temperature probe to the infant.
5. Change distilled H<sub>2</sub>O daily or as per manufacturer's instructions.

### **Bili-blanket phototherapy**

Fiber optic blankets generate little heat and can be placed directly against infant skin (with custom cover in place). They should be maintained while cuddling and feeding. Fiber optic blankets can also be used in conjunction with overhead phototherapy lights

1. Unit setup:
  - Place illuminator box on top of phototherapy lamp and plug in.
  - Insert light pad into new disposable cover. Secure cover around illuminator pad. Change covers daily and when they become soiled.
  - Place covered pad in isolette with illuminating side up. Place infant directly on illuminated pad so as much of their back is in contact with the pad as possible.
  - Switch the unit on.
  - Eye protection is required with the bili-blanket.

**Intensive (Double) Phototherapy** use of two of the above light sources in conjunction to provide phototherapy to 80% of skin surface.



## Monitoring

- Check TSB levels 6-8 hours after establishing phototherapy.
- Monitor TSB levels at least once daily until they remain below phototherapy levels.
- Light source should be turned off during blood draws.
- Consider a consult to a tertiary centre if the neonate:
  - Fails to respond to standard phototherapy (bilirubin continues to rise or does not decrease).
  - Approaches the exchange transfusion levels Guidelines for Exchange Transfusions (CLI.5810.SG.012.SD.02).
  - Had a documented bilirubin greater than 400 micromol/L.
- Assess infant's skin every 8 hours.
- Temperature, pulse and respirations are assessed and documented every 4hrs and PRN.
- Encourage adequate breast or bottle feeds every 2-3 hrs.
- Monitor infant weight loss daily and supplement as necessary with expressed breast milk or formula to maintain adequate hydration.
- Monitor urinary output and stools – assess for dehydration. Loose stools are expected while the infant is on phototherapy. The stools can be caustic to the skin so timely cleansing is required.
- Monitor for potential side effects of phototherapy:
  - Altered activity level – decreased feeding/lethargy or irritability.
  - Altered fluid status – monitor for insensible water loss.
  - Altered gastrointestinal (GI) function – increased watery stools, decreased intestinal transit time with decreased absorption.
  - Altered hematological function – increased rate of platelet turnover or damage to circulating red blood cells.
  - Altered thermoregulation – increased temperature; increased oxygen consumption; increased respirations; increased blood flow to the skin.
  - Ocular effects – potential damage to the retinas; lack of sensory input.
  - Skin changes – rashes, tanning, burns, bronze baby syndrome.
- Do not apply creams or lotions to the newborn's skin.
- If using isolette to provide warmth during phototherapy, the temperature must not exceed 32.0° Celsius on the unit, distilled water should be added/changed as per instructions for unit to provide optimal humidity.
- Document on the Newborn Frequent Monitoring Record and Integrated Progress Notes (IPN) as applicable.

## Discontinuation

- Ordered by primary care provider when the TSB has fallen below the level at which phototherapy is indicated for the infants age in hours or days.

## Discharge Planning

1. Provide all parents /infant care givers with information on jaundice and review it with them prior to discharge.

2. Note that late preterm infants TSB levels peak later than term infants. Arrange for early follow up with Public Health (Priority Contact). Note on public Health form “Late Preterm – At risk for jaundice” Include TcB or TSB reading including date and time taken.

#### **EQUIPMENT/SUPPLIES:**

- TcB Meter and ability to draw/process true serum bilirubin levels
- Bili-lights or bili-blanket
- Incubator/isolette when overhead bili-lights are used
- Distilled water for isolette/incubator
- Infant eye covers
- Temperature probe for isolette/incubator
- Disposable cover for bili-blanket if using a bili-blanket

#### **SUPPORTING DOCUMENTS:**

[CLI.5810.PR.003.SD.01](#) Guidelines for Intensive Phototherapy in Infants of 35 or More Weeks Gestation

#### **REFERENCES:**

Champlain Maternal Newborn Regional program (2013, updated July 2015), Newborn hyperbilirubinemia: A self-learning module.

Wong, R., Bhutani, V. (2017, September). *Treatment of unconjugated hyperbilirubinemia in term and late preterm infants*. Accessed on September 6, 2017 from [www.uptodate.com/contents/treatment-of-unconjugated-hyperbilirubinemia-in-term-and-late-preterm-infants](http://www.uptodate.com/contents/treatment-of-unconjugated-hyperbilirubinemia-in-term-and-late-preterm-infants)

Winnipeg Regional Health Centre (2017, January). Neonatal Practice guidelines

Health Sciences Centre Women’s/Child Health Programs (2012, November): Newborn 80.275.752 Revised R2 27

KJ Barrington, K Sankaran (2007, June 1; reaffirmed 2016, February 1); Canadian Paediatric Society, Fetus and Newborn Committee. Guidelines for detection, management and prevention of hyperbilirubinemia in term and late preterm newborn infants. *Pediatric Child Health* 2007; 12(Suppl B):1B-12B

[CLI.5810.SG.012.SD.01](#)

Bhutani Nomogram

[CLI.5810.SG.012.SD.02](#)

Guidelines for Exchange Transfusions in infants of 35 or more weeks of gestation