Phototherapy uses blue light transmitted onto the patient’s skin to break down unconjugated bilirubin

**USE FOR**
- Neonatal jaundice requiring treatment

**STANDARD OF CARE**
- Visible jaundice anywhere on the body on day 1 of life
- Jaundice extending below the umbilicus (level 3, see Kramer’s Scale)
- Bilirubin level indicating need for treatment

**1 ASSESS PATIENT**
Assess for jaundice in natural or white light
If jaundiced, determine need for phototherapy based on serum bilirubin measurement or physical exam

**2a BILIRUBIN MEASUREMENT AVAILABLE**
Compare value to bilirubin tables (below) or nomograms to determine need for treatment

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Day of life</th>
<th>Healthy term baby</th>
<th>Premature &lt; 35 wks, LBW or sick baby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phototherapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Jaundice of these levels is treated with phototherapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Treat any visible jaundice with phototherapy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Day 2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 mg/dL 260 µmol/L</td>
<td></td>
<td>10 mg/dL 170 µmol/L</td>
<td></td>
</tr>
<tr>
<td>Day 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 mg/dL 310 µmol/L</td>
<td></td>
<td>15 mg/dL 260 µmol/L</td>
<td></td>
</tr>
<tr>
<td>Day 4 onwards</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 mg/dL 340 µmol/L</td>
<td></td>
<td>17 mg/dL 290 µmol/L</td>
<td></td>
</tr>
</tbody>
</table>

**Exchange Transfusion**
Jaundice of these levels is dangerous and the baby requires urgent referral for possible exchange transfusion

<table>
<thead>
<tr>
<th>Day of life</th>
<th>Healthy term baby</th>
<th>Premature &lt; 35 wks, LBW or sick baby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>15 mg/dL 280 µmol/L</td>
<td>10 mg/dL 170 µmol/L</td>
</tr>
<tr>
<td>Day 2</td>
<td>25 mg/dL 425 µmol/L</td>
<td>15 mg/dL 260 µmol/L</td>
</tr>
<tr>
<td>Day 3</td>
<td>25 mg/dL 425 µmol/L</td>
<td>20 mg/dL 340 µmol/L</td>
</tr>
<tr>
<td>Day 4 onwards</td>
<td>25 mg/dL 425 µmol/L</td>
<td>20 mg/dL 340 µmol/L</td>
</tr>
</tbody>
</table>

**2b BILIRUBIN MEASUREMENT UNAVAILABLE**
If measurement of serum bilirubin is not timely or unavailable, estimate serum bilirubin and determine need for phototherapy using Kramer’s Scale (below)

| 1 | 4–6 mg/dL | 70–100 µmol/L |
| 2 | 8–10 mg/dL | 130–170 µmol/L |
| 3 | 12–14 mg/dL | 200–240 µmol/L |
| 4 | 15–18 mg/dL | 250–310 µmol/L |
| 5 | 15–20 mg/dL | 250 to >340 µmol/L |

**Area 1**
Only start phototherapy if day 1 of life

**Areas 1 and 2**
If premature, low birth weight or a sick term baby start phototherapy

**Areas 3, 4, or 5**
Start phototherapy for all babies, including healthy term babies, especially if palms and soles (area 5) are jaundiced

Transcutaneous bilirubin and Kramer’s Scale are less precise in determining serum levels after phototherapy has begun
Do not delay treatment while awaiting bilirubin laboratory results

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**Lightmeter**

**Height adjustment**
20–60 cm adjustable height

**Intensity mode**

**Intensity adjustment**

**Exam lights**

**Treatment time**

**Reset button**
**PREPARATION & TREATMENT**

**Phototherapy Light**

Blue light within the wavelengths of 425–475 nm breaks down unconjugated bilirubin to a water soluble, non-toxic form that can be easily excreted.

**USE FOR**
Patient with jaundice on physical exam or a bilirubin level requiring phototherapy.

**STANDARD OF CARE**
- **Regular** phototherapy irradiance: 25–30 µW/cm²
- **Intensive** phototherapy irradiance: 30–35 µW/cm²

**ASSESS PATIENT**
Measure bilirubin to determine if phototherapy is indicated. Estimate bilirubin with Kramer’s Scale if testing not available.

**PREPARE DEVICE**
Turn on the phototherapy light. Set irradiance to regular or intensive. Turn on lightmeter and hold near patient’s mattress. Lower light to increase irradiance OR raise to decrease as appropriate for clinical condition.

**PREPARE PATIENT**
Follow hand washing protocol. Remove baby’s clothes except for diaper. Place eye mask on patient so it fully covers the eyes. Place patient directly under the light.

**MONITOR PATIENT**
During treatment:
- begin thermal management with a radiant warmer if needed
- check daily bilirubin levels (if available)
- turn patient and check eye pad every 4 hours
- check for signs of dehydration, hypothermia, kernicterus or eye infection

Minimise interruptions to treatment with the exception of feeding.

**REMOVE PATIENT FROM DEVICE**
If bilirubin can be measured stop phototherapy when:
- bilirubin 50 mmol/dL or 3 mg/dL below the level requiring treatment
- jaundice is limited to area 1 in premature infants and areas 1 & 2 in term infants

**COMPLICATIONS**
- Dehydration
- Hypothermia
- Retinal damage
- Eye infections
- Bronze baby syndrome
- Kernicterus

**DISINFECTION & INFECTION PREVENTION**
- Clean hands with soap and water or alcohol before and after handling phototherapy materials that will be used on patients
- Disinfect phototherapy, lightmeter housing, and LCD controls using 70% alcohol
- Ideally use one phototherapy unit for a single patient
- Refer to the General Infection Prevention Module

If jaundice persists despite 7 days of phototherapy conduct investigations for pathologic causes of jaundice.

Clinical Job Aid
Phototherapy devices are usually rolling units with brakeable caster wheels. Devices may be rolled from patient bed to patient bed as needed.

**DAILY MAINTENANCE**
Always wipe the phototherapy unit with 70% alcohol using gauze or a cotton swab before first use and between patients

**PREVENTIVE MAINTENANCE**
Test the phototherapy light weekly to ensure it is still providing a therapeutic range of 25–35 µW/cm² at 40 cm

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If the light is **not turning on**
- Check that the power cable is securely attached to the phototherapy device
- Check that the switch and power outlet are turned on

If the light turns on but **only some bulbs are working**
- Check that phototherapy light is set on therapeutic rather than examination lights

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**CONTACT A TECHNICIAN OR MAINTENANCE DEPARTMENT IF DEVICE CONTINUES TO NOT WORK PROPERLY AFTER ADDRESSING THE COMMON ISSUES**