GLOBAL HEALING | Phototherapy Light Intensity Meter

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Technical Information

Global Healing's phototherapy light intensity meters (referred to as "light meters" hereto forward) are designed to measure the intensity of therapeutic blue light with a spectral range and peak of 380 - 567 nm and 470 ±10 nm, respectively. They are outfitted with filters to block infrared light, white light, red light and green light.

The light meters have been calibrated against an Olympic Bili-Meter (Natus Medical Inc, San Carlos, CA, USA) to measure absolute irradiance (in units of μW/cm²/nm) of one Special Blue (BB) F20T12 fluorescent tube at a distance of 30 cm.

Specifications:

Spectral Range	380 - 567 nm
Bandwidth, 50%	106 nm
Peak Sensitivity	470 nm
Measuring Functions	μW/cm²/nm
Measuring Range	0 to 99.9, increments of 0.1
Ideal Temperature	Ambient
Size	104 mm x 66 mm x 38 mm
Weight	102 g (+22 g with batteries)
Sensor Type	Silicon photocell
Display Type	Liquid crystal display (LCD)
Battery	2 AAA alkaline

Purpose of Light Meter

The light meters are primarily intended for technicians and medical professionals to monitor the aging of blue light sources used in phototherapy, so that they can be replaced no later than after a 50% decrease of the initial light intensity. The light meters can be used to measure these irradiance levels of phototherapy devices containing BB and TL/52 fluorescent tubes.

Typically, a blue fluorescent tube light will see 50% degradation of light intensity around 14 months. **Thus, the phototherapy device should be measured for intensity output once a month with this light meter to maintain quality control.**

NOTE: This light meter should not be used to measure absolute irradiance.

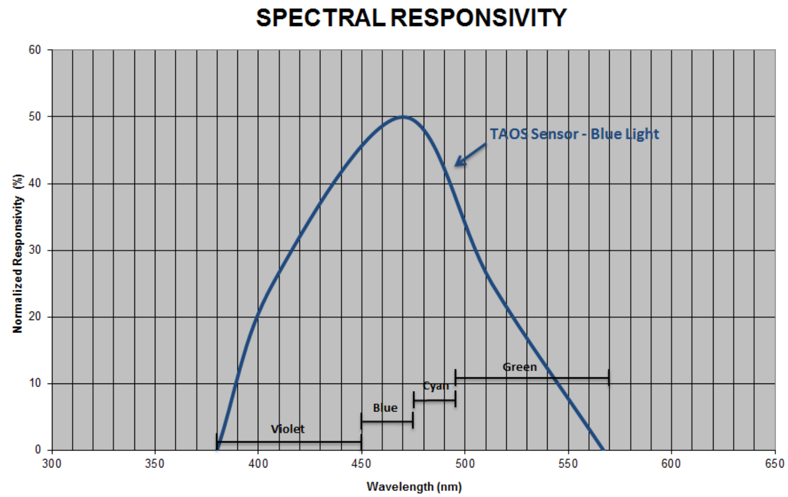

Fig 1. Global Healing's light meter responsivity to blue light irradiance between the spectral range of 380 - 567 nm.

Directions for Light Meter

A. Checking the Blue Light Irradiance:

1. Turn on unit by pressing the red power switch on the left labeled “power”.
2. Place the light meter 30 cm from the light source, roughly the same distance the baby’s belly would be in the center of the light footprint.
3. When the blinking numbers in the display stabilize, press the red hold button on the right labeled “hold”.
4. Read the results, displayed in $\mu W/cm^2/nm$.
5. Results for acceptable lights should be greater than 30 $\mu W/cm^2/nm$ for Type BB bulbs.
6. Turn off the unit by pressing the red “power” switch.

B. Type of Lights to be Used:

1. The recommendation for lamps are the following:
    - Blue 20-W F20T12/BB manufactured by General Electric, Westinghouse or Sylvania.
    - TL52/20W manufactured by Philips in Eindhoven.
    - If no blue lights can be obtained, daylight fluorescent tubes are twice as therapeutic as cool white.
2. Global Healing does not recommend 20-W F20T12/B bulbs, as they do not have the intensity needed for effective phototherapy. However, if these are the only bulbs available, place the baby closer to the lights and use the light meter to determine an appropriate distance. Irradiance readouts should be between 8-10 $\mu W/cm^2/nm$.
3. **Do not use standard fluorescent lights if possible!**

C. Images of Light Meter

Fig 2. Front view of light meter user interface

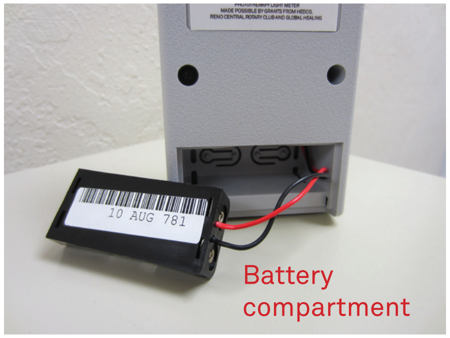

Fig 3. Rear view of light meter with battery compartment and serial number

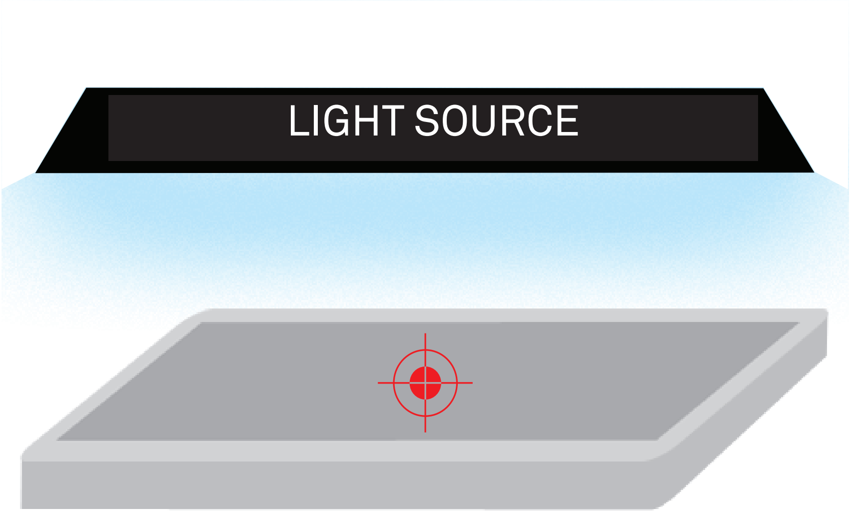

Fig 4. Placement of the light meter (red dot) for irradiance readings. **NOTE:** Irradiance at the center of the light footprint is much higher than at the periphery.

American Academy of Pediatrics' Recommendations

"Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation"

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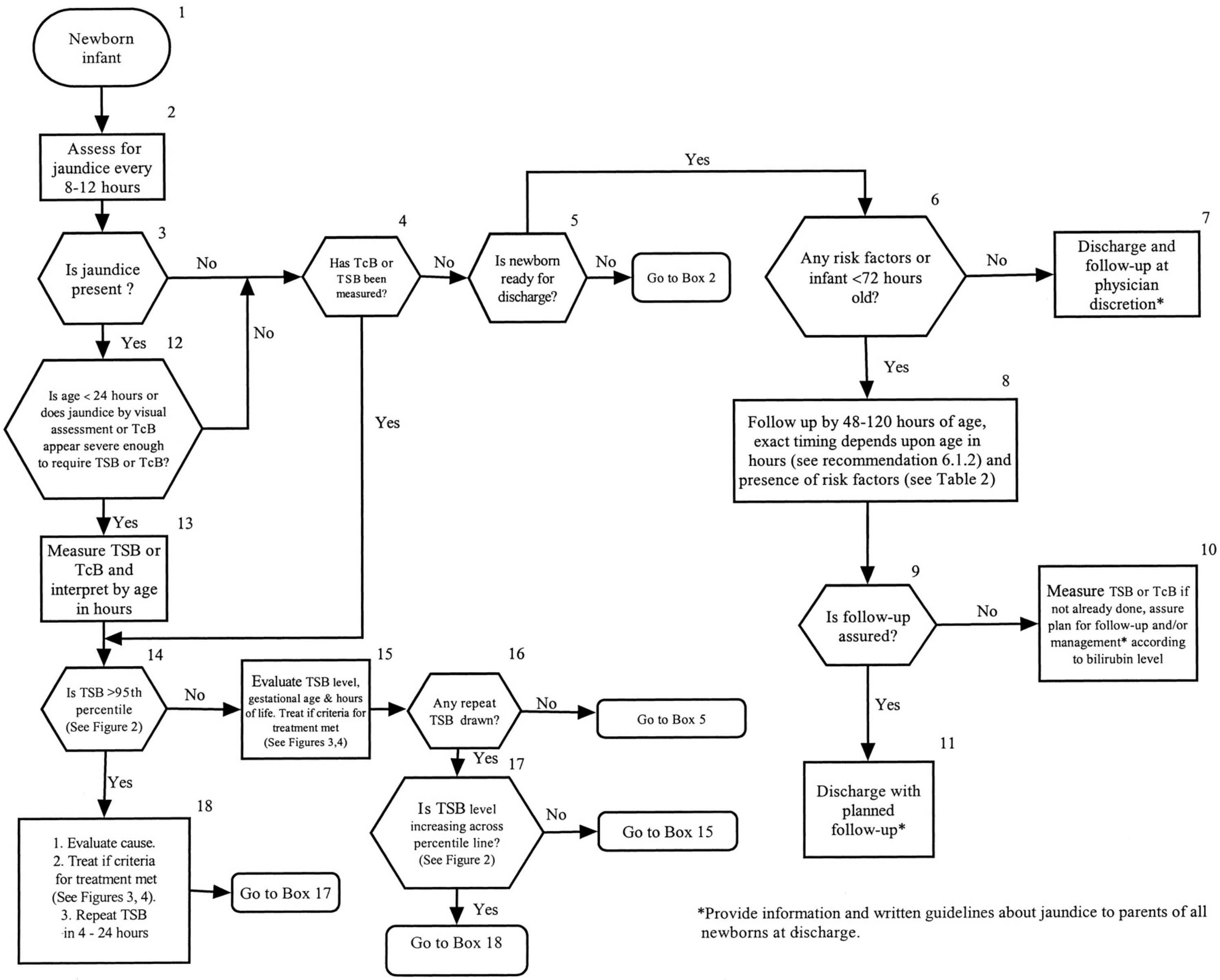

Fig 5. Algorithm for the management of jaundice in the newborn nursery.

Phototherapy Device Quality Control Log

Hospital Name: ______________________________

Phototherapy Device Model: ____________________

Light Source:_________________________________

Date	Irradiance Reading (µW/cm2/nm)	Initials

SAMPLE

Note: Phototherapy device should be measured for irradiance once a month. Take irradiance readings at the same distance each time. Refer to "Directions" section of manual for additional instructions.

Light Meter Maintenance

1. Do not submerge the light meter in water or any liquid solution.

2. Do not shake the light meter as this can disrupt the circuitry and affect the readings. If the instrument is dropped, contact Global Healing for repairs and/or a replacement.

3. The light meter does not need to be calibrated.

4. The sensor of the light meter is mounted to the circuit board. Please do not attempt to open the box to clean it with a cloth or any cleaning solution. If needed, use a dry cotton swab to clean the sensor. Be careful not to dislodge the sensor from its mount.

5. Store light meter in a cool, dry place away from sunlight.

6. Replacing the batteries:
   - Remove the battery cover on the back of the unit by sliding it in the direction of the arrows.
   - Install 2 new AAA batteries, noting the polarity on the battery holder.
   - Battery life will vary depending on how many times it is used and the length of time the light meter is left on. If continuously left on, battery life will last approximately 25 hours.

Troubleshooting

Potential Issues:

1. If display does not provide a readout, check installation or replace battery.
2. If display continues to not provide a readout, there is a possibility that the board or sensor is malfunctioning. Contact Global Healing, referencing serial number on battery holder of light meter.
3. If readouts for irradiance output of phototherapy unit is inconsistent, check that it is connected to a reliable and stable supply of power.

Warranty:

The phototherapy light intensity meter is provided by Global Healing on an "AS IS" basis without any representations, warranties or conditions of any kind, whether expressed or implied, statutory, out of a course of dealing or usage, trade or otherwise, including any implied warranties or conditions or merchantability, merchantable quality, fitness for any particular purpose of use of noninfringement. Global Healing does not warrant or guarantee that the meter will be error free.

Additional Information

1. Management of hyperbilirubinemia in the newborn infant 35 or more weeks of gestation. Subcommittee on Hyperbilirubinemia. Pediatrics. 2004; 114(1): 297-316.
2. Maisels, M. Why use homeopathic doses of phototherapy? Pediatrics. 1996; 98: 283-287.
3. Vreman, H. Phototherapy: the challenge to accurately measure irradiance. Indian Pediatrics. 2010; 47(2): 127-128.
4. Strauss K, Robinson D, Vreman H, Puffenberger E, Hart G, Morton D. Management of hyperbilirubinemia and prevention of kernicterus in 20 patients with Crigler-Najjar disease. European Journal of Pediatrics. 2005; 165(5): 306-19.

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