Nellcor is designed to reject ambient light. The finding we report indicates that ambient light may be sensed and displayed under certain conditions. The manufacturer's technical bulletin addresses the effect of excessive ambient light on probes properly applied to patients. The problem we describe is not specifically addressed.*

* Nellcor Incorporated. Controlling external optical interference in pulse oximetry. Pulse Oximetry Note No. 5, 1986

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In Reply:—Bright external light sources are known to affect pulse oximeters' and, to our knowledge, all pulse oximeters share this sensitivity. This occurs because these instruments use optical means to make their measurements. Consequently, to obtain accurate measurements, potential sources of optical interference must be controlled. Because pulse oximeters' optical components are in the sensor, proper sensor application and use are key factors in reducing optical interference. Optical interference occurs when bright light from an external source reaches the detector, or when light reaches the detector without passing through a pulsatile arteriolar bed. If not controlled, such interference can prevent the oximeter from tracking the pulse, or it can result in erratic or inaccurate but apparently normal measurements. External light sources that can interfere with pulse oximeter performance, if they are bright enough, include surgical lamps, bilirubin lamps, fluorescent lights (as used in this case), infrared heating lamps, and direct sunlight. In the presence of such lights, sensors must be covered with opaque material. Another type of optical interference may occur when some of the light from the sensor's light sources reaches the detector without passing through an arteriolar bed. Such an optical shunt results in either erratic or stable but inaccurate measurements. Optical shunts typically occur when an inappropriate sensor is selected and when a sensor is used incorrectly. The clinician should select a sensor that is suitable for the patient and the clinical setting based on the patient's size, the available sensor sites, the amount of patient activity, the intended duration of monitoring, considerations of sterility, and the adequacy of the patient's perfusion. An especially important consideration in the use of high performance sensors is that the sensor adhere snugly to the skin, so that it remains properly positioned and aligned on the patient and that no light leaks from the light source or ambient light are permitted to reach the detector.

When anomalous measurements are reported in clinical settings, we commonly find that the sensor being used was not appropriate for the patient site or application site, the sensor was repeatedly reapplied, or additional tape or a finger cot was used to secure the sensor after its own adhesive was exhausted. Such practices tend to result in sensors that do not fit the patient, that do not snugly adhere to the skin, or that fall off the patient easily. In such situations, bright environmental light and shunted light from the sensor's light emitting diodes could be expected to reach the detectors without passing through a pulsating arteriolar bed. In addition, applying additional tape or finger cots can produce venous congestion and result in venous pulsations that may interfere with accurate arteriolar saturation reading.

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REFERENCES


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