

Gregory Herring  
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### Pulse Oximetry

The pulse oximeter has proven to be useful in clinical monitoring. It is the most widespread electronic clinical device in the operating room. Oximetry is the determination of the hemoglobin-oxygen saturation. The advantages of the pulse oximeter are that it is noninvasive and gives continuous real-time estimates of arterial-oxygen saturation. The pulse oximeter consists of a probe attached to the patient's finger or ear lobe, which is linked to a computerized unit. The unit displays the percentage of HbO<sub>2</sub> with an audible signal for each pulse beat, a graphical display of the blood flow, and sometimes a calculated heart rate. Audible alarms may also be provided and adjusted by the user depending on the patient.

In 1975, Professor Susumu Nakajima reported the feasibility of pulse oximetry, using the arterial blood pulsatile component to overcome calibration problems. In 1984, pulse oximeters were introduced to operating rooms and critical care units in the United States. In 1989, pulse oximeters reached ninety-five percent of the operating rooms and manufactured by over thirty-five firms with annual world wide sales of sixty-five thousand units valued at two-hundred million dollars. Today, the pulse oximeter is an essential instrument for patient monitoring (almost as important as the electrocardiogram). Pulse oximetry has become a billion dollar industry and is still growing.

A patient's respiration or movement influences the performance of

the pulse oximeter. A light source originates from the probe at two different wavelengths. These wavelengths are typically in the red and the infrared zones. Specifically, the wavelengths are around 650 nanometers and 805 nanometers. The light is partially absorbed by the hemoglobin. The amount of light absorbed is dependent on the wavelength and the saturation of oxygen in the blood. By calculating the absorption at the two wavelengths the processor can compute the proportion of hemoglobin, which is oxygenated.

The clinical applications of the pulse oximeter are the Hypoxia detection and quantification during anesthesia and critical care for adults and infants, and monitory circulation.

### Sources

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