

Neonatal Portable Pulse Oximeter



Pulse oximeter with modifications to fit on neonate

Global Health Challenge

Respiratory diseases such as tuberculosis and pneumonia are the prevailing cause of neonatal and pediatric deaths world-wide. In the developing world, this problem is escalated: 22% of pediatric deaths in sub-Saharan Africa are attributed to acute respiratory disease. Pulse oximeters are a common tool for measuring two important indicators of respiratory health: blood oxygen concentration and heart rate. Unfortunately, in many clinics in the developing world, physicians may only have access to adult-sized pulse oximeters, which are more common and less expensive than pediatric pulse oximeters, but are ineffective for neonates due to the difference in size.

Appropriate Solution

The design team of BIOE 260: Introduction to Global Health Issues designed a simple and cost-effective modification of a cordless adult pulse oximeter (Fingertip Oximeter CMS-50L model) for use on neonates while retaining functionality for adults. Adult pulse oximeters, which compare the absorption of infrared and red light by blood to indirectly measure the oxygen saturation level, normally fit on a finger. On the other hand, pediatric pulse oximeters are designed to fit on a neonates palm or foot. As a solution, the design team shaved the sides of the adult pulse oximeter and added plastic extensions to create a wider opening to allow the oximeter the option to fit on an adult or a neonate. Though the modifications were initially designed for the pediatricians and pediatric nurses at Queen Elizabeth Hospital in Malawi, the technology could be used in many settings in the developing world. Special thanks is owed to Dr. Rebecca Richards-Kortum, Dr. Maria Oden, Dr. Mark Pierce, and Allison Lipper of the Rice Bioengineering Department and Dr. Matuszczak, Director of Pediatric Anesthesia of UT Houston Medical School for their supervision and advice .

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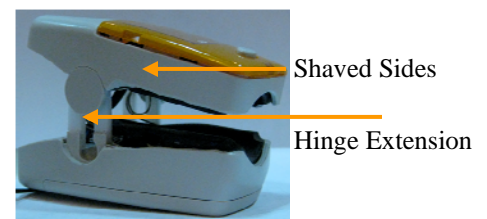
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Pulse oximeter without modifications



Pulse oximeter with modifications

Current Status

Five modified pulse oximeters were implemented in Malawi in July 2009, with positive feedback. A clinical test is being planned to analyze the efficacy of the modifications on both adults and neonates.

An initiative for the advancement of appropriate, high-value innovations in global health biotechnology

