Mobile phone pulse oximeter

Health problem addressed

Hypoxemia is a common complication of childhood infections, particularly pneumonia. Pneumonia impacts developing countries disproportionately, and accounts for over 2 million deaths a year worldwide. Hypoxemia is a recognized risk factor for death, and correlates with disease severity and is difficult to detect until onset of cyanosis.

Product description

The phone oximeter has been developed using a commercial wireless pulse oximeter and custom software for smartphone or laptop computer. User friendly software has signal processing algorithms for oxygen saturation, respiratory rate, and heart rate from the plethysmographic waveform. Clinical rules and the training module are under development.

Product functionality

The phone oximeter combines a pulse oximeter sensor and module with a mobile phone. Our pulse oximeter device conveys the quality and trend of physiological data through its user interface. The ease of use, presentation of warning signals and reliance on symbols mean that it can aid clinicians in detecting clinical events and clinical decisions.

Developer’s claims of product benefits

Pulse oximetry is not widely used in developing countries. Current devices are expensive and designed for use by clinical experts. Inadequate financial resources, infrastructure and a trained workforce are factors that have impeded adoption. The cost could be significantly reduced by using personal communication devices such as mobile phones to process and display information. The goal of this project is to demonstrate the potential for automated interpretation of information collected from a pulse oximeter. The display will minimize the need for training in interpretation, optimize the use of information in the pulse oximetry signal and provide intelligent interpretation of results.

Operating steps

The phone oximeter is a pulse oximeter that uses a mobile phone to intelligently analyze and creatively display the information received from a sensor placed on the finger.

Development stage

The device has undergone interface usability testing in Vancouver, Canada. For further usability tests, we have sent a team to Mulago Hospital in Uganda. There is development on the software and hardware aspects to include other physiological parameters. The decision support tools are functioning. Automated capillary refill time algorithms and interface have been developed. Publications, conference posters and presentations have all been well received by the academic community.

Future work and challenges

Further financing for development and evaluation of the device and software is required. Funding is currently limited to seed funding for the development and evaluation of the prototype for use during anesthesia in a hospital setting. Grant applications have been submitted. Development of a low cost sensor is of utmost importance. We are currently conducting R&D to create this sensor.

Use and maintenance

User: All
Training: None
Maintenance: Local support services for phones.

Environment of use

Requirements: Mobile phones are widely available in many developing countries. Mobile phones have high efficiency power storage, an integrated display and processing power to analyze the pulse oximeter signals.

Other features: Portable and reusable. Runs on batteries, uses software and is compatible with telemedicine systems.

Product specifications

Dimensions (mm): 100 x 50 x 10
Weight (kg): 0.25
Consumables: None
Life time: >5 years

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