How might we cut costs of hospital-grade pulse oximetry for small hospitals/clinics in developing countries?

Oxaros
Team #17

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Problem

A pulse oximeter measures light absorption through skin to calculate blood oxygen saturation (SpO_2), **critical** for understanding a patient's cardiovascular and respiratory health.

Oximetry is vital during surgeries, as anesthesia impacts blood oxygen content. Without oximetry, surgery mortality rate increases **tenfold**.

Many **small hospitals and clinics** in developing countries do not have access to hospital-grade oximetry.

Hospital Hurdles

COST POWER USABILITY

Current oximeters are either cheap but inaccurate or accurate but expensive. Since Oxaros intends to break even instead of profit, we can eliminate the price markups of hospital-grade oximeters. We believe we can **produce and distribute** a hospital-grade oximeter for **only $20**.

10%
of Namibians have access to hospital-grade oximetry.

Current hospital-grade oximeters cost
$75-200

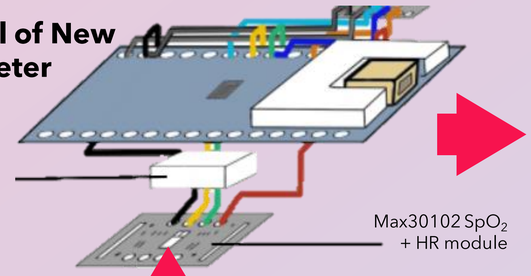
Progress

We identified rural **Botswana** and **Namibia** as our target region and are in the process of connecting with NGOs and local governments for distribution.

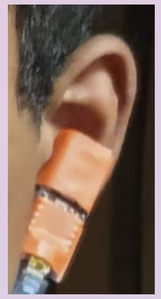
We validated 3 ideas with **experts at Emory:**

1. Replace complex expensive components with simple solutions (See below)
   - LCD displaying specific readings → **Single LED emitting color based on range**
   - Rechargeable batteries → **Button battery**
2. Configure oximeter to target the ear for easier readings (see prototype #5 below & to the right)
   - **More blood and constant skin perfusion**
3. Adjust algorithms to avoid melanin bias
   - $SpO_2 = IR_{AC} / (RED_{AC} + IR_{AC})$
   - *In Progress*

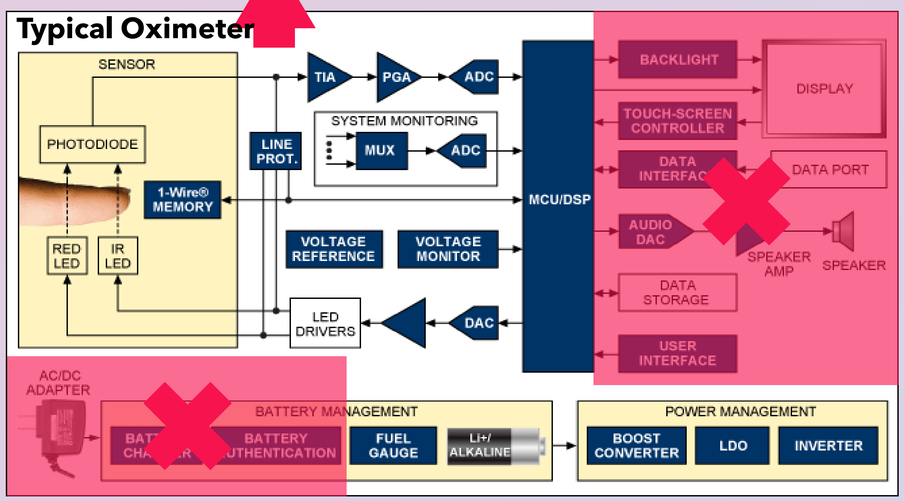
Model of New Oximeter



Prototype #4



Typical Oximeter



Present Day

Our fifth iteration of the oximeter has **$10** in components and maintains **~90% accuracy** with a calibration time of **30 seconds**.

Goals

FINALIZE PRODUCT | ESTABLISH PARTNERS | START SUPPLYING

We plan to increase accuracy to at least **99%** and decrease calibration time to under **15 seconds** within the next month of prototyping.

We are in contact with the **Health Ministry** in Namibia and are in the process of partnering with local organizations to simplify distribution and reduce or potentially eliminate shipping costs.

Our product has the potential to save **80K lives** in our target region. After successful implementation in our target region, we hope to expand to neighboring areas and broaden our impact.

SOUTHERN AFRICA
- **Botswana**
- **Namibia**

80K
lives to save