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Spring 2022



01 WHISTORY

O3 APPLICATIONS

02 THEORIES

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INTRODUCTION 00





INTRODUCTION

Pulse oximetry is the measurement of oxygen saturation in body. It's a method based on electromagnetic characteristics of blood, which contributes to many crucial medical applications including its uses in ICU, sleep laboratories, cardiac catherization laboratories, etc.



"Yes, the pulse oximeters have increased our confidence greatly, but also the confidence of the caregivers. You explain to them that this is medical equipment to assess if the child has pneumonia. Then, when you tell them that this is just the common cold or an upper respiratory infection, they will believe you, because you have used the instrument rather than just saying to them that the child just has the common cold. They can see the results right there and it helps them to feel that their child is safe, that they are receiving proper care."

—SYLVIES, FIONA ET AL.

DOI:10.1371/JOURNAL.PONE.0242440

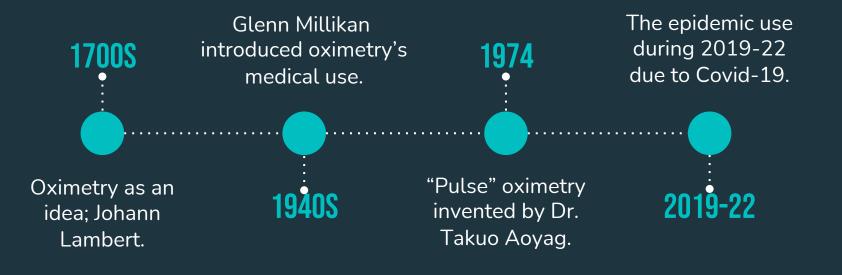








TIMELINE









BASIC CONCEPTS



HEMOGLOBIN

Hb - Iron-containing oxygentransport metalloprotein in red blood cells.



HEART RATE

Number of times the heart contracts during a minute.



OXYGEN SATURATION

SpO2 – measure of how much oxygen the blood is carrying as a percentage of its maximum capability.



ELECTROMAGNETIC WAVES

Wavelengths of the two waves contributing to this method (IR and red) are 950 nm and 650 nm.



OXYGEN SATURATION

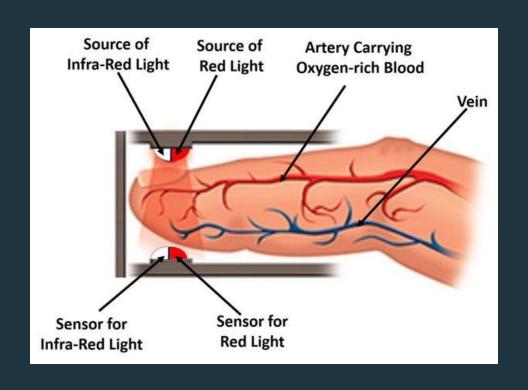


Oxygen-carrying Hb

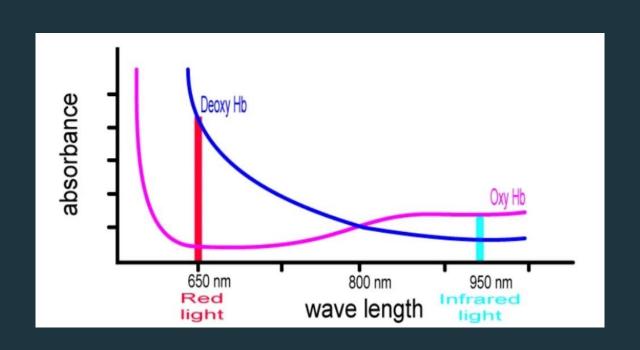
X

Non oxygen-carrying Hb

HEMOGLOBIN CONCENTRATION MEASUREMENT



HEMOGLOBIN CONCENTRATION MEASUREMENT



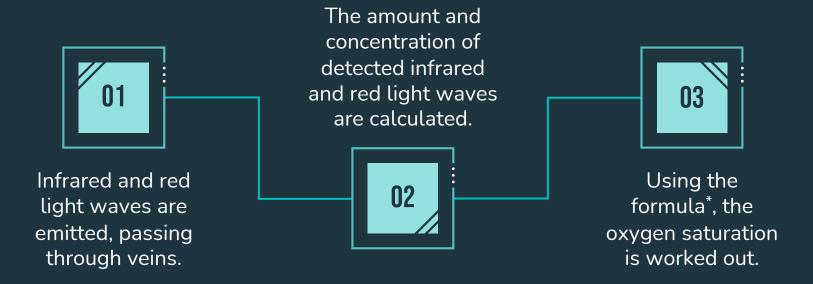
OXYGEN SATURATION CALCULATION

Oxygen saturation =
$$\frac{C \text{ (HbO2)}}{C \text{ (HbO2)} + C \text{ (Hb)}} \times 100 \text{ (%)}$$

$$C \text{ (Hb)} = \text{Concentration of deoxygenated hemoglobin}$$

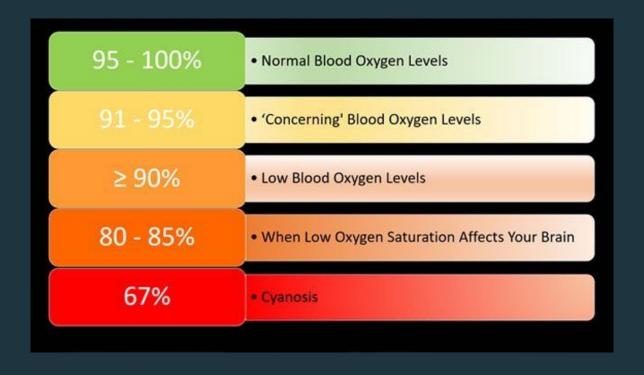
$$C \text{ (HbO2)} = \text{Concentration of oxygenated hemoglobin}$$

METHOD



^{* -} As shown in the previous slide.

OXYGEN LEVELS CHART





APPLICATIONS 03







TYPES OF PULSE OXIMETERS

1

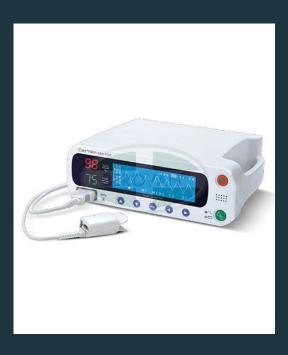
DESKTOP UNIT

2

FINGER/MOBILE UNIT



TYPES OF PULSE OXIMETERS







TYPES OF PULSE OXIMETERS

3

PULSE OXIMETER
DEFIBRILLATOR ANESTHETIC



PULSE OXIMETERS IN MARKET



Mindray PM-60 Saturatiemeter, pulsoximeter,...

€423.44

Medische Vakhan... Free shipping



Nonin PalmSat 2500 Pulsoximeters

€653.40

Electro Medico B.V. +€6.95 shipping



PM-60 Pulse Oximeter

€598.95

FysioSupplies NL +€4.95 shipping



Diagnostische multifunctionele spirometer met...

€1,439.95 Quirumed Fournit...

Quirumed Fournit... Merkala +€12.79 shipping Free sh



Welch Allyn Connex Spot Monitor 7100 NIBP

€1,416.43 Merkala

Free shipping



NEUTRAL 8888 Oximeter Pulse Oximeter, No,...

€39.76 RS Compon

RS Components ... +€5.99 shipping



O2 Ring
Pulsoximeter met
Alarm,...

€179.00

Amazon.nl +€2.49 shipping



Beurer BEURER PO80 - Grijs

€74.99

MediaMarkt ★★★★ (86)

+€3.99 shipping



Braun Pulsoximeter 1 - 1 Stuk

€23.99

24pharma.nl

**** (423) +€3.90 shipping



Pulse oximeter (Incl. batterijen) –
Saturatie meter –...

€9.88

bol.com

Was €15.4

Free shipping



WHAT WE LEARN

FROM PULSE OXIMETER'S PROVIDED INFORMATION

PROBLEM 1:

What if a person's blood oxygen saturation is low?

PROBLEM 2:

What change shall be expected if a person experiences cardiac arrest?



WHAT WE LEARN

FROM PULSE OXIMETER'S PROVIDED INFORMATION

PROBLEM 1:

What if a person's blood oxygen saturation is low?

An immediate action should be taken in order to improve breathing and circulation quality.

PROBLEM 2:

What change shall be expected if a person experiences cardiac arrest?

The saturation would decrease.



CONCLUSIONS 04







"Using a pulse oximeter to measure oxygen levels is no better than just regularly asking patients with COVID-19 if they are short of breath,"

- PERELMAN SCHOOL OF MEDICINE OF THE UNIVERSITY OF PENNSYLVANIA DOI: 10.1056/NEJMC2201541



REFERENCES

- The impact of pulse oximetry and Integrated Management of Childhood Illness (IMCI) training on antibiotic prescribing practices in rural Malawi: A mixed-methods study
- Pulse Oximetry for Monitoring Patients with Covid-19 at Home A Pragmatic, Randomized Trial
- The Evolution of Pulse Oximetry
- Pulse oximetry

THANKS!

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