

Supporting Tools of Covid 19 : Pulse Oximeter

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Goals of The Module

1

- Learn the basic principle of pulse oximeter

2

- Know the usage of pulse oximeter, specially to cov-19 patients

3

- Know the advantages and disadvantages of pulse oximeter usage



Contents of The Module

1

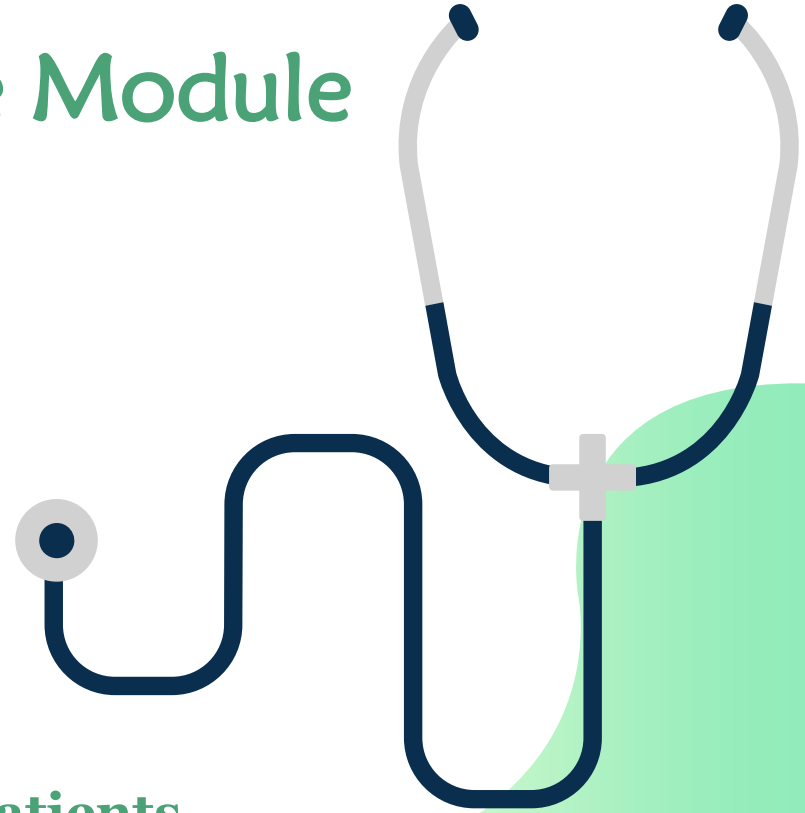
Principle of Pulse Oximeter

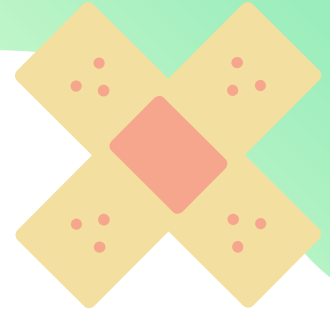
2

Usage of Pulse Oximeter

3

Pulse Oximeter to Covid 19 patients





01

About the Tool : Pulse
Oximeter

The History : Pulse Oximeter

1935



Karl Mathes invented ear O₂ saturation

1940



Green Allan Milkan invented the first oximeter

1972



Takuo Ayagi was the first bioengineer technician that measured cardiac output noninvasively

The Principle : Pulse Oximeter



01

Differentiate HHb and HbO₂

02

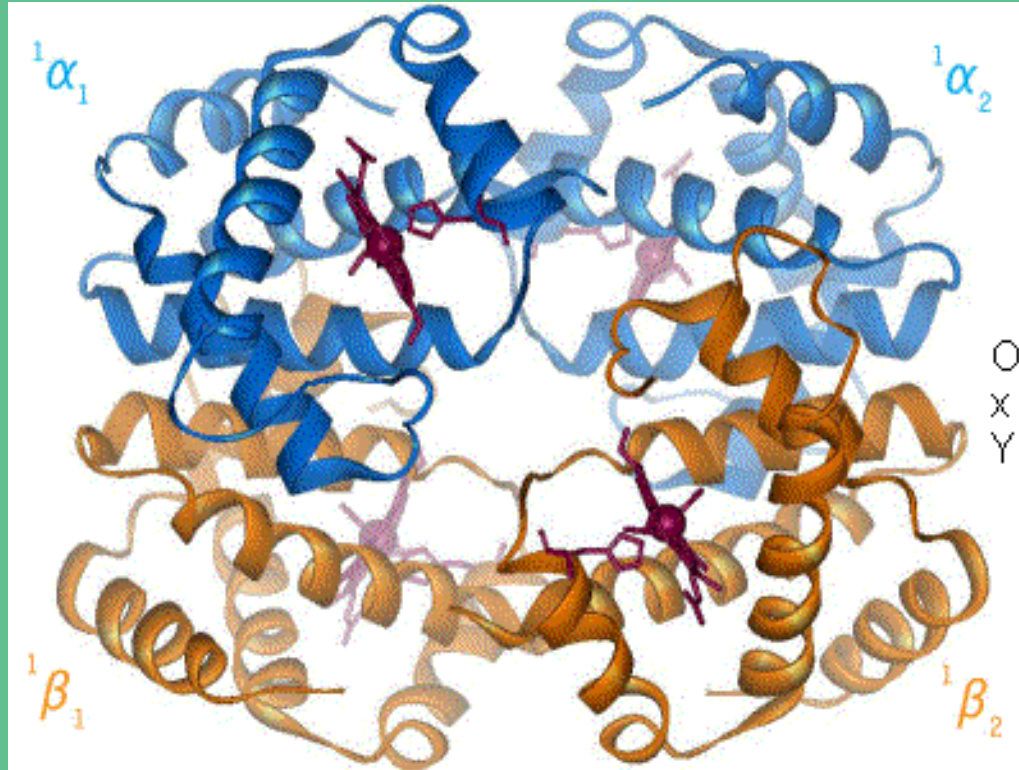
How HHb and HbO₂ emit the light

03

How to get the value/result

Hemoglobin Structure

When at deoxy and oxy state



Hemoglobin Structure

Taut (T): **deoxygenated** form with low affinity for O_2 , therefore it promotes release/unloading of O_2 .

Relaxed (R): **oxygenated** form with high affinity for O_2 , therefore oxygen loading is favored.

T and R configurations lead to different electromagnetic absorption and therefore different emission of light.

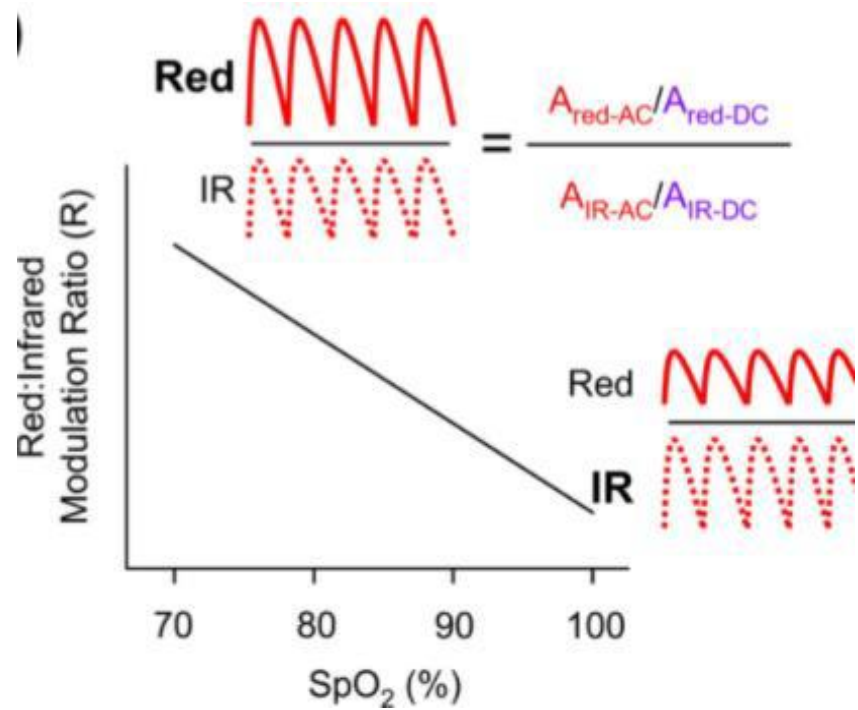
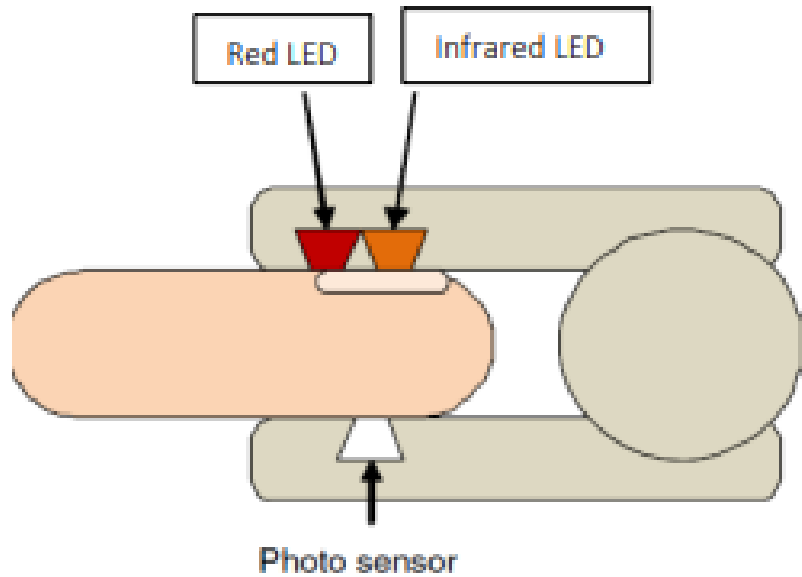
The Principle : Pulse Oximeter

Based on the different ability of red and IR absorption of Hb

Red, 660 nm
Deoxygenated blood



Infrared, 940 nm
Oxygenated blood



02

The Use of Tool : pulse Oximeter



Usage of Pulse oximeter

01

Respiratory system
evaluation

02

Monitor
hypoxemia state

03

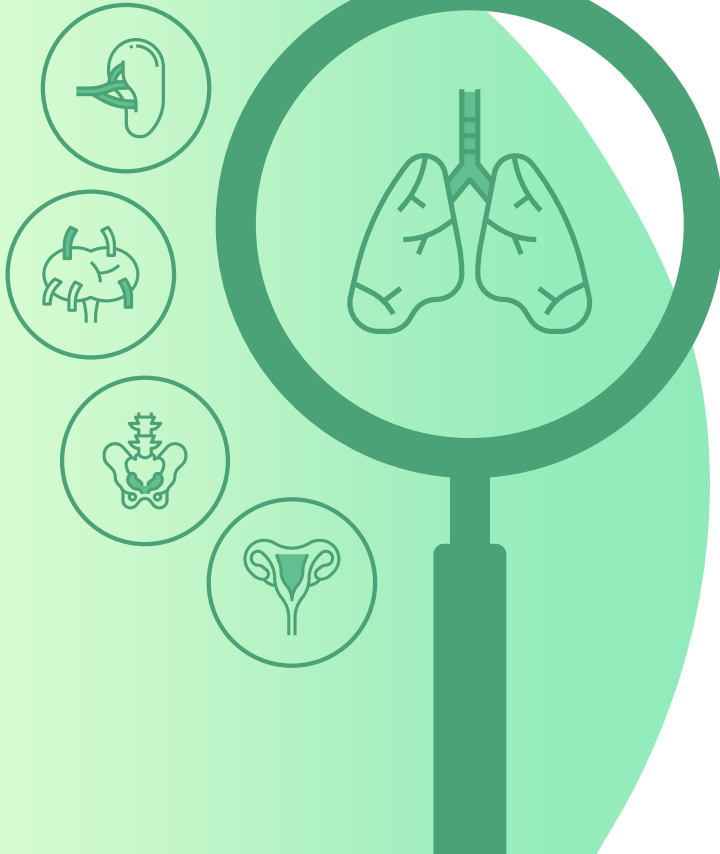
Maintain
the patient
of
Covid19

04

Diagnose
ARDS

05

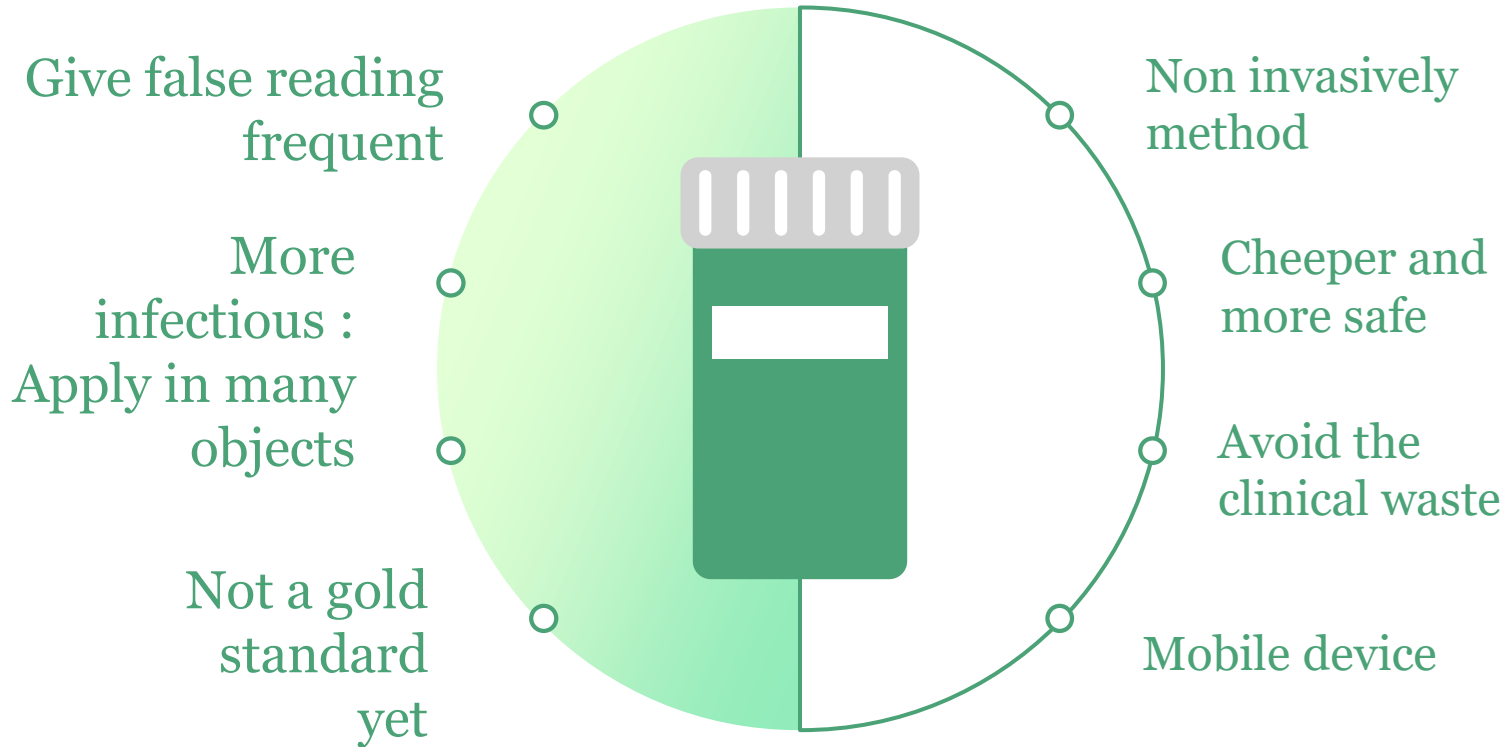
Ventilator
support
tools



03

Two Sides of Tool :
Pulse Oximeter

Pros and Cons of Tool





Thank you

