O2 sats probes

- To comply with MHRA guidelines- really necessary or just a faff?

John Bell ACP Hospital@Night Team GWH….be aware I am a nerd

Classification: Official

NHS Improvement

Patient Safety Alert

Risk of harm from inappropriate placement of pulse oximeter probes

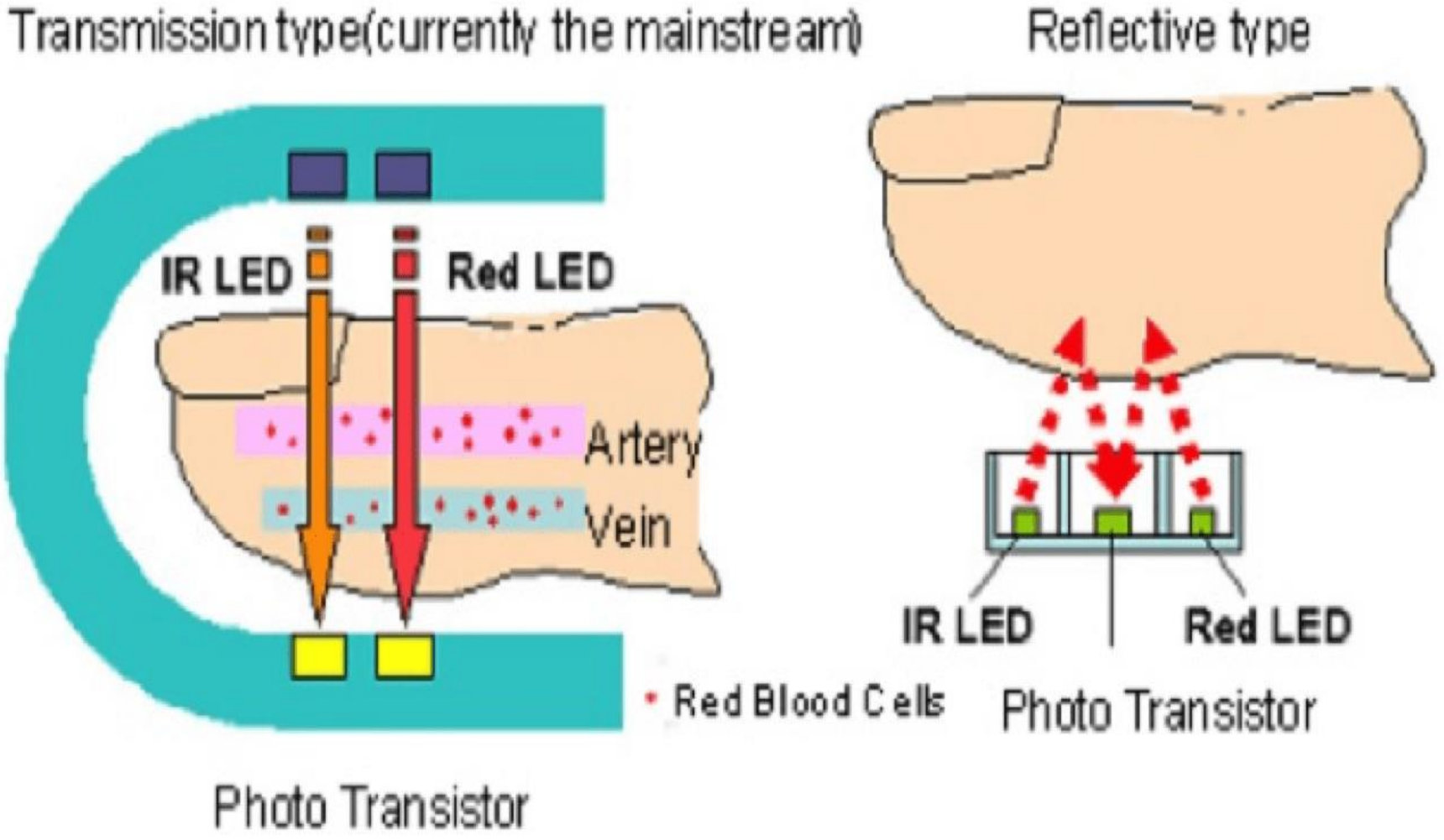
18 December 2018

Alert reference number: NHS/PSA/W/2018/009

Warning Alert

Actions

O2 sats probe theory



Oxygen saturation formula:

$$\text{Oxygen saturation} = \frac{C(HbO_2)}{C(HbO_2) + C(Hb)} \times 100\ (\%)$$

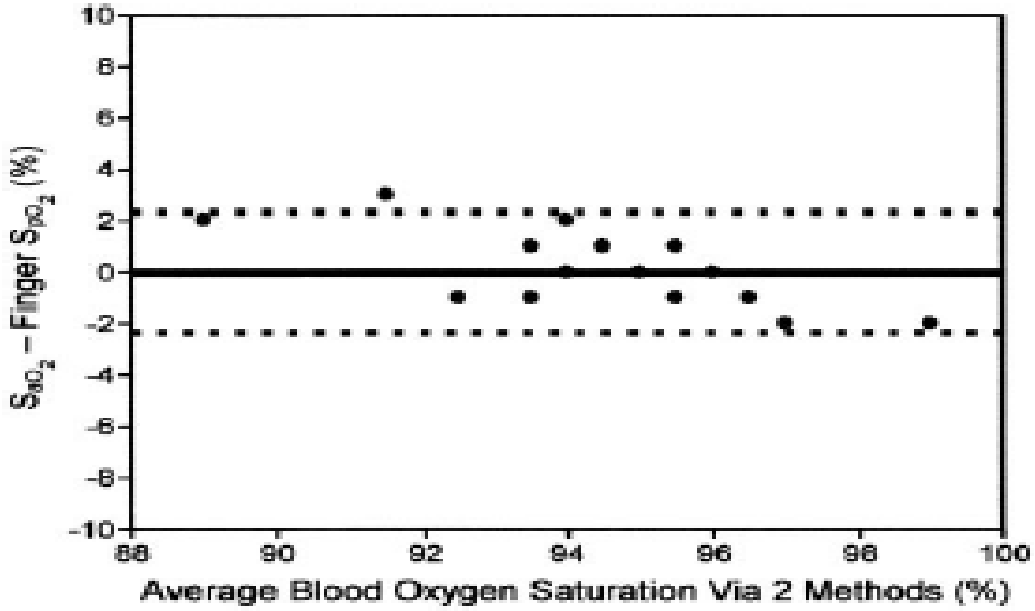
C (Hb) = Concentration of deoxygenated hemoglobin

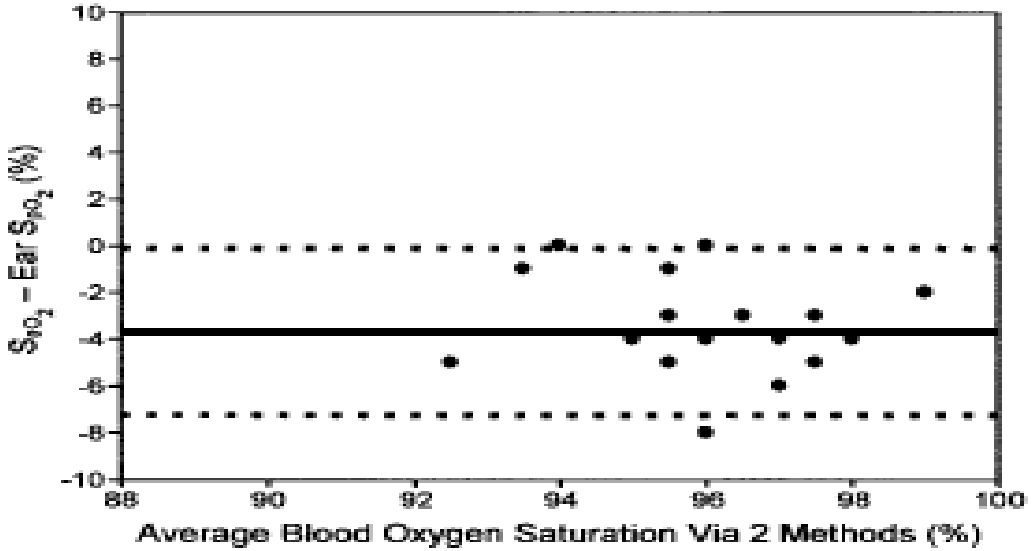
$C(HbO_2)$ = Concentration of oxygenated hemoglobin

Oxygen saturation is a measurement of the percentage of oxygen binding sites that contain oxygen. If all the oxygen binding sites contain oxygen, then the oxygen saturation is 100%. Oxygen saturation is defined as the ratio of oxy-hemoglobin to the total concentration of hemoglobin present in the blood (i.e. Oxy-hemoglobin + reduced hemoglobin). When arterial oxy-hemoglobin saturation is measured by an arterial blood gas it is called SaO2. When arterial oxy-hemoglobin saturation is measured non-invasively by a finger pulse oximeter or handheld pulse oximeter, it is called SpO2. Note that SaO2/SpO2 alone doesn't reveal how much oxygen is in the blood; for that we also need to know the hemoglobin content.

Finger probe on the ear is ok right?

Sats are Sats?





Cost analysis

Finger probes £75-225 including cabling

- Reusable (non disposable)
- Disposable
- Cleanliness
- Decontamination between patients
- Wear and tear
- 2 hourly changes of position? Anyone ? Anyone at all?

Ear probes (£125-375 including cabling)

- Why extra cost?
- Bulk purchasing
- Commissioning via multiple trusts
- Wear and tear (more fragile then finger probe)
- Patient safety improved by avoiding inaccuracies of 30-50% on o2 sats either under or over reading (median inaccuracy range 3-8%)

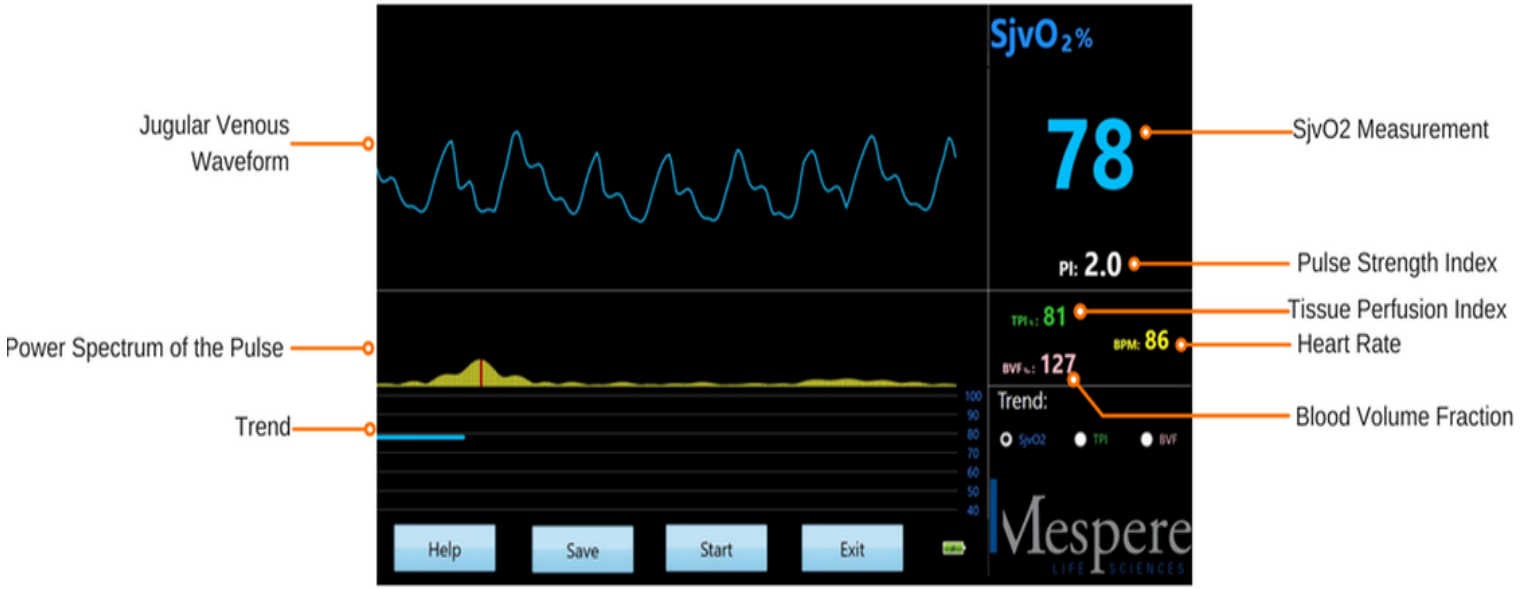
Other options- the future:

- Nose clips/ probes

- Cost ↑ single patient use

Other options continue

- Continuous waveform oximetry via invasive lines- currently limited to jugular and central venous lines- arterial is coming! Cost £250-300 per line+ timely set up and prone to user error



Other options continued 2

- Continuous ABG or direct inline ABG devices- Sphere/ Proxima

Sphere/ Proxima

Pros

- Bedside
- Less interruption to care
- Less time with no nurse in the side-room or bed-space
- Reduced iatrogenic anaemia- smaller sample size and closed circuit with flush back and little discarded blood
- Iatrogenic anaemia equates to 25-33% of all RBC transfusion requirements in ICU
- Typically an ICU patient will on average require transfusion within 7-10 days

Cons

- Technically challenging to set up
- Non-familiarity with the equipment
- Cost per block/ set up as single patient use circa £500
- Maximum number of samples less than a “unit-wide” ABG system before discard and setting up new testing set

references

- American Association for Respiratory Care. AARC Clinical Practice, Guideline: Pulse oximetry. Respir Care 1991;36(12):1406–1409.
- Jeffrey M Haynes (2007)The Ear as an Alternative Site for a Pulse Oximeter Finger Clip Sensor, RESPIRATORY CARE • JUNE 2007 VOL 52 NO 6