Confident Decision Making

- Accurate and reliable heart rate visible to the delivery team in real time\(^1, 2\)
- Continuous pulse waveform
- Heart rate signal within 15-30 seconds of cap placement\(^2\)
- Developed with the Faculties of Engineering and Medicine at The University of Nottingham

Optimum Sensing Location

- Perfusion is maintained longer at the forehead than at the periphery\(^3, 4\)
- The VS uses green light, which has a larger depth of modulation in the presence of pulsatile blood than red or infrared wavelengths\(^5, 6\)
- The volume of blood under the skin surface is measured using an active optical sensor. As the volume changes, due to the heart beating, a pulsatile signal is captured and relayed wirelessly to the display monitor.

Flexible Patient Care

- Portable Display with 4 hour battery life
- No wires - wirelessly transmits to the bedside display
- Potentially facilitates heart rate monitoring in evolving delivery room practices
- This includes delayed cord clamping, early breast feeds, delivery room cuddles and minimally-invasive transition support

Integrates Easily into Care Pathway

- Sensor is contained within in a thermoprotective Cap\(^2\) which takes seconds to fit
- 5 Cap sizes accommodate the full range of newborn head circumferences
- Cap provides fixings for breathing apparatus (ETT/CPAP)
- Fontanelle access for scanning

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Auditable Records

- Birth timer
- Touchscreen Display records clinical events along with heart rate
- USB download feature provides a permanent record which supports training, clinical governance and patient safety

Comfort and Safety Designed In

- Thermoprotective Cap
- Biocompatible materials
- Soft sensor surface with no skin damage
- Cap usable after transfer to NICU (sensor is removable)
- Systematic, user-focused approach to design

Pros and Cons of heart rate monitoring approaches for newborn babies

<table>
<thead>
<tr>
<th>Stethoscope</th>
<th>Pulse Oximeter</th>
<th>ECG</th>
<th>SurePulse VS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>$\times_8$</td>
<td>$\checkmark_9$</td>
<td>$\checkmark_{10}$</td>
</tr>
<tr>
<td>Designed specifically for newborn care</td>
<td>$\times$</td>
<td>$\times_{12}$</td>
<td>$\checkmark_{13}$</td>
</tr>
<tr>
<td>Heart rate in few first minutes</td>
<td>$\times$</td>
<td>$\times$</td>
<td>$\checkmark_{14}$</td>
</tr>
<tr>
<td>Event logging</td>
<td>$\times$</td>
<td>$\times$</td>
<td>$\times$</td>
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<tr>
<td>Developed to work with delayed cord clamping</td>
<td>$\times$</td>
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</tbody>
</table>

Technical Information

- Pulse Rate accuracy: $\pm 5$ beats per minute
- Pulse Rate Range: 25-240 beats per minute
- Pulse Rate Averaging: 5 Seconds
- Head Circumference: 20-40cm
- Display Battery Life: 4 Hours
- Module Battery Life: 2 Hours per Module
- Wireless Interface: 2.4GHz Class IIISM
- Data Storage: 100 Hours
- Wavelengths: 530, 660, 940 nm
- CE Approval: Class llb Medical Device

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Every second counts

For Sales and Technical Enquiries

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