

The Dementia Problem

- 1 in 4¹ UK hospital beds is occupied by a dementia patient
- 20% of dementia patients are hospitalized due to easily preventable infections
- 1.1 million¹ people in the UK are projected to live with dementia in 2025
- £26 billion² is spent on the care and treatment of dementia patients annually.

Given these figures it is imperative that solutions are developed enable more effective, humane, and efficient care for people with dementia.

1 NHS Long Term Plan. (2019). Technology helps clinicians monitor the health of dementia patients in their homes
2 NHS UK (2019). NHS England - Dementia

Technology Integrated Health Management

TIHM is an award-winning study using cutting edge technology to improve the quality of life for people living with dementia at home.

- A network of 21 devices is used to monitor the patient.
- Advanced algorithms detect anomalous data, enabling early interventions by a clinical monitoring team.

Phase 1 of the study shows:

- a reduction in visits to A&E and GP's
- reassured carers and patients

TIHM is run by the University of Surrey and the NHS Surrey and Borders Partnership

Client Requirements

The client wishes to extend TIHM to primary care by enabling more rapid deployment across a wider range of patients. Specifically, the client requirements are:

- Simplify and streamline the reporting of key vital signs
- Increase the frequency of measurements
- Transmit sensor data to the GP systems
- Investigate additional signal processing algorithms to analyse data and provide deeper insights

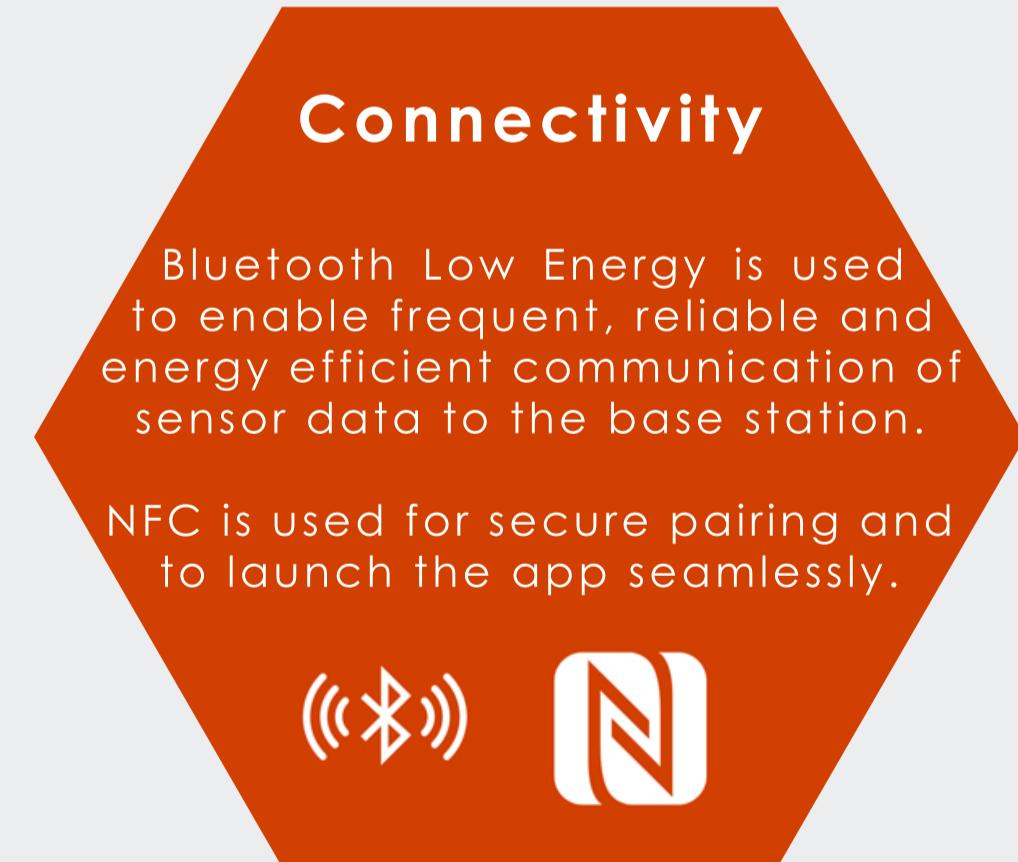
Vision & Future Work

In order to simultaneously make the product more suitable to the client and allow it to be commercially successful, the team endeavours to:

- develop an algorithm for wrist blood pressure sensing
- test the device in a clinical environment at the TIHM Living Lab
- become part of the TIHM suite of monitoring devices
- develop a mass-producible casing and wristband



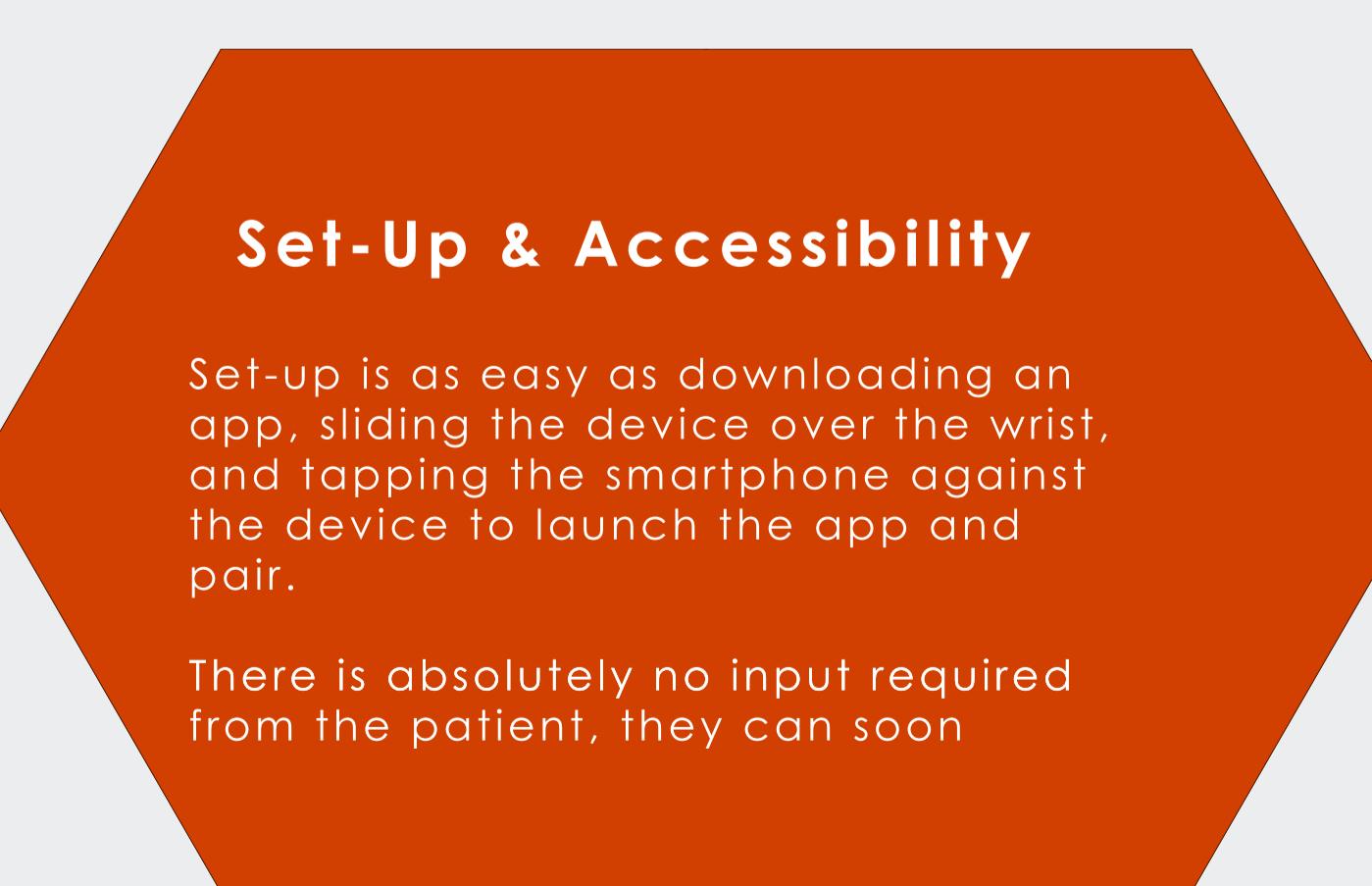
Next generation remote patient monitoring bringing together newly released sensors and state of the art self-charging technology, providing consistent and reliable vital signs.



Self-Charging

Under ideal conditions the device can be fully powered by the heat of the patient's skin.

Intelligent power management leverages the thermoelectric generator, the built-in LiPo battery and USB-C charging.



- Ensures close sensor-skin contact
- Maximizes patient comfort
- Minimizes patient input through a buttonless design
- To the patient, the device is no more than a bracelet.

The P24 apps give patients and carers real-time information about their vital signs.

User Interface

The Android and iOS apps provide a base station that includes:

- Main Dashboard showing current measurements and visualized data.
- History Dashboard for in-depth analysis by patient or carer
- Settings Page allowing patient/carer to control the degree of alerting provided



Preventing Illness using Machine Learning

Alerts are determined by using machine learning algorithms that detect anomalies in patient sensor readings.

Additionally, the device provides valuable data for the TIHM backend.

No data is stored on the machine-learning server, meaning the device remains GDPR compliant.



NHS Integration

The base-station forwards data from the patient's home to the FHIR (Fast Healthcare Interoperability Resources) database which is used by NHS GPs and Hospitals

Alerting System

The fully customisable alerting mechanism will keep a patient's carers' and/or loved ones up to date via regular and emergency SMS updates.