

## C-Detect from Waire Health

C-Detect is a stand-alone 4-in-1 medical grade vital signs monitor designed to continuously monitor four key Vital Signs.

Unlike spot-checks, Continuous monitoring allows for deterioration to be detected at the earliest moment.

At the core of our design ideology is that all Waire sensors are fully autonomous. They will always work, connected or not and will not require additional infrastructure such as routers or hubs. All communication hardware is contained within the sensor.

The device measures the wearer's vital signs constantly while at rest, and is worn on the upper arm in order to maximise the accuracy of the multiple sensors, and to minimise motion artefacts seen in wrist-mounted devices.

C-Detect has been developed based on the experience of delivering Waire Health's<sup>1</sup> clinically proven Sentinel Wearable Vital Signs Monitor, now focused on Respiration Rate, Heart Rate, Blood Oxygen (SPO2), HRV and Core Body temperature<sup>2</sup>.

Also, unlike fitness devices, the on-board 3-axis positioning sensor ensures that measurements are taken "at rest" as the sensor knows the patients motion levels and orientation. This further increases accuracy of vital signs but also fall-detection.

The on-board firmware manages the measurement process and delivers a visible and Haptic response if the status of vital are outside of personalised pre-set ranges. If the multi-colour LED remains blue, then all is well, should the LED change to Orange however, the wearer or their carer should seek advice – If the sensor is connected to a dashboard or platform, alerting can be fully automated.



In addition to the LED, a Haptic (vibration) response, similar to a mobile phone, will alert the wearer of any change of status, even under thick or protective clothing. The alert and alarm protocols are entirely configurable from the SDK.

In addition to the above capabilities, the device can deliver Fall Detection (or "man down") to a central dashboard. This feature is available to Platform developers via the Waire Health SDK.

Monitors Core-Body Temp – NOT just skin temperature.

Blood Oxygen Saturation – SPO2.

Respiration Rate.

Heart Rate & HRV\IBI.

3-Axis Position.

Wi-Fi & Cellular options available. - No additional infrastructure needed i.e. Routers\Hubs etc

Works Off-Grid – Local A.I.

Fall Detection & Prediction

Indoor Bluetooth Beacons - Detect toilet frequency, patient locations.

Simple to use for any age.

<sup>1</sup>Previously known as Sentinel Biosensor Ltd

<sup>2</sup>[NICE COVID-19 rapid guideline: managing suspected or confirmed pneumonia in adults in the community](#)

<sup>3</sup>[Lower mortality of COVID-19 by early recognition and intervention: experience from Jiangsu Province](#)



## Connectivity

Waire Health very strongly believe that Internet connections should be used for what they are best suited – communications - they should not be allowed to become the single point of failure, which could mean a medical device simply stops delivering the Vital Signs and other information critical to patient well-being.

C-Detect can be paired with a Smart Phone; however, this is not necessary for the device to fulfill its Continuous Vital Signs monitoring function. Bluetooth 5 securely connects the device to the phone, and information on the device's measurements can be accessed by authorised users.

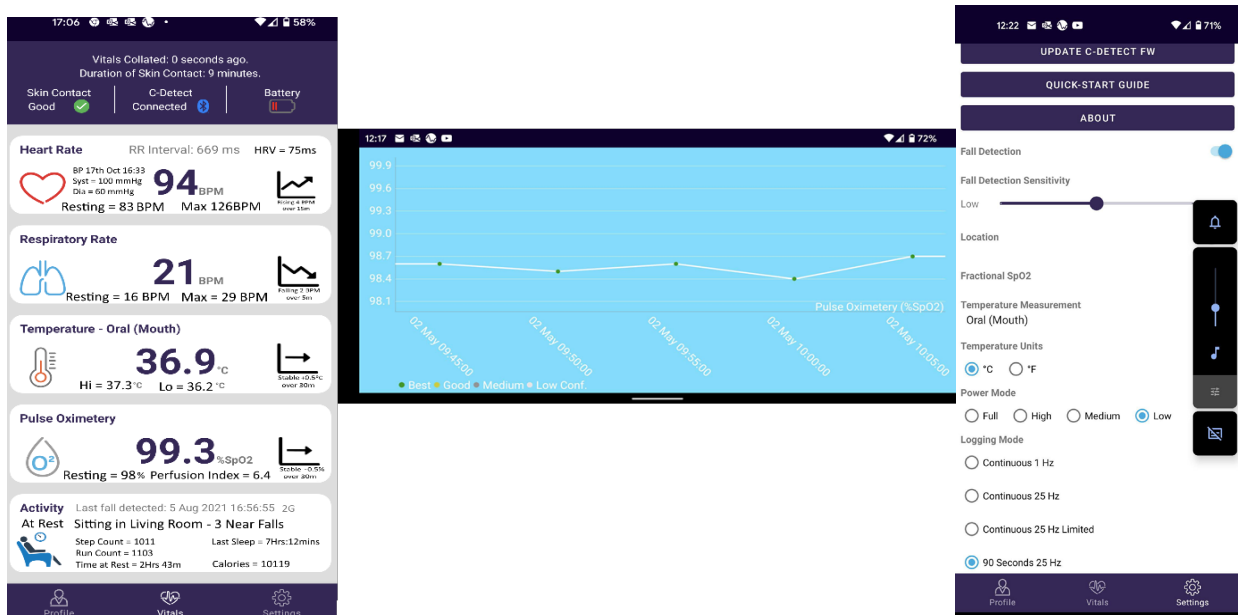
C-Detect can also use Bluetooth<sup>4</sup> to communicate with standard Patient Monitoring dashboards and Electronic Patient Records, delivering data as required to Electronic Patient Records (EPRs). These platforms often feature Mobile Apps on smartphones or tablet's, Waire Health can supply an SDK to allow our partners to incorporate access to the sensor's data directly into their own Apps. Data securely passes directly to the customer's servers, never ours. Patients can be monitored from anywhere in the world and the sensors can optionally have internal Cellular and Wi-Fi modules fitted. The device is self-contained and no additional hubs or routers are required. The device can be given to the patient on discharge or pre-configured and sent by mail. Alerts or alarms can be set individually on each sensor either locally or remotely via the SDK. Waire devices are autonomous and will work anywhere.

## About the company

Edinburgh, Scotland-based Waire Health was founded in 2015 to develop Vital Signs software solutions by a core team with a combined experience of 75 years in electronics systems design, project management in large scale digital roll outs across multiple markets, including health.

The first technology development was the company's unique Prototype Sensor to capture vital signs enabling significantly greater accuracy and intended for wearable medical devices. This breakthrough was the foundation of a successful EU Nightingale Horizon 2020 PCP tender to support Older and Post-Operative patients resulting in the prototype Sentinel wearable Continuous Vital Signs device (commercially available in mid 2023).

Discussion in early 2020 with the 5 EU University Hospital Nightingale collaborators, made clear that the four main early indicators of a patient's possible infection with Covid-19 (heart rate, respiration rate, core body temperature, and SPO2 oxygen saturation) were already part of the feature set of the Sentinel device, the team therefore re-purposed and simplified the design to deliver the highly cost-effective C-Detect sensor.



<sup>4</sup> Internal within the sensor, global Cellular, and Wi-Fi networking options available from June 2021

## Metrics



Respiration rate: detection via oxygen saturation.



Heart rate: beats per minute.



Temperature: core body temperature. (Not skin temp)



Blood Oxygen saturation: medical- grade SpO2

Perfusion Index, RR Interval, Accelerometer data, activity – walking, running, cycling, kcals expended and more.

3-axis Gyro: Manages when readings are taken and reports user sitting, lying down etc

Fall Detection with g-force severity

Indoor Bluetooth beacon capability

All recordable @25Hz to 32GB storage

## Connectivity

Bluetooth5 – Low Energy & Long Range

NFC tap to Pair<sup>5</sup> to Mobile Device

NFC tap for data transfer to mobile app for rapid triage

USB3.0(charging)

Optional internal global Cellular connectivity

Optional internal Wi-Fi

Data never crosses Waire Servers - Customer only

## Integration

C-Detect can be used stand alone with no infrastructure.

Waire Health app can be used to track and trend vitals when installed on a smartphone or tablet.



Waire Health Android and iOS SDK is available for partner development. Full access to sensor raw data is available. All parameters are configurable including monitoring cadence.

<sup>5</sup> Suitable Android devices only

iOS 10 and higher, Android 6.0 and higher

<sup>7</sup> [Design of Multi-Wavelength Optical Sensor Module for Depth-Dependent Photoplethysmography](#)

## Device

### User Interface

Multi-colour LED.

Haptic feedback via vibration motor.

32GB Storage - 100 day off-grid internal data recording @ 100Hz\25Hz for all raw data.

### Sensor Suite

Green, Red, InfraRed sensors<sup>7</sup> enable accurate measurements. Sensors detect skin variations, such as colour & tattoos, and react accordingly.

Core Body Temperature sensor & Skin temp

Accelerometer and 3-Axis position

### Physical

C-Detect: 85mm, (L) 54 mm (W), 11 mm thickness (D). Weight 50gm including strap

Strap:360mm, (L) 49 mm (W)

Rating:IP65 (Shower proof)

Operating Temperature: 0C to 60C

Storage-10C to 70C

Worn on upper left arm<sup>8</sup> to ensure industry- leading accuracy of vital sign measurements by minimising motion artefact's.

Battery Capacity:610mAh (0.2C discharge).

Charging: standard consumer USB 3.0 charger.

Battery Life: Up to 10 days per charge.



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<sup>8</sup> [Motion Artifact Reduction in Wearable Photoplethysmography Based on Multi-Channel Sensors with Multiple Wavelengths](#)

**This product is a CE approved Class 1 Medical Device**



CE Marking on product is a Manufacturer's declaration that the product complies with the essential requirements of the relevant European health, safety and environmental protection legislation.