

HRV Project

Background Research



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Brief Overview of Companies

- GE Healthcare
- Abbott (previously St. Jude Medical)
- Medtronic
- Hill-Rom
- Philips Healthcare
- Edwards Lifesciences
- Terumo
- Getinge
- Omron

GE Healthcare

CARESCAPE B650 Monitor

Function

- Provides consistent haemodynamics and cardiac measurements using the CARESCAPE Patient Data Module (PDM)
- Used in: CCU, PACU, NICU, L&D, lower-acuity ICU, OR and emergency dept.

Features

- Parameters: NMT, entropy, EEG, 12-lead ECG, volumetric CO2 and O2, PiCCO, Cardiac Output, SPV, PPV, SvO2, and dual SpO2
- Customisable page views for neurology, respiratory, cardiology, etc.
- MUSE cardiology information system and EK-Pro algorithm



Imperial College
London

12-lead at the bedside

Histograms

Auto-view on alarms

Adequacy of Anaesthesia NMT and Entropy monitoring

CardioMEMS HF System



Function

- Monitors pulmonary artery (PA) pressures to detect heart failures early
- Used in patients with at least one heart failure hospitalisation (HFH) in the past year or would benefit from remote monitoring

Components

- PA sensor, delivery catheter, patient electronics system, hospital electronics system and secure web portal

Abbott

Features

- Merlin.net Patient Care Network (PCN) and myCardioMEMS Mobile App

Workflow

- Implantation
procedure: <https://www.cardiovascular.abbott/us/en/hcp/products/heart-failure/pulmonary-pressure-monitors/cardiomems/procedure-overview.html>
- Patient -> sensor -> Merlin.net PCN -> Clinician

Benefits

- \$13 000 reduction in cost (Desai et al., 2017)
- 24% HFH reduction and 30% mortality reduction (Abraham et al., 2019)
- 66% HFH reduction and improved quality of life (Angermann et al., 2020)
- Personalised monitoring for each patient

Medtronic

LINQ II Insertable Cardiac Monitor (ICM)

Function

- Long-term ECG monitoring, management and diagnosis of patients
- Used in patients who are at risk of cardiac arrhythmias or experience transient symptoms such as dizziness, palpitation, syncope or chest pain

Features

- Reduced number of false positives with new pause detection algorithm
- Extended life of 4.5 years due to new hardware architecture
- Safe for MRI
- BlueSync Technology and CareLink network



Medtronic

Workflow



- 1) CareLink Network
- 2) Reveal LINQ Mobile manager (app) or MyCareLink Relay home communicator
- 3) LINQ II

Medtronic: CareLink Network

Quick Look Tab

Quick Look | Episodes | Trends | Comments and Notes | History

Reveal LINQ™ LNQ11
Device Serial Number: RLA600111S

Reason for Monitoring: AF Ablation
Date of Implant: 06-Nov-2013

Battery Status
1 + OK

Quick Look Data From: 07-Oct-2016 00:12 to 10-Oct-2016 01:12

Date range display since the last time Quick Look was viewed

	Current	Lifetime	Parameters
Symptom	1	1	Four 7.5 min Episodes
Tachy	3	9	>150 bpm, >=16 beats
Pause	0	0	>3 sec
Brady	0	0	< 35 bpm, >=4 beats
AT	0	0	Off
AF	9	28	>=10 min
% of Time in AT/AF	2.2%	4.2%	

Observations

- Device Cleared on 10-Oct-2016
- Electrical Reset
- Symptom + Detected Episode
- Average V. Rate during AT/AF > Threshold
- AT/AF Daily Burden > Threshold
- Maximum Episode Count Met
- Maximum Symptom Count Met
- Device Data Collection is OFF

Current: counters show episodes since last Quick Look access

Lifetime: counters continue to show episodes since implant

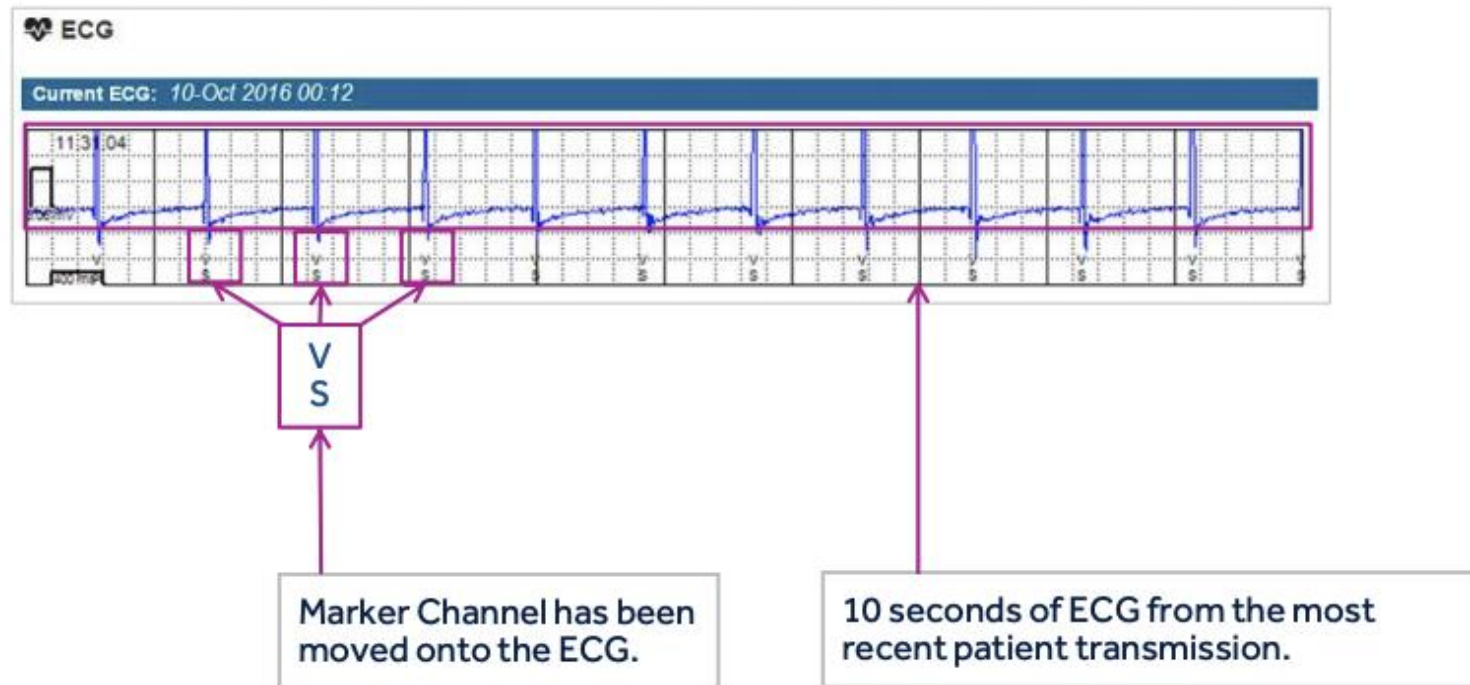
Parameters: moved next to their corresponding event type

Observations: Information about patient events associated with programmed CareAlert™ notifications and reflects data uploaded to the CareLink Network from the last time Quick Look was accessed

NOTE: Observations and Counters/Parameters are now grouped at the top of the page for easier viewing

Medtronic: CareLink Network

Current ECG



Medtronic: CareLink Network

Summary ECG

Ability for clinicians to assess episodes directly from Quick Look instead of navigating to individual episodes.

Up to 25-second summary ECG showing automatic or symptomatic episodes arranged by episode type.

Episode List Summary text of key ECG data (detection, duration, type, etc.).



Condensed rate trend plot outlining episode detection, term, and symptom marking.

Hill-Rom

Connex Vital Signs Monitor

Function

- Displays NIBP, EtCO2, respiratory rate, heart rate, etc.

Features

- Touchscreen & wireless
- Multiple profiles
- Measurements in 15s



Hill-Rom

EarlySense Vitals Surveillance System

Function

- Displays HR, RR and motion
- Quick access to vital information for early detection

Features

- Cybersecurity: verification and encryption
- No direct physical contact

Other products

- ELI 380 Resting Electrocardiogram



Philips Healthcare

IntelliVue MX750

Function

- Bedside patient monitor, actively displaying extensive range of measurements
- IPC, compatible to Window OS and many medical devices

Features

- Cybersecure
- Cost-friendly
- Alarms for surveillance

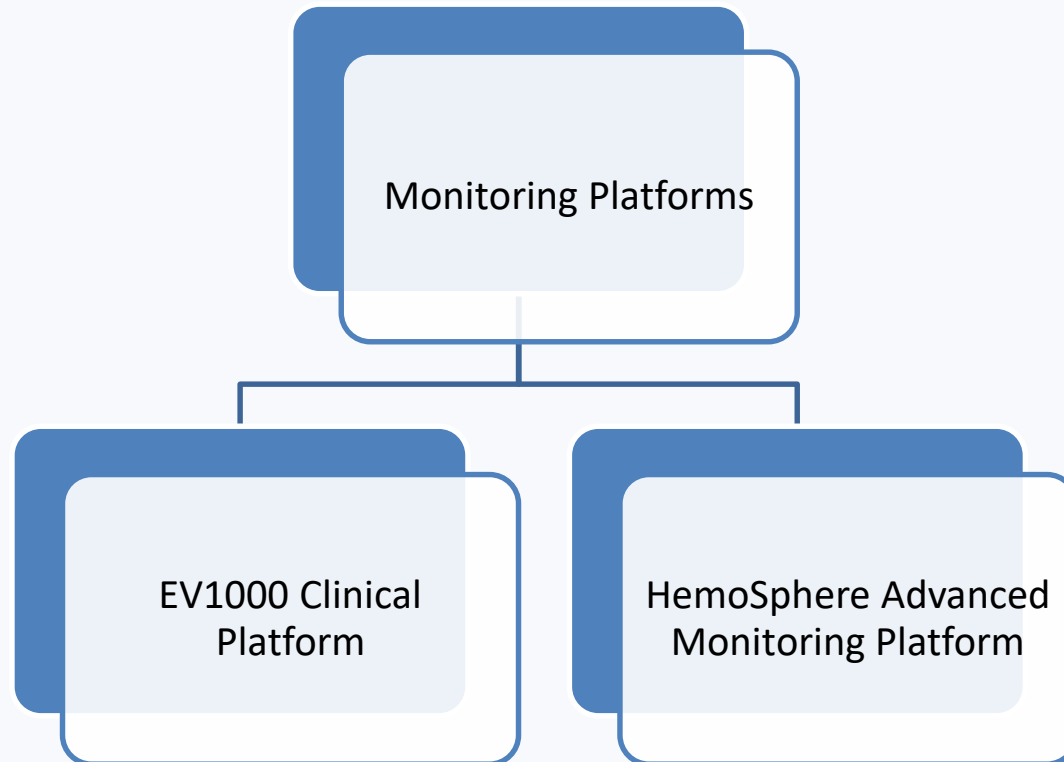
Other products

- EarlyVue VS30
- InttelliVue X3



Edwards Lifesciences

Global leader in hemodynamic monitoring



Edwards Lifesciences

EV1000 Clinical Platform

Access to advanced hemodynamic parameters

- Facilitate volume administration decisions

Communicate patient's status quickly

- Using color based indicators

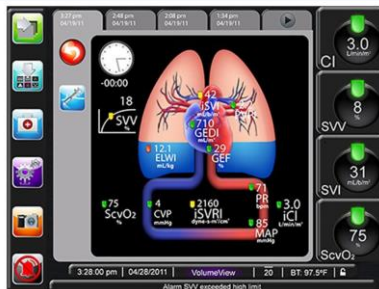
Immediate recognition and increased understanding of clinical situations

- Through visual support screens

Edwards Lifesciences

KEY FEATURES

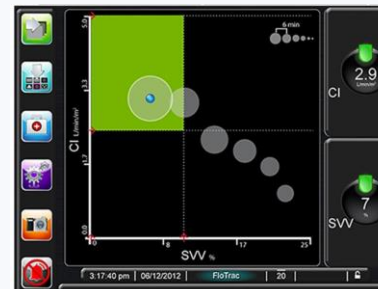
- Provides choice of parameters you want to view + how you want to view them
 - 5 screen options available



Real time
physiology screen



Cockpit screen



Goal positioning
screen



Graphical trend
screen



Physio-relationship
screen

Edwards Lifesciences

HemoSphere Advanced Monitoring Platform



Cerebral desaturations

- Provide comprehensive picture of oxygen delivery and consumption

Sepsis management

- Early detection through access to CO and SV

Hypotension (MAP < 65mmHg)

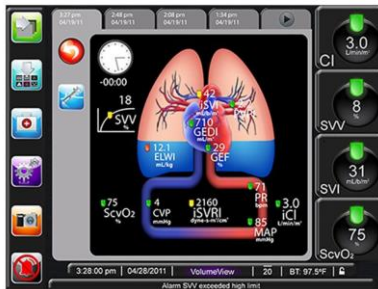
- Continuous hemodynamic monitoring allows early detection

Hemodynamic instability

- Proactive monitoring of SV and SVV can guide proper fluid administration

Edwards Lifesciences

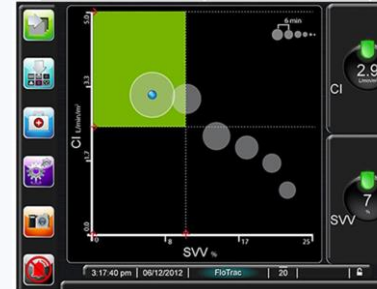
KEY FEATURES



Real time
physiology screen



Cockpit screen



Goal positioning
screen



Graphical trend
screen



Physio-relationship
screen



Graphical/Tabular
Split Screen



Brain screen

Edwards Lifesciences

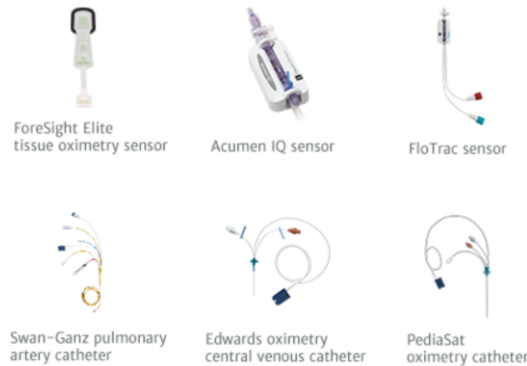
KEY FEATURES



Hot
Swappable
Battery



Predictive
decision
support
software



Compatibility with a
range of products



Mobility

Terumo

CDI[®] Blood Parameter Monitoring System 550



Delivers 12 critical continuous blood parameters readings

Alerts changes in patient status quickly

- Average response time in seconds

Optimize perfusion during cardiopulmonary bypass surgery

KEY FEATURES

Monitor

- Large, color liquid crystal display
- Visual and audible indicators
- Graphic/Tabular format display



H/S Cuvette

- Optical reflectance technology



Calibrator

- Fast two point gas calibration
- Mountable onto monitor pole clamp



Shunt sensor

- Unique fluorescence sensor technology



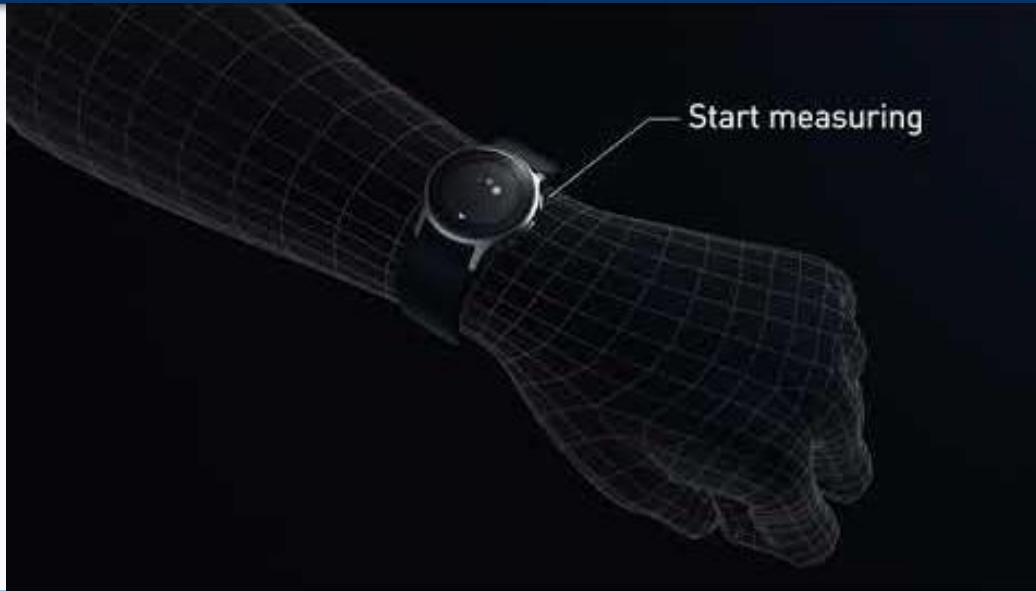
NICCI Technology

- Continuous blood pressure measurement.
- Provides dynamic parameters such as mean arterial pressure, cardiac index, stroke volume variation and pulse pressure variation
- 2 finger sensor in different sizes.
- Cuff docks on a mouse which fits in patient's palm.
- Integrated NIBP calibration automatic calibration to gold standard when using the cuff.
- Use during surgeries or other medical procedures.



reddot winner 2020

Omron – HeartGuide TM



Wearable blood pressure monitor

Use with companion app HeartAdvisor.

80 new patents that miniaturize the components for traditional oscillometric measurement

Inflatable cuff within the watch band to take blood pressure readings

sets HeartGuide apart from other wearables that rely on sensor technology, which only provide blood pressure estimates

Records blood pressure to clinical accuracy in 30 seconds. Tracks sleep, and activity

Omron



Complete®
Wireless Upper Arm Blood
Pressure Monitor + EKG

KardiaMobile EKG



Professional IntelliSense®
Blood Pressure Monitor

Comparisons

Similarities

- Monitor similar parameters
- Automatic link records
- All visual
- Compatibility with other devices used in clinical setting

Differences

- How measurements are taken
- Portability
- Use in home or in clinical setting
- Focus on parameters
- Price
- Accuracy
- Additional components for functionality