Health Technology for Tomorrow

Seminar 1: ‘The potential for wearable technology in ambulatory care: Isansys Patient Status Engine’

25 November 2016  Somerville College, Oxford

www.oxford.dec.nihr.ac.uk
The Patient Status Engine

Data driven digital healthcare: new methods for improved patient safety
Anywhere, Anytime, Accurate, Wireless Patient Monitoring
Isansys Lifecare Limited

- **Established in 2010 at Milton Park, Oxfordshire**
  - Clinical need and first customer identified by entrepreneurs with sector-leading expertise
  - Headquarters, manufacturing and development based at Milton Park, Oxfordshire (16 FTEs)
  - Development of ‘Patient Status Engine’ completed in 2013 (Second generation in 2015)
  - Bangalore subsidiary incorporated in 2015 (2 FTEs)

- **Patient Status Engine now shipping**
  - Germany, Norway, India, USA
  - ISO 13485 certification (Europe; Canada; SE Asia) gained in 2012 (subsequently recertified)
  - Designated a CE mark Class IIa medical device in 2012 (upgraded 2015)
  - FDA 510k filing Dec 2016

- **Strong commercial positioning**
  - Clinically validated, ISO certified and CE marked for European and other markets
  - Isansys IP throughout platform: devices, software and processes
  - Meets immediate needs of clinical care teams
  - Offers significant benefits versus competitor systems
Patient Status Engine
- Analysis & Prediction of Clinical Deterioration

Real Time Patient Data Acquisition and Analysis Platform

Measure → Model → Predict

Vital signs & biomarkers → Patient Status

Early Actions

Clinician / Carer
Patient Status Engine
- What is it?

A complete end-to-end wireless patient data capture, analysis and delivery platform

*that is also a medical device (CE Mark Class 11a)*

**Wearable sensors**
- Smart patches & other wearables

**Patient Gateways**
- Interactive bedside displays

**Lifeguard Server**
- Data storage, analytics, forwarding
- Network control, logistics

**User Interfaces**
- Dashboards
- Charts
- Reports
Patient Status Engine
- What does it do?

✓ Monitors patients continuously wirelessly and in real-time

✓ Provides accurate vital sign data, 24/7, for patients in hospital or at home

✓ Performs continuous “obs” with automatic data capture and data entry

✓ Presents the aggregated data from each patient on a dashboard (at the nurses’ station or remotely on any authorised smartphone, tablet or other device)

✓ Carries out MEWS and NEWS score calculations and displays real time score

✓ Integrates with apps for alerting and escalation indications, e.g. RAPID Index

✓ Connects easily to EPR’s and other IT through open API (programming interface) and web services
Patient Status Engine
- What does it measure?

Six Vital Signs

✓ Heart Rate (continuous)

✓ Respiration Rate (continuous)
  ✓ + Real time heart rate variability (millisecond accuracy)
  ✓ + ECG on request (on screen button - local or remote)

✓ Temperature (continuous axillary)

✓ Oxygen Saturation (continuous)
  ✓ + PPG on request (on screen button - local or remote)

✓ Blood Pressure (as required)

✓ Coma Score
  ✓ Manually entered score in accordance with local practice (4 point / 12 point)
Patient Status Engine
- In-hospital architecture

Lifetouch
- Heart Rate
- Respiration Rate
- Heart Rate Variability

Lifetemp
- Temperature

Pulse Oximeter
- Oxygen Saturation

Blood Pressure

Lifeguard Server and Data Base
(Runs behind hospital firewall)

API

Third party apps e.g. RAPID Index

Hospital Server

Electronic Health Record
Other Patient Data ??

Supplied by Hospital or IT Partner

Low power Wireless Connections

Gateways
- One per bed
- Real time vital signs
- Patient charts
- Device association
- Relay to Isansys Server

Patient data on any authorised device

Nurses Station Dashboard

Low power Wireless Connections

Wi-Fi

Hospital Server Gateways
- One per bed
- Real time vital signs
- Patient charts
- Device association
- Relay to Isansys Server

Lifetouch
- Heart Rate
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Pulse Oximeter
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Blood Pressure

API

Third party apps e.g. RAPID Index

Hospital Server

Electronic Health Record
Other Patient Data ??

Supplied by Hospital or IT Partner

Low power Wireless Connections

Wi-Fi
Patient Status Engine
- @Home architecture – simple network change

“Digitised” Patient Wearable sensors

Lifetouch
- Heart Rate
- Respiration Rate
- Heart Rate Variability

Lifetemp
- Temperature

Pulse Oximeter
- Oxygen Saturation

Blood Pressure

Gateway
- Mobile device
- Patient App
- Collection of vital sign data and analysis
- Relay to Isansys Server
- Back channel for patient information and feedback

Low power Wireless Connections

Secure Wi-Fi / 3G / 4G Network

Lifeguard Server and Data Base
(Runs behind hospital firewall)

API
Third party apps e.g. RAPID Index

Hospital Server
Electronic Health Record
Other Patient Data ??

Supplied by Hospital or IT Partner

Nurses Station Dashboard

Patient data on any authorised device

Lifetouch
- Heart Rate
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Blood Pressure
Simple and secure operation
- Local or remote user login

- Multiple Ward Views
Real-time Patient Dashboard
- Local and remote views of all patients

At nurse station, or any connected device including tablets and smart phones
Real-time Individual Patient Charts
- Anytime, anywhere, on any screen
Case Study – Paediatrics
- Real-time adaptive & predictive indicator of deterioration

- Partners: Birmingham Children’s Hospital, McLaren Applied Technologies, Aston University, Isansys
- Development of new patient pathway based on wireless wearable sensors
- 800+ patients to date
- 500million+ heart beats logged
- New data driven self-learning personalised Early Warning Score
Case Study – Advanced Liver Disease
- New data driven diagnostic / predictive biomarker

LIFETOUCH®: A NOVEL REMOTE MONITORING DEVICE TO IDENTIFY PATIENTS WITH ADVANCED CIRRHOSIS MOST AT RISK OF DECOMPENSATION – A PROOF OF CONCEPT STUDY

Devnandan A Chatterjee, Helen Jones, Angela Gallego León, Graziella Privitera, Rajiv Jalan, Rajeshwar P Mookerjee
Institute of Liver and Digestive Health, University College London Medical School, Royal Free Hospital Campus, London, UK
2Isansys, Milton Park, Abingdon, Oxfordshire, UK

- Lifetouch data provides same information as MELD Test for advanced liver disease patients
- Analysis of 10 - 20 minutes of data from Lifetouch same as blood test taking hours in the lab. Patients can now remain at home.
Case Study – Early Detection of Sepsis
- Cancer patients @home following chemotherapy

**Queen Elizabeth Hospital Birmingham**
Part of University Hospitals Birmingham
NHS Foundation Trust

- Compromised immune systems can lead to neutropenic sepsis
- Patients at home
- Early detection allows patients to be treated in the community
- Data collected for 21 days with Lifetouch and Lifetemp
Case Study – Critical Care Monitoring
- Advanced notice of deterioration in adults

- Early warning of deterioration in tertiary care patients

- Initial pilot August 2016 - Two patients lives saved through early detection of serious deterioration

- November 2016 – Commercial implementation to provide PSE to all patients
Patient Status Engine
- How is it deployed?

• Simply, quickly and seamlessly
• No additional infrastructure required. Wifi good but not essential.
• PSE can operate in stand-alone mode. No EPR is necessary.
• Stage 1: Initial “calibration” deployment
  – Install instance of Lifeguard Server on hospital IT system (2-4 hours – carried out remotely)
  – Install 5 -10 trolley mounted Gateways in wards of your choice (1-2 hours)
  – Initial user training (1 – 2 hours)
  – Accurate real-time patient data now available - at the bedside, at the nurse station and on any authorised mobile device
  – Devise new pathways and work flows enabled by the PSE. Test health economic scenarios
• Stage 2: Scaling deployment
  – 50 - 100 Gateways. Fixed or mobile or combination
  – Implement new pathways and work flows (including e.g. patients at home)
• Stage 3: Full deployment
Patient Status Engine
- Why chose it?

✓ Automatic and manual data capture and entry
  = e-obs for free!

✓ The PSE platform is open
  = add new devices, integrate with best-in-class clinical decision support tools such as RAPID Index

✓ It’s a platform not a product
  = configurable, expandable, future proof

✓ Digitises the patient producing detailed and dynamic physiological images
  = observe and audit the patient’s journey at each point on their care pathway and quantify outcomes

✓ Easy & simple transition of patient to home
  = Patient at home with high-accuracy continuous monitoring, early deterioration alerts

✓ It’s all about the data
  = accurate, secure, scalable, affordable (managed service models)

✓ Provides a direct route to efficient paperless wards
  = better obs and huge time savings

✓ It’s the future of patient monitoring in hospital, at home, anywhere
  = all other systems are only halfway measures and don’t enable fundamental (and much needed) change
New generation healthcare

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Health Technology for Tomorrow seminar series
SAVE THE DATES

25 November 2016: The potential for wearable technology: Isansys Patient Status Engine

23 February: Applications for ultrasound in primary care

April: Topic TBC

25 May: (as part of EurOOHnet conference) Topic TBC

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