Digital care assistant

Categories: Organisations we regulate

This is a digital care assistant (DCA) based on an optical sensor that can monitor a service user's movement, pulse and respiration in their bedroom.

Using this technology can, for example, monitor people at night remotely, avoiding the need for staff to enter the room and disturb the patient. Used in secure units it can allow staff to monitor patients that could be a high safety risk and alert to activity related to self-harm, violence and aggression, contraband use, and falls.

Software analysing the optical sensor's data picks up movement in the room and knows where the critical objects in the room are, for example, the bed, the door, the en suite bathroom. When someone walks into a room, the DCA detects where they are. It notices movement on or through objects/locations and triggers the appropriate alert to risky activity, or notes the activity down for clinicians.

The DCA can see 'micro blushes' that accompany heart beats, which the human eye cannot see. It counts these micro blushes to calculate a pulse rate. It can see movements of the chest and diaphragm as we breath, and counts these movements to calculate a breathing rate (just as a nurse would if they were observing the patient with a stopwatch). The technique works through thick clothing and bedding and even when the body is partially obscured, for example by hiding under a desk. It is certified as a medical device for spot-check observations.

If someone stops moving around, for example lying down to rest or sleep, the system will detect any small movements they are making, such as the rise and fall of the chest from breathing. But - if the system cannot detect even these small signs of activity, the system will sound an alert.

By reviewing unwitnessed incidents, such as a fall, clinicians can assess what follow-up action is necessary – if it can be seen that, for example, there was no head injury. This could save the need to do more intrusive examinations or rush a patient to A&E.

Clinicians have access to daily and weekly activity reports that provide real-time, continuous information to inform clinical handovers, ward rounds and feed into care and medication interventions.

The default monitoring is not based on an image, so privacy is protected, but if staff receive an alert or need to review an incident, they can ask for a short, often anonymised video to help assess the issue (under strict information governance).

How was it developed?

Oxehealth was formed by a partnership between Oxford University's Institute of Biomedical Engineering and Oxford University Hospitals NHS Trust. The company was founded by Professor Lionel Tarassenko, head of engineering at Oxford University in 2012.

This research group asks clinicians what challenges they most need addressing, and then tasks biomedical engineers with inventing tools to meet those clinical needs. Oxford University Hospitals Trust [https://www.ouh.nhs.uk/] was a partner in the development of the DCA.

The company says the DCA has been designed in consultation with patients and clinical, carer and custodial users.

Before the technology is deployed, the company engages with clinical teams across the organisation to make sure it is set up according to their particular needs. It is designed to reflect existing protocols and procedures, slotting into everyday use.

Who is using it?

Oxehealth is being used in mental health, care home, acute hospital, prison, police and homecare settings. Oxehealth is currently working with 17% of England's Mental Health Trusts across acute, older adult, Psychiatric Intensive Care Unit (PICU), rehab, seclusion and S136 [https://www.legislation.gov.uk/ukpga/1983/20/section/136] services.

Early customers include Broadmoor Hospital as part of West London NHS Trust, Coventry and Warwickshire Partnership NHS Trust, South West London & St Georges Mental Health NHS Trust and Oxford Health NHS Foundation Trust.

Coventry and Warwickshire Partnership NHS Trust [https://www.covwarkpt.nhs.uk/our-news/trust-wins-hsj-patient-safety-award-for-best-healthtech-solution-1532/] initially deployed the digital care assistant across the Older Adult inpatient services to reduce falls at night. The trust extended their use into 65 bedrooms across its Acute, PICU and Rehab wards in 2018.

NHS Trusts are working with Oxehealth to support their broader inpatient safety agenda, notably zero suicide strategy, reducing restrictive practice, reducing violence and aggression, falls prevention, and reducing substance misuse on inpatient wards.

Outcomes

Tracey Wrench, who was Coventry and Warwickshire Partnership NHS Trust's chief nurse and chief operating officer during the pilot, said: "This innovative technology supports our staff to manage the risk of patient safety by reporting on a number of activities and physical health markers."

The trust reported the following findings from an eight-month clinical study in its older adult services:

- 33% falls reduction at night
- 56% reduction in A&E demand
- 71% reduction in enhanced observations = 7,800 clinical hours saved annually
- staff embraced the system, reported improved patient safety and greater job fulfilment
- carers reported greater peace of mind

Linda Fitzpatrick, ward manager says: “Falls have reduced massively on the ward because of the system. It’s our sixth member of staff on the nightshift.”

Its use was noted as outstanding practice in CQC’s December 2018 report on the trust, with the report stating: ‘Pembleton and Stanley wards had been involved in a pilot scheme to install infrared sensors in some patent bedroom. The sensors detect changes in patients’ movement and vital signs. The technology aimed to support staff to changes in patients’ vital signs. Staff had identified a reduction in falls since the technology had been introduced.’

Oxford Health [https://www.oxfordhealth.nhs.uk/news/new-technology-changes-the-face-of-patient-care-at-oxford-health/] reported the following findings from a service evaluation on a male acute ward. It compared a modified observation protocol where staff used the DCA for general and intermittent observations at night versus conventional methods:

- staff confirm patient safety without disturbing/waking patients
- 100% patients reported feeling safer and sleeping better
- 86% patients reported a greater sense of privacy
- staff reported it is easy to use, they felt confident patients were safe, and it was 45% faster to complete observation rounds at night
- the modified observation protocol is as safe as conventional methods

Oxford Health Deputy chief operating officer Pauline Scully said: “The way that nursing observations have taken place, with nurses checking patients in person, has not really changed for decades and can be incredibly disruptive to patient sleep. Working with Oxehealth is transforming the patient experience at night while providing reassurance to staff that the patient is safe.”

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