

# Project details

## Competition name

Digital health technology catalyst round 3: collaborative R&D

## Project title

Transforming deteriorating patient care with a digital and sustainable rapid response system developed in the open

## Research category

Industrial research

## Innovation area

Digital health

## Resubmission

No

## Project start date

1 March 2019

## Duration in months

19

## Lead organisation

OPUS VISION LTD.

## Partners

- Coventry University
- THE APPERTA FOUNDATION C.I.C.
- South London and Maudsley NHS Foundation Trust
- Cheshire and Wirral Partnership NHS Foundation Trust
- OPENUK

## Project summary

Our collaborative R&D project has the following partners and roles:

1. Opus Vision Ltd (OpusVL) -SME Industrial Lead Partner - [REDACTED]
2. Coventry University (CU) - Academic Partner - [REDACTED]
3. South London and Maudsley NHS Trust (SLaM) - End User Partner - [REDACTED]
4. Cheshire & Wirral Partnership NHS Foundation Trust (CWP) - End User Partner - [REDACTED]
5. The Apperta Foundation CIC - [REDACTED]
6. OpenUK - [REDACTED]

### **The problem:**

- Deteriorating patient care across UK public health sector - causing increased morbidity, extended patient stay - therefore unnecessary cost to patient and care providers
- Challenges to addressing the problem: Sub-optimal processes, inadequate tools to support the process, closed solutions

### **The vision:**

Package up the approach for clinical definition and digital delivery: This includes

- 1. Transform the clinical process to be optimised for digital delivery
- 2. Transform the translation of clinical process to logical process
- 3. Transform the method for delivering digital health technology

### **Key objectives:**

- Evidencing the approach through structured academic, clinical and technical research
- Share the evidence-based results throughout the process with the public health sector
- Improve method of diagnosing and responding to deteriorating patients
- Create proof of concept open standards-based digital application to meets the clinical need, delivered within the governance structure, which can be integrated with other apps and can evolve in perpetuity
- Evidencing new governance processes for managing digital technology for the public sector

### **Main area of focus:**

- Research of current practice including paper-based and the embryonic use of digitally recorded observations in the NHS leading to evidence-based design decisions for improved process delivery

- Analysis of research, generation of hypothesis for optimum approach
- High-fidelity simulation enabling thorough and consistent measurement
- Implementation of digital solution to deliver the approach
- Validation of approach in a live setting through pilot activities across 2 NHS trust partners

### How it is innovative:

- Close collaboration of clinicians, technologists and academics, working to define new best-practice
- Designed, created, used by clinicians, owned and governed under NHS custodianship, developed by SME, enables future evolution owing to the open approach
- Using open source, standards & platforms to remove integration barriers and address vendor lock-in

### Public description

This project seeks to research and implement a new proof-of-concept open standard digitally-enabled electronic observation (eObs) solution for deteriorating patient care. It will address a major unmet need in the NHS where a significant proportion of patients still experience suboptimal care leading to adverse clinical outcomes such as unplanned ICU admissions, emergency surgery, cardiac arrest and death. An estimated 7% of in-hospital deaths are preventable. (*NCEPOD Emergency Admissions*).

Core reasons behind poor care of deteriorating patients can be linked to current ineffective paper-based (and digital) systems of observation and management of patients leading to lack of recognition of deteriorating conditions. Incumbent, proprietary digital systems lack interoperability and deliver very low value with unsustainable high costs, plus barriers-to-iteration and evolution required for utility needed to deliver improved outcomes and to advance clinical progress.

Our vision is to transform the care process digitally and also to overcome the barriers the NHS faces over proprietary IT systems that cannot be easily or cost-effectively iterated to meet clinician requirements and best practice operating procedures.

We will deliver this by innovating the care process informatics design using an approach commonly used in translational medicine. With Coventry University's help, we will analyse current practice at two NHS Trusts (South London and Maudsley, Cheshire and Wirral Partnership), design an optimal approach and trial it with healthcare practitioners in a simulated NHS hospital environment at Coventry University (the first major project for CU at the most advanced simulation lab in UK); and once proven, trial it for real with our two NHS Trust partners. Governance, safety and standards will be assured through working with Apperta and Open UK.

Success with our project will bring measurable improved patient outcomes due to a better eObs patient observation system that has wide-reaching outcomes from mental health to productivity, and reduced need for further clinical intervention.

Immediate benefits will include reduced staff time and reduced human error compared with manual administration. Adopting an open source and standards approach will eliminate prohibitive annual software licensing and adaptation costs while delivering a flexible public asset that can readily be adapted to individual NHS Trust needs.

Our approach is uniquely consistent with secretary of state for health Matt Hancock's vision for Digital Transformation (October 2018) for the NHS and will serve as a vehicle to transform market access for SME's to grow the UK digital healthcare industry through the innovative use of digital technologies.

## How does your project align with the scope of this competition?

This project seeks to research and implement a new approach and proof-of-concept open standard digitally-enabled electronic observation (eObs) solution for deteriorating patient care. It seeks to address a major unmet need in the NHS where a significant proportion of patients still experience sub-optimal care leading to adverse clinical outcomes such as unplanned ICU admission, emergency surgery, cardiac arrest and death. An estimated 7% of in hospital deaths are preventable. (*NCEPOD Emergency Admissions*).

Core reasons behind poor care of deteriorating patients can be linked to current ineffective paper-based (and digital) systems of observation and management of patients leading to lack of recognition of deteriorating conditions. Incumbent, proprietary digital systems lack interoperability and deliver very low value with unsustainable high costs, plus barriers-to-iteration and evolution required for utility needed to deliver improved outcomes and advance clinical progress.

We plan to address this unmet need by researching optimal methods of deteriorating patient observation and exploring typical response scenarios for a new digital eObs system in a simulated patient environment at Coventry University. Once proven in this environment, we will validate the solution against current best practice in two mental health NHS trusts.

This project fits with a number of themes in the competition scope, specifically:

- applications of technology to health challenges where digital solutions offer and can demonstrate significant improvements in quality, speed, cost, outcomes and learning
- applications delivering clinical decision-making support and help treatment compliance
- data driven: informatics, data analytics and process
- mental health intervention and treatment (via NHS Trust partners)

- urgent and emergency care provision

Our research adopts an innovative approach for evaluating current working practices in the NHS, identifying strengths and weaknesses, identifying an optimal approach for best practice, then implementing this in a software system that's trialled in a simulated clinical environment at Coventry University prior to field-trialling the solution in real operational environments at two NHS Trusts.

The software system implementation breaks new ground by implementing the solution using proven open source software, that delivers a freely available, eRRS open source software application that all NHS Trusts can adopt. This approach also overcomes the contractual and technical barriers that currently exist with incumbent proprietary IT systems at NHS.

Our approach is uniquely consistent with Matt Hancock's vision for Digital Transformation (October 2018) in NHS and will serve as a vehicle to transform market access for SME's to grow UK's digital healthcare industry through innovative use of digital technologies.

# Application questions

## 1. What is the business need, citizen challenge, technological challenge or market opportunity behind your innovation?

### Main motivation:

- Many patients still experience sub-optimal care leading to adverse clinical outcomes such as unplanned ICU admission, emergency surgery, cardiac arrest and death. Estimated 7% of in-hospital deaths are preventable. (*NCEPOD Emergency Admissions*)

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## 2. What approach will you take and where will the focus of the innovation be?

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### 3. Who is in the project team and what are their roles?

The consortium comprises an excellent multidisciplinary team with the range of skills and facilities necessary to ensure success (see AppendixQ3). Key partner roles and project contribution include:

**Opus Vision Ltd (OpusVL)** - (lead SME partner) is an Open Source software specialist with over 20 years' experience in delivering high performance business critical software systems. [REDACTED]

**Coventry University (CU)** - (academic partner) CIRAL research centre specialists in Digital Health and Innovative Methodologies (DHAIM) will deliver rigorous research into NHS working practices. [REDACTED]

**South London and Maudsley NHS Trust (SLaM)** and **Cheshire and Wirral Partnership NHS Trust (CWP)** will provide vital insight on current approaches for the deteriorating patient care pathway. [REDACTED]

**The Apperta Foundation CIC** (Apperta) - (Not-for-profit partner) is a clinician-led, not-for-profit company, supported by NHS England, NHS Digital and others, to promote open systems and standards for digital health and social care. [REDACTED]

**OpenUK** - (Not-for-profit partner) - is the UK open source industry association. [REDACTED]

[REDACTED]

[REDACTED]

#### 4. What does the market you are targeting look like?

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**5. How are you going to grow your business and increase your productivity into the long term as a result of the project?**

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## 6. What impact might this project have outside the project team?

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[REDACTED]

[REDACTED]

[illegible]

Total project costs £931,616

Category	Cost (£)
Total project costs	£931,616
Materials	£450,000
Labour	£350,000
Overhead	£100,000
Profit	£31,616

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**9. Describe the impact that an injection of public funding would have on this project.**

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## 10. How much will the project cost and how does it represent value for money for the team and the taxpayer?

Overall project cost is £931,616 over a 20-month project. We are seeking grant funding of £791,216 across all partners:

- [REDACTED]
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[illegible]

# Terms and conditions

This is the overview of the finances provided by all partners in this project.

	Total costs	Funding level (%)	Funding sought (£)	Other public sector funding (£)	Contribution to project (£)
OPUS VISION LTD. Lead organisation	<div></div>	<div></div>	<div></div>	<div></div>	<div></div>
Coventry University Partner					
THE APPERTA FOUNDATION C.I.C. Partner					
South London and Maudsley NHS Foundation Trust Partner					
Cheshire and Wirral Partnership NHS Foundation Trust Partner					
OPENUK Partner					
Total	£931,615		791,215	0	140,400

	Total	Labour (£)	Overhead costs (£)	Materials (£)	Capital usage (£)	Subcontracting costs (£)	Travel and subsistence (£)	Other costs (£)
OPUS VISION LTD. Lead organisation								
Coventry University Partner								
THE APPERTA FOUNDATION C.I.C. Partner								
South London and Maudsley NHS Foundation Trust Partner								
Cheshire and Wirral Partnership NHS Foundation Trust Partner								
OPENUK Partner								
Total	£931,615							