

# Making surgery safer: Testing a wireless monitoring patch on general surgery wards

<b>Submission date</b> 03/07/2017	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 30/08/2017	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 19/09/2023	<b>Condition category</b> Surgery	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Up to a third of patients who have major surgery will experience a serious complication, such as infection. Identifying complications early makes them easier to treat and improves the results for the patient. One of the ways patients are monitored for complications is by charting their vital signs: blood pressure, heart rate, breathing rate and temperature. The nurse looking after the patient will usually check these signs every few hours in the days after surgery. The vital signs are used to form a score, the National Early Warning Score (NEWS), which can alert if the patient becomes unwell. One of the problems with NEWS is that patients can deteriorate in the interval between monitoring, which can delay vital treatment. One solution to this problem is continuous monitoring. We are testing a wireless monitoring patch that continuously monitors heart rate, breathing rate and temperature. This information is sent wirelessly every two minutes to a mobile phone carried by the nurse, which alerts if the vital signs become abnormal. This could help detect unwell patients earlier than traditional monitoring, but not enough is known about this technology to say for sure. This is why it has to be tested against the current national standard of care: NEWS monitoring. In order to test this theory, a study will be done comparing the patch system with NEWS monitoring. The main aim is to provide information about whether the research works, and if the patch improves results for patients having major surgery.

### Who can participate?

Adults aged 18 and older who are having planned major surgery and returning to one of these wards afterwards.

### What does the study involve?

Participants are randomly allocated to receive one of two types of monitoring during their hospital stay. Those in the first group receive standard NEWS monitoring alone. Those in the second group receive the NEWS monitoring and the continuous monitoring patch. All other care will be the same as those who are not in the study. Researchers will collect data about how the trial is running, and any complications the patients experience.

### What are the possible benefits and risks of participating?

For patients in the NEWS monitoring group, care will not vary from that of someone who is not

taking part in the research, although information about their hospital stay will be collected. Patients who receive the monitoring patch will have the patch applied in the Recovery Room after their operation. This process is painless, but takes 5-10 minutes and may involve some skin preparation of the area on the chest where the patch is applied. This sometimes includes shaving small areas for the patch to stick to. The patch's battery lasts for five days. These patients will be expected to wear a patch for the whole of their hospital stay. This may mean getting the patch changed a number of times, if they are in hospital for a few weeks. Once the patch is applied, the patients are free to move about as normal. The patch is not connected to any machines and does not limit movement. At the end of the patient's hospital stay, the patch will be removed and they will be asked to share their views about the monitoring they have received.

Where is the study run from?

St. James's University Hospital (UK)

When is the study starting and how long is it expected to run for?

September 2016 to September 2017

Who is funding the study?

National Institute for Health Research (UK)

Who is the main contact?

Miss Candice Downey

c.l.downey@leeds.ac.uk

## Contact information

**Type(s)**

Public

**Contact name**

Miss Candice Downey

**ORCID ID**

<https://orcid.org/0000-0001-9818-8002>

**Contact details**

Leeds Institute of Biomedical & Clinical Sciences

Clinical Sciences Building

St James's University Hospital

University of Leeds

Leeds

United Kingdom

LS9 7TF

## Additional identifiers

**Protocol serial number**

35024

## Study information

**Scientific Title**

Trial of Remote Continuous vs Intermittent Vital Signs Monitoring after Major Surgery

**Acronym**

TRaCINg Study

**Study objectives**

The aim of this study is to compare a continuous monitoring system with NEWS monitoring to provide information about how best to undertake a larger study to fully test the new monitoring system.

**Ethics approval required**

Old ethics approval format

**Ethics approval(s)**

Yorkshire & the Humber – Leeds West Research Ethics Committee, 28/07/2017, 17/YH/0180

**Study design**

Randomised; Interventional; Design type: Diagnosis, Prevention, Device, Complex Intervention, Management of Care

**Primary study design**

Interventional

**Study type(s)**

Treatment

**Health condition(s) or problem(s) studied**

Specialty: Surgery, Primary sub-specialty: General Surgery; UKCRC code/ Disease: Generic Health Relevance/ No specific disease

**Interventions**

Participants are individually randomised (stratified for gender and comorbidity) to receive either standard NEWS monitoring (control arm) or SensiumVitals monitoring and NEWS monitoring (intervention arm). The patients will remain in their allocated monitoring arm for the duration of their hospital stay. After discharge from hospital they will be followed up for 30 days to see if they are readmitted.

**Intervention Type**

Other

**Primary outcome(s)**

1. Recruitment is determined by recording the number of patients eligible, approached, consenting and randomised. Recruitment rate will be calculated as the number of patients randomised out of the number of patients eligible. The proportion of ineligible patients will be calculated as the number of patients ineligible out of the number of patients approached.
2. Adherence to protocol, and reasons for non-adherence as defined by the number of patients who do not receive the correct type of monitoring as per randomisation (and reasons for this) and the number of patients who do not wear the patch for their entire hospital stay or at least five days during their admission (and reasons for this including failure to repatch after return

from critical care).

3. The amount of missing data for a data item will be calculated as the proportion of missing data for that item out of the number of patients randomised. Loss-to-follow-up will take into account withdrawal and death. The proportion of patients who are classed as 'drop-out' by design (i.e. never being admitted to a participating ward) will be calculated using the number of patients randomised as the denominator.

4. Optimal outcome measures to test effectiveness. This will be determined by observing effectiveness endpoints (see below) such as time to administration of antibiotics in cases of sepsis, critical care admission rate, length of hospital stay and assessing their potential as primary outcome measures for the definitive study. Assessment of the optimal outcome measures will take into consideration the amount of missing data and summary statistics for each potential outcome.

5. Estimation of sample size for definitive RCT will be calculated using relevant effect size(s) as seen in the effectiveness endpoint(s).

### **Key secondary outcome(s)**

1. Time to antibiotics in cases of sepsis will be calculated as the time in minutes between the first evidence of sepsis on either or both monitoring tools and the first administration of antibiotics to the patient, and determined using the electronic patient record. Clinical suspicion of sepsis is defined by the presence of a likely source of infection and 2 or more criteria from a collection of clinical signs and laboratory investigations as follows:

1.1. Temperature  $>38.3^{\circ}\text{C}$  or  $<36.0^{\circ}\text{C}$

1.2. Tachycardia  $>90$  beats per minute

1.3. Tachypnoea  $>20$  breaths per minute

1.4.  $\text{pCO}_2 <4.3$  kPa

1.5. Hyperglycaemia (blood glucose  $>6.6$  mmol/l) in the absence of diabetes mellitus

1.6. Acutely altered mental status

1.7. WBC count  $>12 \times 10^9/\text{L}$  or  $<4 \times 10^9/\text{L}$

2. Number of HDU/ICU admissions defined as any admission to Level II/III care after stepdown to the general wards (i.e. non-perioperative admission from a participating ward) following surgery, and determined using the electronic patient record

3. Length of stay in HDU/ICU in days per admission, calculated as the difference in days between date of admission to either HDU/ICU and date of discharge from HDU/ICU, and determined using the electronic patient record. HDU and ICU lengths of stay will be amalgamated into a total HDU/ICU length of stay (excluding any peri-operative critical care admission)

4. Total length of stay in hospital in days per admission, including perioperative and postoperative Level II/III care, calculated as the difference in days between the date of admission and date of discharge, and determined using the electronic patient record

5. Number of postoperative complications, defined as any complication occurring after the patient has left the theatre complex and returned to wards J44 or J45 (i.e. not including perioperative HDU/ICU post-operative complications), and determined using the electronic patient record

6. Number of re-interventions, defined as the number of medical, radiological and surgical interventions required to treat postoperative complications, and determined using the electronic patient record. The proportion of patients receiving at least one re-intervention will be presented using as the denominator the number of patients receiving on-trial monitoring (i.e. admitted to a participating ward at some point during their stay)

7. Patient acceptability, as determined by the patient questionnaire and semi-structured interviews, and focus groups throughout the study

8. Nursing acceptability, as determined by the Modified System Usability Score and semi-structured interviews throughout the study

9. 30-day readmission rate, defined as the number of patients who are admitted to hospital for any reason within 30 days of discharge from their index admission, and determined using the electronic patient record

**Completion date**

31/03/2019

## Eligibility

**Key inclusion criteria**

1. Patients who are undergoing elective surgery
2. Patients who have the capacity to provide informed, written consent on admission
3. All ages >18 years

**Participant type(s)**

Patient

**Healthy volunteers allowed**

No

**Age group**

Adult

**Lower age limit**

18 years

**Sex**

All

**Total final enrolment**

136

**Key exclusion criteria**

1. Patients who have undergone emergency surgery
2. Those who do not consent
3. Allergy to adhesives on electrodes
4. Cardiac pacemaker in situ

**Date of first enrolment**

04/09/2017

**Date of final enrolment**

10/04/2018

## Locations

**Countries of recruitment**

United Kingdom

England

**Study participating centre**  
**St. James's University Hospital**  
Beckett Street  
Leeds  
United Kingdom  
LS9 7TF

## Sponsor information

**Organisation**  
University of Leeds

**ROR**  
<https://ror.org/024mrx33>

## Funder(s)

**Funder type**  
Government

**Funder Name**  
National Institute for Health Research

**Alternative Name(s)**  
National Institute for Health Research, NIHR Research, NIHRresearch, NIHR - National Institute for Health Research, NIHR (The National Institute for Health and Care Research), NIHR

**Funding Body Type**  
Government organisation

**Funding Body Subtype**  
National government

**Location**  
United Kingdom

## Results and Publications

**Individual participant data (IPD) sharing plan**

The datasets generated during and/or analysed during the current study will be available upon request from [c.l.downey@leeds.ac.uk](mailto:c.l.downey@leeds.ac.uk)

## IPD sharing plan summary

Available on request

### Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>	results	23/11/2020	04/03/2021	Yes	No
<a href="#">Results article</a>	Reliability data from the remote monitoring arm	15/08/2019	19/09/2023	Yes	No
<a href="#">Protocol article</a>	protocol	11/06/2018		Yes	No
<a href="#">HRA research summary</a>			28/06/2023	No	No
<a href="#">Participant information sheet</a>	version V3	28/06/2017	26/10/2017	No	Yes