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Use of facial monitoring technology for recording vital signs in the emergency department waiting room: a feasibility study

Submission date
15/05/2025

Recruitment status
No longer recruiting

Registration date
08/12/2025

Overall study status
Completed

Last Edited
20/01/2026

Condition category
Other

[_] Prospectively registered
[X] Protocol
[_] Statistical analysis plan
[_] Results
[_] Individual participant data
[X] Record updated in last year

Plain English summary of protocol

Background and study aims
Patient vital signs (like heart rate, blood pressure, and oxygen levels) are essential for assessing a patient's health, especially in urgent care settings. They help medical staff monitor if a patient is getting better or worse. Normally, vital signs are checked at least once when patients first arrive at emergency departments (EDs) however due to high workloads and crowding, sometimes these checks are missed or delayed which can lead to serious problems for patients.

A proposed solution is to allow patients in the ED waiting area record their own vital signs using a smartphone. This would help speed up the process of checking vital signs, reduce delays, and allow nurses to focus on more critical tasks. The idea is based on using smartphones and wearable technology, which have been tested in other medical areas to save time and improve patient care. While using smartphones for patient monitoring has grown during the COVID-19 pandemic, it hasn't been widely studied in emergency settings.

Currently, many people in the UK own smartphones, and they're generally open to using them in healthcare setting, such as for entering personal information or receiving test results. At St George's University Hospitals NHS Foundation Trust, patients already use their smartphones to check in when they arrive at the ED, making the process faster and more efficient. The Trust is now exploring the possibility of using smartphones to let patients record vital signs on their own. The main aim of this research is to see if it is possible and acceptable for patients to use facial monitoring through smartphones to track their vital signs in the emergency department. This research also aims to find out if this technology is acceptable for healthcare staff, as well as exploring if patients in emergency care settings are interested in using mobile health technology in their care. We will also compare how well the facial monitoring works against traditional methods of checking vital signs (like heart rate, respiratory rate, oxygen levels, and blood pressure).

Who can participate?
1. Patient-level data capture (vital signs recording): Adults aged 18+ who attend a 'walk in' centre at St George's University Hospitals NHS Foundation Trust (ED, Urgent Treatment Centre

or Enhanced Primary Care Hub) who have access to a smart phone and are willing and able to provide consent to take part.
2. Patient acceptability (digital health technology survey): Adults aged 18+ who attend a 'walk in' centre at St George's University Hospitals NHS Foundation Trust (ED, Urgent Treatment Centre or Enhanced Primary Care Hub) who have access to a smart phone and are willing and able to provide consent to take part.
3. Staff acceptability data capture: ED staff working in triage or initial assessment.

What does the study involve?
1. Patient-level data capture (vital signs recording)
You will be asked to record your vital signs using an internet application on your smartphone. This will involve scanning a QR code to access a secure app that guides you through the process. After you have recorded your vital signs the research nurse will take your vitals manually. After this, you will complete a short online questionnaire about your experience. This will take about 5 minutes. You can use your device to complete the questionnaire, or the research team can provide a tablet if needed.
2. Patient acceptability (digital health technology survey)
Completion of an anonymous online survey about the acceptability of digital health technology in the emergency department. This should take 5-10 minutes.
3. Staff acceptability data capture
Completion of an anonymous online survey about the acceptability of smartphone-monitored vital signs. This should take 5-10 minutes.

What are the possible benefits and risks to participating?
There are no direct benefits to taking part in this research, however it could influence how technology could be used emergency care to improve the service. There are no expected risks to taking part.

Where is the study run from?
The study is run by St George's University Hospitals NHS Foundation Trust (UK)

When is the study starting and how long is it expected to run for?
October 2024 to October 2026

Who is funding the study?
Royal College of Emergency Medicine (UK)

Who is the main contact?
For more information, please speak to a member of the research team in the Emergency Department or email FacED.study@stgeorges.nhs.uk

Contact information

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Public, Scientific

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Additional identifiers

Integrated Research Application System (IRAS)
346745

Central Portfolio Management System (CPMS)
63686

Study information

Scientific Title
FacED: facial vital signs recording in ED

Acronym
FacED

Study objectives
Timely and accurate recording of vital signs (heart rate, blood pressure, oxygen saturation, temperature, respiratory rate) is essential for patient assessment in Urgent and Emergency Care (UEC) settings, but factors such as nursing workload and crowding can lead to delays and omissions in monitoring. This can increase the risk of adverse outcomes due to delayed interventions. Smartphone-based, patient-initiated facial vital sign recording could serve as an effective solution by enabling patients to record their own vital signs in the ED waiting room, thus reducing wait times, alleviating pressure on staff, and ensuring more frequent monitoring of stable patients. This approach may improve overall patient care by facilitating quicker triage, supporting better patient redirection, and allowing clinical staff to focus on higher priority tasks.

While the use of mobile technologies for self-monitoring has been explored in other healthcare settings, limited data exists on their application in UEC settings. Therefore, this study aims to evaluate the acceptability, usability, and effectiveness of smartphone-based vital sign recording in the ED, exploring both patient and staff perspectives on the technology. By addressing the gaps in current literature and offering a potential solution to ED crowding and delays, this research could have significant implications for improving patient care and workflow in UEC settings.

Ethics approval required
Ethics approval required

Ethics approval(s)
Approved 14/02/2025, London - Surrey Research Ethics Committee (2 Redman Place, London, E20 1JQ, United Kingdom; +44 207 104 8131; surrey.rec@hra.nhs.uk), ref: 25/PR/0222

Primary study design
Observational

Study design
Observational cross-sectional study

Study type(s)
Other

Health condition(s) or problem(s) studied
Adult walk-in patients in the Emergency Department (ED) and ED staff

Interventions
1. Patient-level data capture (vital signs recording)
Patients arriving at the ED will be approached by a member of the research team and screened for eligibility before being given information about the study. Patient will complete their vital signs using PPG technology on their smartphone accessed through a QR code link on a webpage. The webpage will not capture any personal information and all data is removed once the participant leaves the website. Participants will be guided through the capture of their vital signs by a research nurse if needed. Clinical or research staff will near-simultaneously complete the patients vital signs using traditional methods. Post-PPG recording, participant acceptability data will be captured electronically using a secure web-based questionnaire. Participants will be able to complete the survey on their personal devices, following a linked QR code or can be provided with a handheld electronic device. The electronic survey contains the invitation to participate letter (participant information sheet), consent form and the questionnaire. Advantages of the electronic format include ease of administration, ease of data collection and reduced environmental impact versus the use of paper.The questionnaire has been designed to meet the study objectives, drawing from previous literature on digital technology acceptability and technical affinity. Two standard measures on current usage of technology and perceived technical capability will be used as this is a factor in the uptake of digital technologies by patients. Participant demographic and ED attendance information will be captured from the hospital electronic patient record (EPR) by the research team and linked to the patient acceptability data following consent. The survey should take no longer than 5 minutes for each participant to complete.

2. Patient acceptability (digital health technology survey)
This survey will collect data from patients attending the ED with any condition as this provides access to a diverse study population. The reason for attendance to the ED is not a factor in participation as we are aiming to capture data on digital health technology acceptability use not clinical condition. Participants will be approached by research team members at an appropriate time in their ED visit to participate in the survey. Survey data will be captured electronically. Participants will be able to complete the survey on their personal devices by following a linked QR code, or can be provided with a handheld electronic device. The electronic survey contains the invitation to participate letter (participant information sheet), consent form and the questionnaire. Data collected includes participant demographics, digital technology acceptability and technical affinity, opinion on the use of smartphones in the ED by patients. Information in the survey is anonymous, and no data is collected that can be traced back to the participant.

3. Staff acceptability data capture
Staff acceptability will be captured electronically using a questionnaire designed to determine the potential usefulness of the technology on their practice. Information in the survey is anonymous and no identifiable information is being collected.

Intervention Type
Other

Primary outcome(s)
Measured at a single timepoint:
1. Feasibility: defined as the proportion of patients consented who were able to complete the

vital signs recording using patientcheck.in
2. Acceptability of self-recorded vital signs (patients): self-assessment using the single-ease question (SEQ) and the system usability scale (SUS) and self-reported technical affinity

Key secondary outcome(s)
Measured at a single timepoint:
1. Acceptability of digital health technology (patients): electronic survey of perceived patient acceptability of smartphone use as part of their care
2. Acceptability (staff): electronic survey of usability constructs based on the Health Information Technology Usability Evaluation Scale
3. Performance: reliability of the platform to accurately measure the vital signs will be measured using the intraclass correlation coefficient (ICC)

Completion date
01/10/2026

Eligibility

Key inclusion criteria
Patient participant inclusion criteria:
1. ‘Walk-in’ adult patients aged ≥18 years at one of St George's University Hospitals NHS Foundation Trust's urgent care centres (Emergency Department, Urgent Treatment Centre or Enhanced Primary Care Hub)
2. Has access to own smartphone
3. Willing and able to give informed consent for participation in the study

Staff participant inclusion criteria:
1. Clinical ED staff who work in a triage or initial assessment role in ED

Participant type(s)
Employee, Health professional, Patient

Healthy volunteers allowed
No

Age group
Mixed

Lower age limit
18 Years

Upper age limit
100 Years

Sex
All

Total final enrolment
0

Key exclusion criteria
Patient participant exclusion criteria
1. Clinical condition warranting immediate or urgent medical assessment

Staff participant exclusion criteria:
1. Unwilling to complete questionnaire

Date of first enrolment
18/05/2025

Date of final enrolment
01/10/2026

Locations

Countries of recruitment
United Kingdom

England

Study participating centre
St George's University Hospitals NHS Foundation Trust
Blackshaw Road
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Sponsor information

Organisation
St George's University Hospitals NHS Foundation Trust

ROR
https://ror.org/039zedc16

Funder(s)

Funder type
University/education

Funder Name
Royal College of Emergency Medicine

Alternative Name(s)
The Royal College of Emergency Medicine, Royal College of Emergency Medicine | London, RCEM

Funding Body Type
Private sector organisation

Funding Body Subtype
Universities (academic only)

Location
United Kingdom

Results and Publications

Individual participant data (IPD) sharing plan

IPD sharing plan summary
Data sharing statement to be made available at a later date

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol (preprint)		26/05/2025	20/01/2026	No	No