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Use of an innovative electronic communications platform to improve pre-hospital transport of injured people in Rwanda

Submission date
23/05/2024

Recruitment status
Recruiting

Registration date
29/07/2024

Overall study status
Ongoing

Last Edited
15/08/2025

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
Delays in getting injured patients to the hospital on time result in avoidable death and disability. This is particularly the case in low- or middle-income countries (LMICs), where even when ambulance systems are available, communication between ambulance systems, patients, and hospitals is inefficient. In Rwanda, injury causes 9% of deaths; 47% occurring before-hospital. Similar to many LMICs, Rwanda experiences long delays in getting patients to the hospital, with all communication between patients, ambulances, and hospitals done using multiple phone calls. To overcome these difficulties, a local software firm designed Rwanda912, a novel electronic tool for use in low-resource settings. Rwanda912 uses an ambulance Destination Decision Support Algorithm (DDSA) which regularly collects information from hospitals on the availability of staff and equipment, and from the ambulance crew on patient status; it uses this information to match the patient with the nearest able hospital. It has been endorsed by the Rwandan Ministry of Health (MoH) and won local innovation awards. In collaboration with MoH, Rwandan ambulance services, and local and international academics, this project will test whether Rwanda912 reduces time from injury to arrival at the hospital and improves clinical outcomes such as death and length of stay in the hospital.

Who can participate?
All patient incidents/patient conditions transported to public health facilities by Service d'Aide Medicale Urgente (SAMU) in Rwanda

What does the study involve?
The study will ensure Rwanda912 is acceptable to users and failsafe in the field before it is deployed in ambulances and will test whether it improves patient outcomes in a major urban and rural district in Rwanda. Along with collecting information on patient outcomes after Rwanda912 is deployed, information will be collected from people who use Rwanda912 about its "user friendliness" and whether it is being used as intended. Additionally, the study will assess the costs and resources needed to develop and deploy it. These outcomes will be used to determine roll-out throughout the country by MoH and provide knowledge to enable its transferability to other countries. The study focuses on injured patients, however, if successful,

the findings will apply to other emergency conditions requiring ambulance transport. Capacity building is central to the project, supporting the development of project management, research, and software development skills amongst Rwandan partners. The project will also support Rwandan PhD students to be jointly supervised by Rwandan and UK supervisors. The project development has been informed through deep engagement with key stakeholders - including patients, healthcare workers, and policymakers - on their needs and priorities around injury care. Stakeholder engagement will continue throughout the project, in project management, governance, and ensuring that the research findings have an impact. The study team plans to achieve this through a structured program, supporting and enabling community and health systems stakeholders to drive policy based on the research findings. Engagement with our international collaborators including at WHO and Emergency Medical Societies in LMICs will ensure maximal international impact.

What are the possible benefits and risks of participating?
The intervention will be delivered at the level of the health system and patients are not going to be individually enrolled.

Where is the study run from?
Murray Learning Centre, University of Birmingham (UK)

When is the study starting and how long is it expected to run for?
November 2022 to October 2027

Who is funding the study?
National Institute for Health and Care Research, (NIHR) Research and Innovation for Global Health Transformation

Who is the main contact?
Prof Justine Davies, j.davies.6@bham.ac.uk

Study website
https://www.birmingham.ac.uk/research/applied-health/research/rwanda912

Contact information

Type(s)
Scientific, Principal Investigator

Contact name
Prof Justine Davies

ORCID ID
https://orcid.org/0000-0001-6834-1838

Contact details
Murray Learning Centre
University of Birmingham
Edgbaston
Birmingham
United Kingdom
B15 2TT

+44 (0) 7384 584673
j.davies.6@bham.ac.uk

Type(s)
Public

Contact name
Dr Aurore Nishimwe

ORCID ID
https://orcid.org/0000-0002-8019-2561

Contact details
Murray Learning Centre
University of Birmingham
Edgbaston
Birmingham
United Kingdom
B15 2TT
+44 (0) 7448863640
a.nishimwe.1@bham.ac.uk

Additional identifiers

EudraCT/CTIS number
Nil known

IRAS number

ClinicalTrials.gov number
Nil known

Secondary identifying numbers
NIHR203062

Study information

Scientific Title
Use of an innovative electronic communications platform (Rwanda912) to improve pre-hospital transport of injured people in Rwanda: a hybrid type 2 effectiveness implementation study

Acronym
Rwanda912

Study objectives
Research question: Can a novel electronic system, Rwanda912, which uses an ambulance Destination Decision Support Algorithm (DDSA), improve transport time of injured patients to a facility that can treat them, in two areas (urban-Kigali and rural-Musanze), in Rwanda?

Ethics approval required

Ethics approval required

Ethics approval(s)
Approved 10/02/2023, Rwanda National Ethics Commitee (KN 3 RD, Kicukiro, Kigali, P.O. BOX 84, Rwanda; +250 788 592 004; info@rnecrwanda.org), ref: No.99/RNEC/2023

Study design
Single-centre interventional hybrid type 2 effectiveness implementation study

Primary study design
Interventional

Secondary study design
Non randomised study

Study setting(s)
Hospital, Medical and other records, Workplace, Other

Study type(s)
Prevention, Safety

Participant information sheet
Not available in web format, please use contact details to request a participant information sheet

Health condition(s) or problem(s) studied
Pre-hospital care and emergency medical services

Interventions
The intervention consists of the implementation and evaluation of Rwanda912, an emergency medical services communication system intervention composed of interfaces to capture facility and patient-relevant data and a guideline-based destination decision support algorithm (DDSA). The intervention aims to reduce delays in transport to hospitals for injured patients. An Interrupted Time Series (ITS) approach will be used to assess the effectiveness of the intervention. Implementation outcomes will be studied using the RE-AIM QuEST framework, which combines qualitative and quantitative measures to understand the intervention's Reach, Effectiveness, Adoption, Implementation, Cost, and Maintenance.

Intervention Type
Other

Primary outcome measure
Time from injury to arrival at an appropriate facility measured using data collected on individual patients' records in the Rwanda912 database and trauma registry from baseline through to end-line

Secondary outcome measures
1. Clinical or process (e.g. death, need for ITU, length of stay) measured using data collected on individual patients from hospitals' electronic medical records and the trauma registry from baseline through to end-line
2. Quality of life measured using the self-assessed, health-related quality of life questionnaire

(EQ5D5L) after the rollout of the intervention
3. Disability measured using the WHO Disability Assessment Schedule (WHODAS) after the rollout of the intervention
4. Implementation outcomes: Reach, Effectiveness, Adoption, Implementation, Cost, and Maintenance measured using the RE-AIM QuEST framework after the rollout of the intervention

Overall study start date
01/11/2022

Completion date
31/10/2027

Eligibility

Key inclusion criteria
1. All incidents/patient conditions transported by Service d'Aide Medicale Urgente (SAMU) in Rwanda
2. For clinical outcomes, the study will concentrate on patients transported to public health facilities because they receive the largest number of cases from SAMU

Participant type(s)
Patient, Health professional, Service user

Age group
All

Sex
Both

Target number of participants
Sample size is based upon an expected number of observations each week (i.e., number of ambulances calls in each region per week) of at least 50. We have assumed a realistic auto-regressive correlation of order 1 (exponential decay) will be sufficient to characterise the correlation structure of the data. We assume a small to moderate effect size (standardised effect size of 0.25) in line with the nature of the intervention. This standardised effect size of 0.25 can be considered as a target effect size of quarter of the standard deviation of the outcome (across the monthly time periods). For example, if the average time from calling of the ambulance to arrival at facility has a mean of 70 minutes and SD 30 (across 108 weeks of the evaluation), this would be equivalent in an effect of the intervention of 7.5 minutes. A sample size of 108 observations (for example weekly means of duration of time to hospital), assuming an equal number of observations pre and post roll-out, would provide more than 90% power across all values of auto-regressive correlations (at 5% significance). This is a conservative calculation as we will have between around 100 measures pre- the official roll-out and 50 to 70 measures post roll-out; meaning our evaluation should have power to detect smaller changes than 7.5 minutes. This change represents the total change in the post roll out period and includes shift changes and trend changes.

Key exclusion criteria
Patients transported to private health facilities

Date of first enrolment
01/10/2023

Date of final enrolment
01/06/2027

Locations

Countries of recruitment
Rwanda

Study participating centre
SAMU - Service d'Aide Medicale Urgente five district hospitals (Kibagabaga, Masaka, Muhima, Nyarugenge, Kacyiru) and three referral hospitals (Centre Hospitalier Universitaire de Kigali [CHUK], King Faisal Hospital [KFH], Rwanda Military Hospital [RMH]).
Kigali
Rwanda
Not applicable

Study participating centre
Musanze district site: The Ruhengeli Referral Hospital (RRH)
Musanze
Rwanda
Not applicable

Sponsor information

Organisation
University of Birmingham

Sponsor details
Edgbaston
Birmingham
England
United Kingdom
B15 2TT
+44 (0)121 414 3344
welcome@contacts.bham.ac.uk

Sponsor type
University/education

Website

http://www.birmingham.ac.uk/index.aspx

ROR
https://ror.org/03angcq70

Funder(s)

Funder type
Government

Funder Name
National Institute for Health and Care 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

Publication and dissemination plan
Policy dissemination: The Ministry of Health (MoH) of Rwanda and its technical arm (The Rwanda Biomedical Centre), the Rwandan Ambulance Services ("SAMU, Division of Emergency Medical Services (EMS)" including Dispatch), the Software developer, and healthcare providers at facilities are co-investigators on this project. The study team will not simply be disseminating results to them; they have been actively involved in the development of the project and will be involved in the running of the project to ensure that it is done in a manner which will maximise impact.

Policy Briefs will be created for the study team or members of the Scientific Advisory Group to use in dissemination to wider audiences and funders. In addition, the study team will form community engagement groups (injured persons community groups) in Kigali and Musanze to advocate for better care for injured persons. Local dissemination will be guided by community members.

Dissemination to academics: This will be via presentations at conferences, peer-reviewed publications in open-access journals, and via social media. All methodologies will be posted on our website for use by others.

Intention to publish date
31/10/2028

Individual participant data (IPD) sharing plan
The anonymised data generated and/or analysed during the current study will be available upon reasonable request from Prof. Justine Davies, j.davies.6@bham.ac.uk, 12 months after the project has ended, to ensure that local academics have the opportunity to use the data for their own purposes.

IPD sharing plan summary
Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Protocol (preprint)		24/12/2024	07/01/2025	No	No
Protocol article		27/06/2025	30/06/2025	Yes	No
Protocol article		13/08/2025	15/08/2025	Yes	No