





STUDY PROTOCOL

REVISED

Identifying priorities for the collection and use of data related to community first response and out-of-hospital cardiac arrest: protocol for a nominal group technique study [version 2; peer review: 2 approved]

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Abstract


Introduction: Out-of-hospital cardiac arrest (OHCA) is a devastating health event that affects over 2000 people each year in Ireland. Survival rate is low, but immediate intervention and initiation of cardiopulmonary resuscitation (CPR) and administration of an automated external defibrillator (AED) can increase chances of survival. It is not always possible for the emergency medical services (EMS) to reach OHCA cases quickly. As such, volunteers, including lay and professional responders (e.g. off-duty paramedics and fire-fighters), trained in CPR and AED use, are mobilised by the EMS to respond locally to prehospital medical emergencies (e.g. OHCA and stroke). This is known as community first response (CFR). Data on the impact of CFR interventions are limited. This research aims to identify the most important CFR data to collect and analyse, the most important uses of CFR data, as well as barriers and facilitators to data collection and use. This can inform policies to optimise the practice of CFR in Ireland.


Methods: The nominal group technique (NGT) is a structured consensus process where key stakeholders (e.g. CFR volunteers, clinicians, EMS personnel, and patients/relatives) develop a set of prioritised recommendations. This study will employ the NGT, incorporating an online survey and online consensus meeting, to develop a priority list for the collection and use of CFR data in Ireland. Stakeholder responses will also identify barriers and facilitators to data collection and use, as well as indicators that improvements to

Open Peer Review

Reviewer Status  

	Invited Reviewers	
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version 1 26 Jul 2021	 report	 report

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Any reports and responses or comments on the article can be found at the end of the article.

these processes have been achieved. The maximum sample size for the NGT will be 20 participants to ensure sufficient representation from stakeholder groups.

Discussion: This study, employing the NGT, will consult key stakeholders to establish CFR data collection, analysis, and use priorities. Results from this study will inform CFR research, practice, and policy, to improve the national CFR service model and inform international response programs.

Keywords

first response, community first responders, out-of-hospital cardiac arrest, nominal group technique, prehospital emergency care, consensus meeting, priority list, outcome measurement

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Author roles: **Keegan D:** Investigation, Methodology, Project Administration, Resources, Writing – Original Draft Preparation, Writing – Review & Editing; **Heffernan E:** Investigation, Methodology, Project Administration, Resources, Supervision, Writing – Original Draft Preparation, Writing – Review & Editing; **McSharry J:** Conceptualization, Funding Acquisition, Methodology, Writing – Review & Editing; **Barry T:** Funding Acquisition, Writing – Review & Editing; **Masterson S:** Conceptualization, Funding Acquisition, Investigation, Methodology, Project Administration, Resources, Supervision, Writing – Original Draft Preparation, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

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REVISED Amendments from Version 1

Following peer review the protocol has been revised. The 'Design' section has been updated to outline that the online survey and online meeting outcomes will be participant-driven, in line with nominal group technique (NGT) procedure. Additionally, it also includes detail on the sampling strategy, specifically that a diverse cohort of participants will be recruited to ensure a wide array of experience and expertise are included, which subsequently we hope will result in a wide variety of outcome data (both short and long term) being included. Separately, the 'Ethical considerations' section has been updated to include further detail pertaining to data storage, security, and access, as well as including detail on ensuring anonymity for participant data. The 'Participants and recruitment' section has been updated to make clearer the maximum sample size and the rationale for the sample size based on previous research in the nominal group technique (NGT) field. It now also includes further detail on the sampling strategy, including outlining the role of the advisory group and research team in participant selection and recruitment. We have also acknowledged the importance of the patient and family perspective during the consensus process. The 'Plans for dissemination' section has been updated to outline that the results from the consensus meeting will be implemented into the national Out-of-Hospital Cardiac Arrest Register (OHCAR) and in the OHCAR annual report. Finally, the 'Discussion' section has been updated to address comments regarding the inclusion of long term outcome data, as well as including further information on implementation of the findings into the national register and future reporting.

Any further responses from the reviewers can be found at the end of the article

Introduction

Out-of-hospital cardiac arrest (OHCA) is a leading cause of mortality around the world¹. In Ireland, each year there are over 2000 OHCA where resuscitation is attempted². The survival rate from OHCA in Ireland is low (~ 7%)³, but timely responses can increase the chance of survival. There is much geographic variation in Ireland, with people living in a range of geographical settings⁴. This variation in accessibility can impact the response times of the emergency medical services (EMS) to OHCA calls. The prospect of survival from OHCA reduces by approximately 10% with every minute before resuscitation is started. Therefore, each minute is literally vital in the event of OHCA⁵. Consequently, many countries, including Ireland, have implemented first response programmes. These are dispatch systems for the deployment of a rapid response team to cardiac arrests or other medical emergencies in the prehospital setting^{6,7}. A range of responder groups (e.g. firefighters, police officers, citizen-responders, off-duty EMS personnel) can be dispatched. These first responders can work alongside the EMS, as part of the EMS, or instead of the EMS. They can be classified as volunteers or non-volunteers, with variations in training, equipment, and dispatch methods⁷. There are wide variations in first response systems within and between countries, with some having multiple systems⁶.

In Ireland, individuals and groups have provided a volunteer community response to OHCA for many years. These individuals, known as community first responders, are volunteers mobilised by the EMS to respond to prehospital medical emergencies (e.g. OHCA, stroke, and choking) in their locality. They

can include lay responders and professional responders, such as off-duty paramedics, general practitioners, nurses, police officers, and fire-fighters^{6,7}. They are often organised in teams within their community⁷. They are typically trained in cardiopulmonary resuscitation (CPR) and automated external defibrillator (AED) use and can provide support to the EMS, patients and patients' families when an OHCA call is made. They are sometimes the first to arrive at the scene, performing CPR and administering an AED. In addition, they can collect patient data, including current patient condition and past medical history, to provide to the EMS³.

Data on community first response (CFR) in Ireland are currently limited. Therefore, the true impact of this intervention is difficult to estimate. As such, it is necessary to establish data collection and use priorities for CFR, including identifying key data that should be measured, collected, and reported as standard during emergency calls involving CFR. These data could be utilised to evaluate and provide evidence for CFR, and could inform policies that will optimise the practice of community response in Ireland. Traditionally, data collection for OHCA interventions has focused on the outcomes of return of spontaneous circulation (ROSC) during resuscitation and short-term patient survival (including at the scene, on arrival to hospital, and hospital discharge)⁸. However, there are many other considerations during community response to cardiac arrest that lie outside of the binary outcome of patient survival/death. For instance, research suggests that CFR volunteers provide important support to patients' families, as well as valuable training and resources to their community⁷.

Currently, there are two core outcome sets (COSs)⁹ specifying the outcomes that should be measured as a minimum during clinical trials of interventions for cardiac arrest survivors; Core Outcome Set for Cardiac Arrest (COSCA)¹⁰ and Paediatric Core Outcome Set for Cardiac Arrest (P-COSCA)¹¹. Both COSs broaden the range of cardiac arrest outcomes to include not only survival but also neurological function, physical function, and health-related quality of life at various time points post-discharge. These outcomes provide a more balanced measurement of short- and long-term patient condition^{10,11}. Research into COS development purports that a standardised approach to outcome measurement¹² can improve the value of research, consistency of measurements, ensure outcomes are relevant, and influence future research and practice, while reducing reporting bias, particularly in randomised trials¹³. COSs clearly define a minimum set of data for measurements that are important to stakeholders, while highlighting that additional relevant outcomes can also be reported as required¹².

This study will adopt a similar approach to develop priorities for data collection and use, specifically focusing on CFR in Ireland. These priorities will be developed primarily for CFR practice, though they could also be used in CFR research. The priorities will not focus solely on OHCA management because, while this is an important component of CFR, volunteers in Ireland attend a wider range of emergencies, including stroke, heart attack, and choking. It is important to capture the rounded experience and outcomes of CFR, to understand and measure its impact, and improve the CFR service as a whole. This research will ensure that CFR data are collected in a standardised,

consistent manner, which will help build an evidence base for CFR and inform improvements to policy and practice for this intervention. This research will also ensure that the data collected and the uses to which those data are put are valued by key stakeholders, such as clinicians, patients, and CFR volunteers. In addition to developing data collection and use priorities, this study will also identify barriers and facilitators to data collection and use during CFR.

The aim of this project is to consult a range of stakeholders, including CFR volunteers, EMS professionals, patients, clinicians, and researchers, on which CFR data are most important to collect and how information can be utilised to improve the community response service. Their responses will inform the development of a priority list for the collection and use of CFR data in Ireland. The specific objectives of this research are to identify:

- (1) The most important data to record and analyse related to CFR.
- (2) The most important uses of data related to CFR.
- (3) Facilitators and barriers to the collection and use of data related to CFR.
- (4) Indicators that improvements to the collection and use of data related to CFR have been achieved.

Methods

Design

The nominal group technique (NGT) is a process in which consensus is used to generate and rank ideas and prioritise topics. There are typically four stages involved in a NGT process: (1) silent generation, (2) round robin, (3) clarification, and (4) voting¹⁴. Stage one involves the private generation of responses by participants, based on questions provided by the research team. Stage two involves participants sharing their responses with the wider group and the responses being recorded. Stage three involves small group discussions of the list of responses provided by the participants. Stage four involves private voting to prioritise and rank responses according to which responses the participants think are most important. The NGT is frequently used in health service research to identify and agree on priorities, for example identifying quality markers in general practice¹⁵, evaluating exercise adherence measures in patients with musculoskeletal disorders¹⁶, and determining important treatment outcomes for patients with aphasia¹⁷. The process facilitates a balanced selection of ideas/topics that are important to the participant group as a whole¹⁸.

In this study, the NGT will be conducted virtually, as current public health guidelines in Ireland do not allow large indoor face-to-face gatherings due to the COVID-19 pandemic. The NGT will facilitate idea generation and consensus development with a range of stakeholder groups, identifying core CFR data for collection and analysis, as well as the barriers and facilitators to this process. This method was chosen because it is an established technique for generating ideas and prioritising topics¹⁸.

The specific NGT procedure used in this study was based on the procedure in a study that aimed to prioritise target behaviours for research on diabetes¹⁹. It will entail two key components:

(1) an online survey and (2) an online consensus meeting. The online survey will be used to gather information on the four study objectives. Specifically, it will be used to generate a comprehensive list of CFR data that should be recorded and analysed (Topic 1), as well as a comprehensive list of the uses to which these data should be put (Topic 2). In addition, the survey will be used to identify facilitators and barriers to the collection and use of CFR data (Topic 3), as well as indicators that improvements to these processes have been achieved (Topic 4). The consensus meeting will be used to identify priorities for the collection, analysis, and use of CFR data. In particular, the meeting will be used to develop a shortlist of the most important CFR data to record and analyse (Topic 1), as well as a shortlist of the most important uses of these data (Topic 2).

The suggestions generated during the online survey and the priorities identified during the online consensus meeting should be participant-driven, rather than researcher-driven, in line with standard NGT practice¹⁴. The online survey questions will therefore be open-ended, rather than closed-ended, which will allow participants to determine what is important regarding data collection and use. Our purposeful sampling strategy will hopefully generate a diverse cohort of participants with varying expertise to ensure all key perspectives are represented, as well as a list of priorities that relate to both short and long term outcome data.

Ethical considerations

Ethics approval has been granted by the Research Ethics Committee of the National University of Ireland (NUI) Galway (reference no. 18-Sept-13). This research will be conducted in accordance with NUI Galway's University Data Protection Policy and Ireland's General Data Protection Regulation (GDPR). Data collected as part of this study, including personal participant data (e.g. name, email address, occupation), will be securely stored on a password protected folder on the NUI Galway network to which only members of the research team have access. Data will be anonymised for analysis and personal participant information will be deleted after the study period. All participants will provide written informed consent prior to the NGT process. The NGT employed here is a component of the third work package of a larger programme of research. Work package 1 examined the international context of community response to OHCA, work package 2 examined sources of community response data in Ireland, and work package 3 will examine data collection, analysis, and integration of community response data working with stakeholders to inform policy and practice⁷.

Project registration

This project involves the generation of a list of core data to be collected for the CFR intervention and has been registered on the [Core Outcome Measure in Effectiveness Trials \(COMET\) website](#).

Participants and recruitment

Participants will be recruited to represent various stakeholder groups, including CFRs, patients, patients' families, clinicians, researchers, and policy-makers. We are very conscious of the need for the patient and family perspective to be represented in

the study and will ensure that they are present in the stakeholder group. The NGT is a small group technique that can include sample sizes from 2 – 14 participants^{14,16}, however larger sample sizes have been employed in some studies¹⁹. This study involves multiple stakeholder groups and as such, to facilitate adequate representation from each cohort while maintaining a manageable size for the conduct of group discussions during the NGT process, the maximum sample size in total for the panel will be 20 participants¹⁹. They will be invited to take part in both the survey and the meeting. A purposeful sampling strategy will be employed to identify and select representatives from each of the stakeholder groups. Peer consultation amongst the research team and the Scientific Advisory Group associated with this study, which include individuals from organisations such as the National Ambulance Service (NAS), CFR Ireland, and the Irish Heart Foundation and who have links with each target stakeholder group, will identify potential participants from each stakeholder group who have relevant experience and expertise. This could be professional or personal/lived experience.

Procedure

Each participant will be emailed a study invitation and a study information sheet. They will be given the opportunity to contact the research team with any questions. They will then provide written informed consent before completing the online survey, which will be generated through Microsoft Forms. In advance of the online consensus meeting, the participants will be sent copies of the comprehensive lists for Topic 1 and Topic 2, which will be generated based on the survey responses. The meeting will be held approximately one month after the survey is launched. The meeting will last approximately three hours and be facilitated by members of the research team using the video platform [Zoom](#). The research team will first outline the format and aims of the meeting. Participants will then be divided into small groups to discuss the lists for Topic 1 and Topic 2, and to suggest any additional items that should be included in the lists, if needed. Subsequently, the participants will carry out a ranking exercise for Topic 1. [Slido](#), an online polling tool, will be used to facilitate this exercise. Each participant will privately rank the items listed for Topic 1 to prioritise what they consider to be the most important data to collect and analyse. Slido will calculate the results of this ranking exercise for the group as a whole. All participants will then take part in a group discussion about the ranking results. Following this discussion, a second round of ranking will take place via Slido to finalise the priorities for Topic 1. This process will be repeated for the Topic 2 list, which is a comprehensive list of the uses to which data relating to CFR should be put. Finally, the research team will gather the participants' views on the collection and use of data related to community response and OHCA.

Analysis

Three stages of analysis will be utilised throughout the NGT process. Firstly, the responses from the pre-meeting online survey will be analysed by the research team in order to generate a comprehensive list of suggestions for each of the four topics included in the survey. The lists for Topic 1 and Topic 2 will be

shared with the participants before and during the consensus meeting to facilitate discussion and ranking. Secondly, during the consensus meeting, participants will rank the suggestions from the Topic 1 and Topic 2 lists using the Slido tool. The tool will also calculate the overall ranking results for the group as a whole. The suggestions ranked highest will receive a score of 10, those ranked second will receive a score of 9, and so on. The sum of the points for each suggestion will be calculated and divided by the number of participants who completed the poll to generate an averaged, ranked score. The top scoring suggestions will be presented back to the participants for discussion.

Public and patient involvement

A panel of three CFR volunteers, including lay and professional volunteers, have assisted with the development of study materials, including pilot testing the online participant survey. The panel also advised the research team on the NGT procedure, including providing feedback and guidance on the length of the meeting, adequate break times for participants, and ensuring balanced representation from each participant group.

Plans for dissemination

The results of this project will be used to provide recommendations to the NAS and Prehospital Emergency Care Council (PHECC) of Ireland on CFR data collection, utilisation, and analysis, as well as identify the barriers and facilitators to this process. The list of priorities/outcome data collected as part of this study will be included in the national Out-of-Hospital Cardiac Arrest Register (OHCAR) and in the OHCAR annual report. The findings will also be submitted for publication in peer-reviewed journals, presented at academic conferences, and shared with project collaborators and research participants.

Study status

The study is ongoing and participant enrolment has permanently closed.

Discussion

This project will provide an agreed upon set of priorities from a range of stakeholder groups regarding the most important CFR data to collect and their most important applications. The NGT will facilitate a virtual discussion with key stakeholders and allow for this priority list of key data to be chosen. The outcomes of this process will help provide evidence for the development of policy and practice to generate a sustainable, improved community response model in Ireland. This research will inform the national community response programme about which data are most important to collect and use during community response to OHCA, as well as barriers and facilitators to data collection and use. It will also inform international community response programmes of important outcomes and data to collect and analyse during community response to OHCA. There is a potential that long term outcome data may be overlooked, however we hope that there will be a diverse group of participants with various experiences and perspectives, including researchers and clinicians, who will identify both short and long term outcome data. After the consensus meeting the research team will consult with the NAS to create a plan to implement the future collection of these data during CFR

activity and in future annual reporting. There is currently no minimum set of data to measure during community response to OHCA, and this study will address this need.

Data availability

Underlying data

No underlying data are associated with this article.

Extended data

Open Science Framework: Identifying priorities for the collection and use of data related to community first response and

out-of-hospital cardiac arrest: protocol for a nominal group technique study, <https://doi.org/10.17605/OSF.IO/VT5M7>²⁰

This project contains the following extended data:

- Study invitation and information sheet
- Consent form and research survey

Data are available under the terms of the [Creative Commons Zero “No rights reserved” data waiver](#) (CC0 1.0 Public domain dedication).

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Open Peer Review

Current Peer Review Status:  

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Reviewer Report 01 December 2021

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Karl -Christian Thies 

Department of Anesthesiology, Critical Care and Emergency Medicine, Bethel Medical Centre, OWL University Hospitals, Bielefeld University, Bielefeld, Germany

Dear Authors,

I have no further comments or questions. Good luck with the project.

Best wishes,
Karl

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Cardiac Arrest, First Responder Systems

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Version 1

Reviewer Report 12 November 2021

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Terry P. Brown 

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This study is proposing to collect information on the work of community first responders (CFR) in Ireland using tried and tested qualitative data collection techniques.

There is conflicting evidence about the impact CFRs can have on the likelihood of survival from out-of-hospital cardiac arrest (OHCA). Data on OHCA is usually collected on those patients that receive treatment from EMS personnel. Little research has been published on what treatment CFRs provide and its potential impact on survival from OHCA prior to the arrival of the EMS. This is especially so for those cases that achieve a return of spontaneous circulation before EMS arrive. In addition, the role of CFRs away from the treatment of patients is not well known. The proposed study will go some way in providing essential information that could inform future policy on the roles and responsibilities of CFRs not only in Ireland but also globally.

I found the study protocol to be clear and concise. The authors outlined their plan of study very well. I only have a couple of minor comments with regard to GDPR, and not sure whether it is HRB policy for statements to be made about where data collected is to be stored, data storage security and who will have access to this data. Also, a statement should be made that the anonymity of participants will be respected.

Is the rationale for, and objectives of, the study clearly described?

Yes

Is the study design appropriate for the research question?

Yes

Are sufficient details of the methods provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Out-of-Hospital Cardiac Arrest, Public Access Defibrillation, Epidemiology, Statistics

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 20 Nov 2021

Dylan Keegan, National University of Ireland, Galway, Galway, Ireland

We thank the reviewer for their consideration of the protocol and valuable comments. We

have addressed their concerns below and feel these changes have allowed us to improve our protocol overall.

- **I only have a couple of minor comments with regard to GDPR, and not sure whether it is HRB policy for statements to be made about where data collected is to be stored, data storage security and who will have access to this data. Also, a statement should be made that the anonymity of participants will be respected.**

We have outlined in the 'Ethical considerations' section that this study will be conducted in accordance with NUI Galway's University Data Protection Policy and Ireland's General Data Protection Regulation (GDPR). However, we acknowledge that more specific information is needed regarding storage, security and access of data, as well as participant anonymity. We have added information to reflect this.

Competing Interests: The authors declare no competing interests.

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Karl -Christian Thies 

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The authors present a study protocol, which describes a consensus process to agree on key data to collect from CFR systems and to identify barriers and facilitators to data collection. The project proposed is relevant. As the authors correctly state, data on CFR systems are scarce; recent studies on CFR systems are difficult to compare with each other because of the lack of any specific reporting standards. Therefore, it makes sense to prioritise in a first step the parameters that should be investigated.

The suggested consensus process appears to be appropriate, provided the points below are addressed / specified:

- The size of the stakeholder groups is not clear; are there 20 per stakeholder group or are there 20 individuals in total on the panel?
- If there are only 20 individuals on the panel, the patient and family perspective would be underrepresented, because the view of survivors and their families as well as the view of non-survivor families should be paramount in this process.
- How do you select the stakeholders?

- How do you ensure that long term outcome data are included into your data set?
- Do you intend to link the data to your national cardiac arrest registry?

Is the rationale for, and objectives of, the study clearly described?

Yes

Is the study design appropriate for the research question?

Partly

Are sufficient details of the methods provided to allow replication by others?

Yes

Are the datasets clearly presented in a useable and accessible format?

Not applicable

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Cardiac Arrest, First Responder Systems

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Author Response 20 Nov 2021

Dylan Keegan, National University of Ireland, Galway, Galway, Ireland

We thank the reviewer for their careful and constructive consideration of our protocol which has allowed us to make some improvements. We have addressed each of their comments below.

- **The size of the stakeholder groups is not clear; are there 20 per stake holder group or are there 20 individuals in total on the panel?**

The maximum sample size is 20 individuals in total for the panel. Previous nominal group technique (NGT) research has a range of sample sizes from 2 – 14 participants^{14,16}, with some research including larger sample sizes (24 participants)¹⁹. To ensure adequate representation for each of our stakeholder groups we have opted for a larger sample size of 20 participants. The Participants and recruitment section has been revised to more clearly state this.

- **If there are only 20 individuals on the panel, the patient and family perspective would be underrepresented, because the view of survivors and their families as well as the view of non-survivor families should be paramount in this process.**

We agree that ensuring the patient and family perspective is appropriately represented is essential and have taken this into consideration in planning the consensus process. We have updated the Participants and recruitment section to reflect this.

- **How do you select the stakeholders?**

A purposeful sampling strategy will be used to select representatives from various

stakeholder groups. Peer consultation will be employed by the research team and the Scientific Advisory Group associated with this study to identify suitable participants from each stakeholder group who have relevant experience and expertise. We have now included this point in the Participants and recruitment section.

- **How do you ensure that long term outcome data are included into your data set?**

We have now addressed this point in the Design section and the Discussion section of the protocol. When asking participants for suggestions in the online survey and consensus process, we will not specify a short or long term timeframe for the outcome data, as such there will be an open timeframe. This is because the nominal group technique requires that data generation and prioritization is participant-driven, rather than researcher-driven, such that it is the stakeholders who create and determine the priorities for data collection and use. We recognize that long term outcome data are important but that there is a risk that they may not be identified as a priority by the stakeholders. However, the purposeful sampling strategy of this study means that a range of participants with diverse expertise will be recruited, including researchers, clinicians, and patients/families. It is anticipated that the diversity of the sample will help to ensure that all key perspectives are represented and that a wide array of priorities are generated, including priorities related to both short and long term outcome data.

- **Do you intend to link the data to your national cardiac arrest registry?**

Yes, the data collected will be included in the National Out-of-hospital cardiac arrest register (OHCAR) and in the OHCAR annual report. This has now been outlined in the Plans for dissemination section and in the Discussion section.

Competing Interests: The authors declare no competing interests.