PEER REVIEW HISTORY

BMJ Open publishes all reviews undertaken for accepted manuscripts. Reviewers are asked to complete a checklist review form (**http://bmjopen.bmj.com/site/about/resources/checklist.pdf**) and are provided with free text boxes to elaborate on their assessment. These free text comments are reproduced below.

ARTICLE DETAILS

TITLE (PROVISIONAL)	Establishing the Aus-ROC Australian and New Zealand Out-of-hospital Cardiac Arrest Epistry
AUTHORS	Beck, Ben; Bray, Janet; Smith, Karen; Walker, Tony; Grantham, Hugh; Hein, Cindy; Thorrowgood, Melanie; Smith, Anthony; Smith, Tony; Dicker, Bridget; Swain, Andy; Bailey, Mark; Bosley, Emma; Pemberton, Katherine; Cameron, Peter; Nichol, Graham; Finn, Judith

VERSION 1 - REVIEW

REVIEWER	Gavin Perkins University of Warwick I am a member of the steering committee for Aus-ROC
REVIEW RETURNED	15-Jan-2016

GENERAL COMMENTS	This is a clear and concise protocol paper summarising the AusROC Epistry It covers most the key points about the design and set up for the registry Some areas where additional clarification might be helpful We recently published the UK registry protocol in BMJ open. Our article refers to some of the potential sources of variation in outcome e.g. data. I wonder if it is worth considering how these are addressed in the AusROC registry e.g. what are the case ascertainment and outcome verification processes - are they the same between services. Are there any data quality checks? Are there any plans to tackle specific research questions or areas of research - if so, this might make an interesting table or paragraph in the discussion

REVIEWER	Takashi Nagta Faculty of Medical Sciences, Department of Advanced Medical Initiatives, Kyushu University, Fukuoka, Japan
REVIEW RETURNED	19-Jan-2016

GENERAL COMMENTS	Thank you for the opportunity of reviewing the manuscript titled "Establishing the Aus-ROC Australian and New Zealand Out of-hospital Cardiac Arrest Epistry."

	It was a well described manuscript about the newly established cohort for out-of-hospital cardiac arrest in Australia and New Zealand. For clarification, several minor revisions are required to improve the quality of the draft. Hopefully, these comments enlisted below will be helpful for the authors. Page 6 of 17. The authors described the overview of the regions which participate in the Aus-ROC Epistry. However, further explanation about the demographic/socio-economic characteristics about the regions is suitable for international audience. Also, ambulance system of Australia and New Zealand should be described, because the outcome of OHCA is strongly influenced with prehospital care. Is it because of variation among participants from different regions? Page 7 of 17. Please explain the reason why 37% of the Australian population is not covered. Page 7 of 17. The primary and secondary outcome are defined as survival to hospital discharge and ROSC in the Aus-ROC Epistry, although the authors figured out in the manuscript that neurological outcome and long-term quality of life measurement should be used. The authors should describe the reasons why survival to hospital discharge and ROSC are selected. Page 8 of 17. There are several issues in the Table 2. Regarding Case overview, what does “X” and “Y” means? Regarding Treatment, how about epinephrine or other medication use? Page 8 of 17. The OHCA data are usually extracted from ambulance and hospital data. Are these paper-based or electrical? This is important to understand the challenge of data capture and control.

REVIEWER	H Soeholm Department of Cardiology, Copenhagen University Hospital Rigshospitalet, Denmark
REVIEW RETURNED	24-Jan-2016

GENERAL COMMENTS	Review ”Establishing the Aus-ROC Australian and New Zealand Out of-hospital Cardiac Arrest Epistry” for BMJ Open Thank for a well-written manuscript covering an epidemiological area of the subject out-of-hospital cardiac arrest. I would like to congratulate the authors, who have done a great job merging the OHCA-databases to enable quality assessment and possible improvement in survival after OHCA in the two regions. I am personally looking forward to reading manuscripts of this large cohort in the future. General comments: Please use past tense throughout the manuscript. Patients “were” enrolled not “is” for example.

	Please specify reasons for not including the complete Australian population, is there any selection bias? Specific comments: Abstract: Please specify the inclusion years. Methods: Inclusion criteria should include the definition of OHCA. Is the personal of the ambulance able to declare a person dead or is all dead patients categorized as OHCA? Were there any ambulances with attending physicians? Or is all ambulances organized with paramedics? This should be more clearly described in the method section. Discussion: Do you have any data covering socioeconomic status and rural/urban population other than transport distances? This could be interesting data to include in my opinion.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1

This is a clear and concise protocol paper summarising the AusROC Epistry.
It covers most the key points about the design and set up for the registry.
Some areas where additional clarification might be helpful
1. We recently published the UK registry protocol in BMJ open. Our article refers to some of the potential sources of variation in outcome e.g. data. I wonder if it is worth considering how these are addressed in the AusROC registry e.g. what are the case ascertainment and outcome verification processes - are they the same between services. Are there any data quality checks?

To provide information about the case capture and outcome verification process, we have added the following to the Methods under the heading of “Data capture”:

“Capture of OHCA cases varies between ambulance services. A combination of electronic queries of patient care records (PCRs), manual sorting through PCRs, staff standardised reporting and dispatch codes are used to identify OHCA cases. For those ambulance services that use electronic queries, subsequent manual searches are conducted by all services to maximise case capture. Hospital outcomes data is commonly obtained through linkage with hospital records and state-based death registries. In one region, hospital outcomes are obtained through linkage with the state Department of Health data.”

2. Are there any plans to tackle specific research questions or areas of research - if so, this might make an interesting table or paragraph in the discussion

We have edited the second paragraph of the discussion to include a number of research questions addressed by other multi-centre cardiac arrest registries that we aim to address using data from the Aus-ROC Epistry. The relevant text reads as follows:

“For example, other multi-centre cardiac arrest registries have investigated regional variation in: the incidence and outcomes of OHCA,20,23,24 temporal trends in survival,6 rates of bystander CPR,25 treatment and transport practices,7 and the association between receiving hospital characteristics and survival.26 The Epistry will serve as a framework to address similar questions and identify factors

associated with regional variation in survival."

Reviewer: 2

Thank you for the opportunity of reviewing the manuscript titled "Establishing the Aus-ROC Australian and New Zealand Out of-hospital Cardiac Arrest Epistry."
It was a well described manuscript about the newly established cohort for out-of-hospital cardiac arrest in Australia and New Zealand. For clarification, several minor revisions are required to improve the quality of the draft. Hopefully, these comments enlisted below will be helpful for the authors.

3. Page 6 of 17: The authors described the overview of the regions which participate in the Aus-ROC Epistry. However, further explanation about the demographic/socio-economic characteristics about the regions is suitable for international audience. Also, ambulance system of Australia and New Zealand should be described, because the outcome of OHCA is strongly influenced with prehospital care. Is it because of variation among participants from different regions?

Thank you for this suggestion. We have now included demographic and socioeconomic characteristics of the regions within Australia and New Zealand (Appendix 2 and Appendix 3). The included text in the Methods reads as follows:

"Demographic and socioeconomic characteristics of each of the regions in Australia and New Zealand are shown in Appendix 2 and Appendix 3, respectively. Australian regions participating in the Epistry demonstrated similar characteristics to those of the broader Australian population. While some regions not currently participating in the Epistry demonstrated variations in the proportion of the population who were Aboriginal and Torres Strait Island peoples and those living in 'major cities', these regions (Australian Capital Territory, Northern Territory and Tasmania) had small total populations that reflected a combined 4.9% of the Australian population.
Differences in the classification of geographical regions did not facilitate comparisons between Australia and New Zealand. Alternate metrics may be required when making comparisons of rurality between the two countries."

We agree that the ambulance systems of Australia and New Zealand should be described – we are currently surveying each of the ambulance services about their structure, treatment of OHCA and management of their cardiac arrest registries. We hope to publish these results soon.

4. Page 7 of 17: Please explain the reason why 37% of the Australian population is not covered.

We have provided clarification in the last paragraph of the discussion:

"While four Australian ambulance services not currently participating in the Epistry have been invited to contribute data (NSW Ambulance, St John Ambulance Northern Territory, ACT Ambulance, Ambulance Tasmania), these service-based OHCA registries are in various stages of development. It is hoped that these registries will be able to contribute data in the future and thus the Epistry will capture the prevalence of OHCA in the entire Australian population – as is currently possible for New Zealand."

5. Page 7 of 17: The primary and secondary outcome are defined as survival to hospital discharge and ROSC in the Aus-ROC Epistry, although the authors figured out in the manuscript that neurological outcome and long-term quality of life measurement should be used. The authors should describe the reasons why survival to hospital discharge and ROSC are selected.

While we recognise that neurological outcome and long-term quality of life measurements are

important patient-centred outcomes, they are not presently collected across all sites in the Epistry. We have used 'ROSC' and 'survival to discharge' as key outcome measures in the Epistry as they are considered 'core' outcomes according to the Utstein template. We have added the following sentence in the Methods to clarify this:

"These measures are considered 'core' outcomes according to the Utstein template.17"

In addition, we have also clarified the importance of neurological outcome and long-term quality of life measurements; the edited text reads as follows:

"While neurological outcome and long-term quality of life measurements are important patient-centred outcomes, they are not presently collected across all sites, and thus these measures are not currently included in the Epistry."

6. Page 8 of 17: There are several issues in the Table 2.
a. Regarding Case overview, what does "X" and "Y" means?

We have edited these variables to read as "Longitude coordinate of event" and "Latitude coordinate of event".

b. Regarding Treatment, how about epinephrine or other medication use?

Similar to neurological outcomes and long term quality of life, medication usage is not collected by all sites in the Aus-ROC Epistry. Additional information on resuscitation practices and interventions will faciliate understanding treatment factors associated with survival from OHCA. To clarify, we have added the following in the last paragraph of the discussion:
"However, it is hoped that over time, all participating sites will be able to collect additional variables, such as 'neurological outcome' and other resuscitation practices and interventions"

7. Page 8 of 17: The OHCA data are usually extracted from ambulance and hospital data. Are these paper-based or electrical? This is important to understand the challenge of data capture and control.

To address this comment (and comment #1 from Reviewer 1), we have added the following paragraph to the Methods under the heading of "Data capture":

"Capture of OHCA cases varies between ambulance services. A combination of electronic queries of patient care records (PCRs), manual sorting through PCRs, staff standardised reporting and dispatch codes are used to identify OHCA cases. For those ambulance services that use electronic queries, subsequent manual searches are conducted by all services to maximise case capture. Hospital outcome data is commonly achieved through linkage with hospital records and state-based death registries. In one region, hospital outcome are obtained through linkage with the state Department of Health data."

Reviewer: 3

Thank for a well-written manuscript covering an epidemiological area of the subject out-of-hospital cardiac arrest. I would like to congratulate the authors, who have done a great job merging the OHCA-databases to enable quality assessment and possible improvement in survival after OHCA in the two regions. I am personally looking forward to reading manuscripts of this large cohort in the future.
General comments:

8. Please use past tense throughout the manuscript. Patients “were” enrolled not “is” for example.

As patients are still being enrolled in the Epistry, we feel that the use of the present tense is appropriate. The use of the present tense is common in protocol papers. For example:

Perkins, Gavin D., et al. "The UK Out of Hospital Cardiac Arrest Outcome (OHCAO) project." BMJ open 5.10 (2015): e008736.

Therefore, no changes have been made.

9. Please specify reasons for not including the complete Australian population, is there any selection bias?

Please see response to comment #4 (Reviewer 2). Additionally, in response to this comment, comment #12 (Reviewer 3) and comment #3 (Reviewer 2), we have included demographic and socioeconomic characteristics of Australian and New Zealand regions, with specific comparisons made between those Australian regions participating and those not participating. Please see our response to comment #3 from Reviewer 2 for further information.

Specific comments:

10. Abstract: Please specify the inclusion years.

We have added the following sentence in the Abstract and in the Methods:

“Data collection commenced in 2014.”

11. Methods: Inclusion criteria should include the definition of OHCA. Is the personal of the ambulance able to declare a person dead or is all dead patients categorized as OHCA? Were there any ambulances with attending physicians? Or is all ambulances organized with paramedics? This should be more clearly described in the method section.

To clarify about whether dead patients are categorised as OHCA, we have added the following to the Methods:
“All deaths attended by ambulance are classified as OHCA and thus included in the Epistry.”
In terms of the structure of ambulances in the Epistry, we are currently surveying each of the ambulance services about their structure, treatment of OHCA and data management. We plan to publish this data shortly.

12. Discussion: Do you have any data covering socioeconomic status and rural/urban population other than transport distances? This could be interesting data to include in my opinion.

Please see responses to comment #3 (Reviewer 2) and comment #9 (Reviewer 3).