

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)	Development of Indicators for Avoidable Emergency Medical Service Calls by Mapping Paramedic Clinical Impression Codes to Ambulatory Care Sensitive Conditions and Mental Health Conditions in the UK and Canada
AUTHORS	Agarwal, Gina; Siriwardena, Aloysius; McLeod, Brent; Spaight, Robert; Whitley, Gregory; Ferron, Richard; Pirrie, Melissa; Angeles, Ricardo; Moore, Harriet; Gussy, Mark; Consortium, EDGE

VERSION 1 – REVIEW

REVIEWER	Morten Søvsø Aalborg University Hospital, Centre for Prehospital & Emergency Research
REVIEW RETURNED	01-Jun-2023

GENERAL COMMENTS	<p>Thank you for the opportunity to review this paper addressing the use of prehospital data to better understand patient pathways. I commend the author on the choice of topic and their work with this data.</p> <p>I do however have some minor comments, I believe needs clarification before publication.</p> <p>In general, the paper is well-written and the method and process of what has been done is easy to follow. My main concern is the description of the ACSC concept.</p> <p>I understand the definition referenced: Age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to hospital, per 100,000 population younger than age 75.</p> <p>Yet, I would like a more balanced discussion of the concept, both in the introduction and in the discussion. In my opinion, the conditions listed as ACSC do contain both conditions that can be prevented and conditions, that cannot e.g. diabetic complication could be sores (with or without infection) due to poor blood glucose management. But it could also be diabetic ketoacidosis perhaps due to infection, which is very difficult to prevent. Almost all of the ACSC listed contain similar examples, and I am missing this discussion.</p> <p>Other than that, the utilisation of this data in such a novel way, creates great potential for future studies.</p>
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REVIEWER	Martina Schmiedhofer Charité Universitätsmedizin Berlin, Emergency and Acute Medicine
REVIEW RETURNED	08-Sep-2023

GENERAL COMMENTS	<p>Thank you for the opportunity to review this well-written paper. The aim of the study was to compare the clinical impressions of paramedics related to ACSC and mental conditions between two countries by analyzing secondary data. The results are intended to serve as a data base for international comparative research on the reduction of emergency department visits due to ACSC. The expertise and experience of paramedics deserve attention when providing comprehensive information about patients' health status. Using this initial assessment as a basis for accurate classification of ACSC is a promising approach. In addition, including mental conditions as preventable hospitalizations is useful for developing prevention strategies.</p> <p>To further improve the manuscript, some issues should be addressed:</p> <p>Research on ACSC began decades ago, and many efforts have been made to systematize and define patients' complaints and symptoms in terms of potential hospitalization avoidance through improved outpatient care. With this in mind, the definition of ACSC should not only be taken from two national registries but also discussed in the context of international research and evaluation, focusing on the avoidance of emergency department use. The literature on cross-national comparison should also be integrated into the discussion section. (For example: https://doi.org/10.1016/j.hpopen.2021.100030; https://doi.org/10.1370/afm.1498; doi:10.1136/bmjopen-2017-016109; https://doi.org/10.1186/s12913-020-05620-9).</p> <p>The data retrieved from the recording systems and the extracted clinical data are described in detail. To provide information on the dimension of the data sources, the time of retrieval and the respective number of patients per year should be added. In addition, for international readers who are not from Canada or the United Kingdom, it would be of interest to know how and by whom the paramedical impression codes are created and monitored. This information could also give an indication of the varying breadth of the codes in the two countries.</p>
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VERSION 1 – AUTHOR RESPONSE

Response 1:

We have revised the title to include these three items:

- Research question: Mapping Paramedic Clinical Impression Codes to Ambulatory Care Sensitive Conditions and Mental Health Conditions in the UK and Canada
- Design: Mapping
- Setting: UK and Canada

New title: Development of Indicators for Avoidable Emergency Medical Service Calls by Mapping Paramedic Clinical Impression Codes to Ambulatory Care Sensitive Conditions and Mental Health Conditions in the UK and Canada

Item 2: Please remove the 'What the study adds', 'What is already known on this topic' and 'How this study might affect research, practice or policy' sections

Response 2:

Thank you for this suggestion - we have removed these sections.

Item 3: In the ethics approval section, please explain why ethical approval was not required.

Response 3:

Ethical approval was not required since there were no human participants and no patient data reviewed in the methodology of this paper. We have revised the ethical approval statement accordingly.

REVIEWER 1

Thank you for the opportunity to review this paper addressing the use of prehospital data to better understand patient pathways. I commend the author on the choice of topic and their work with this data.

I do however have some minor comments, I believe needs clarification before publication.

In general, the paper is well-written and the method and process of what has been done is easy to follow.

Item 1: My main concern is the description of the ACSC concept.

I understand the definition referenced: Age-standardized acute care hospitalization rate for conditions where appropriate ambulatory care prevents or reduces the need for admission to hospital, per 100,000 population younger than age 75.

Yet, I would like a more balanced discussion of the concept, both in the introduction and in the discussion. In my opinion, the conditions listed as ACSC do contain both conditions that can be prevented and conditions, that cannot e.g. diabetic complication could be sores (with or without infection) due to poor blood glucose management. But it could also be diabetic ketoacidosis perhaps due to infection, which is very difficult to prevent.

Almost all of the ACSC listed contain similar examples, and I am missing this discussion.

Other than that, the utilisation of this data in such a novel way, creates great potential for future studies.

Response 1:

Thank you for your comments which will help enrich this paper.

We have added statements in the introduction and discussion to reflect this idea.

Introduction: "While there are some ACSC complications that cannot be prevented, in the majority of cases they can usually be successfully managed within the community; however, ACSCs are still placing significant demand on hospitals."

Discussion (limitations): "We also acknowledge that not all ACSCs require solely community healthcare access in order to avoid hospitalisation. Some chronic disease complications simply cannot be prevented upstream and will need emergency department access and pre hospital care in certain specific situations. However, in the field of pre-hospital care, the concept of ACSCs provides a relevant and interesting benchmark from which to launch enquiry into our practices of care and as such, is a suitable indicator."

REVIEWER 2

Thank you for the opportunity to review this well-written paper. The aim of the study was to compare the clinical impressions of paramedics related to ACSC and mental conditions between two countries by analyzing secondary data. The results are intended to serve as a data base for international comparative research on the reduction of emergency department visits due to ACSC. The expertise and experience of paramedics deserve attention when providing comprehensive information about patients' health status. Using this initial assessment as a basis for accurate classification of ACSC is a promising approach. In addition, including mental conditions as preventable hospitalizations is useful for developing prevention strategies.

To further improve the manuscript, some issues should be addressed:

Item 1:

Research on ACSC began decades ago, and many efforts have been made to systematize and define patients' complaints and symptoms in terms of potential hospitalization avoidance through improved outpatient care. With this in mind, the definition of ACSC should not only be taken from two national registries but also discussed in the context of international research and evaluation, focusing

on the avoidance of emergency department use. The literature on cross-national comparison should also be integrated into the discussion section.

(For example: <https://doi.org/10.1016/j.hopen.2021.100030>; <https://doi.org/10.1370/afm.1498>; doi:10.1136/bmjopen-2017-016109; <https://doi.org/10.1186/s12913-020-05620-9>).

Response 1:

Thank you for this thoughtful feedback about the broader international context and research on ACSCs. We have added a paragraph to the discussion on this topic, including some of the references you have provided:

“Inter-country comparison of ACSCs has occurred though focussing on the reduction of hospitalisations for these conditions.[32-33] However, this work has not used ambulance call data, which remains methodologically novel. The existing research literature has highlighted the importance of making appropriate comparisons, and ensuring that the ACSCs selected for study are appropriate for the demographics, epidemiological profile and primary care practices across countries, and that they are similar.[32] This paper has followed this caveat, as it is comparing similar countries that have similar ACSCs, and this work is designed to ensure future comparative inter-country work will be truly comparable due to the mapping work we have done.”

Item 2: The data retrieved from the recording systems and the extracted clinical data are described in detail. To provide information on the dimension of the data sources, the time of retrieval and the respective number of patients per year should be added. In addition, for international readers who are not from Canada or the United Kingdom, it would be of interest to know how and by whom the paramedical impression codes are created and monitored. This information could also give an indication of the varying breadth of the codes in the two countries.

Response 2:

In the methods, we have further described the “dimension of the data sources” for the ambulance call reports where the clinical impression codes are documented:

“In both settings, these codes are from a pre-determined list provided by the respective governing bodies and are entered into a structured form. Though paramedics can choose which code to enter, they cannot change the actual codes themselves, and other areas of ambulance electronic health records may allow notations.”

In the methods, we have also elaborated on the organizations that created and monitor the impression codes:

“Phase 2: The clinical impression codes common to all Ontario paramedic services were obtained from the Ontario Ministry of Health and Long-Term Care (a provincial governmental body) manual for completing ambulance call reports, under the heading ‘problem codes’.[3] This ministry is responsible for ongoing review and updating of the clinical codes. For the UK, the list of clinical impression codes were obtained from the East Midlands Ambulance Service (a regional institutional body) electronic

patient report template within the Medusa electronic medical record platform. These UK codes are used nationally and were developed by a multi-disciplinary panel of NHS clinicians.[30] These codes, both in Ontario and the UK, provide a common structure for clinicians to use within an ambulance electronic health record despite the multiple different care settings and contexts.”

In the course of writing this paper, we did not pull any ambulance service data therefore we are not able to provide comparisons between the two countries regarding numbers of individuals with these conditions. That would fall under the scope of a future publication.

VERSION 2 – REVIEW

REVIEWER	Morten Søvsø Aalborg University Hospital, Centre for Prehospital & Emergency Research
REVIEW RETURNED	24-Oct-2023
GENERAL COMMENTS	I would like to congratulate the authors on the revision of this paper, which I believe is now suitable for publication.
REVIEWER	Martina Schmiedhofer Charité Universitätsmedizin Berlin, Emergency and Acute Medicine
REVIEW RETURNED	20-Oct-2023
GENERAL COMMENTS	All the requests from the review Report are adressed.