PEER REVIEW HISTORY

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ARTICLE DETAILS

TITLE (PROVISIONAL)	Emergency Medical Services and Palliative Care: A Scoping Review
AUTHORS	Gage, Caleb; Stander, Charnelle; Gwyther, Liz; Stassen, Willem

VERSION 1 – REVIEW

REVIEWER	Carter, Alix Dalhousie University
REVIEW RETURNED	10-Jan-2023

GENERAL COMMENTS	Thank you for the opportunity to provide feedback on this excellent review. I have a few very minor suggestions. 1. it may help the reader if you clearly state your question or objective at the end of your background/introduction. You state it more clearly in the methods section when you describe which papers are eligible, but it would be nice to see it round out the introduction and set the stage. 2. The methods are well described. It is always a challenge when you have already published the protocol, but I think you have struck the right balance between this paper standing alone, and repeating the protocol here. 3. A very unique contribution of this paper is the perspective on EMS and palliative care in LMIC. I would suggest a) (assuming that this was a priori something you wanted to look at) state in your methods that this was part of your question, b)lay out the results to highlight these findings, and also c) in the abstract, the first mention of LMIC is in the conclusion, it should be introduced sooner. 4. Regarding the discussion, it is well laid out in terms of a summary of your findings and then situating in the published literature, then providing clinical and research implications. However, the focus of the discussion is very much on the LMIC context, and the 4 domains identified in the results section don't really feature. I think you could structure the discussion to highlight what is known about each of the domains, and then weave in the differences/similarities with LMIC- and as stated above, if this was a priori part of your question, it should be articulated in the objective and methods. I agree it is an important finding to highlight and discuss, it's more that the discussion and conclusion need to align with your question and results. 5. The references appear to be complete and up to date. Overall a well done review, great job screening through so many papers.

REVIEWER	Hancock, Sophie.
REVIEW RETURNED	22-Jan-2023

GENERAL COMMENTS	Thank you for asking me to review this interesting manuscript regarding the existing literature for emergency medical services and

	palliative care. This is clearly an important topic and the paper has many strengths, however there are several areas which would need to be addressed. Introduction- the introduction in your published protocol is much easier to follow and succinctly sets out the definition of palliative care and the potential integration with EMS- this hasn't translated in to this manuscript and is therefore lacking sufficient detail in background to your study when reading the rest of the paper. You mention reference no 11- Juhrmann ML, Vandersman P, Butow PN, Clayton JM. Paramedics delivering palliative and end-of-life care in community-based settings: A systematic integrative review with thematic synthesis. Palliat Med. 2021;1-17- I am interested as to how your paper is different from this review? There needs to be much more detail on what the aim of this paper is- what are you actually looking at and why? Method- I note 'in hospital setting' is an exclusion criteria- so what is the setting? Patient residence? If this is emergency services provided in the community, I would again ask how this review is distinct from ref 11 mentioned above. How are you defining EMS? how is palliative care being defined- patients with pre-existing life limiting conditions or other end of life situations? How were the topics for your data extraction table decided on? I note the a priori search strategy which you discuss in your protocol for defining search terms but not for data mined from the papers. you mention descriptive content analysis- this requires referencing and more detail. Why was risk of bias not conducted? E.g reference 35 is a case study of one patient. Results- information regarding the setting of patients should be included. Again, I would ask how palliative care is being defined for the purposes of this paper? Reference 37 is a paper regarding patients with intellectual disability- this would not normally be defined as a palliative care diagnosis in its own right. Decreased healthcare cost is discussed- was this measured? Are there any data or analysis of this? Discussion- your primary research question is "what literature exists concerning EMS and palliative care?" but this doesn't really seem to be the focus of the paper. You devote a lot of the discussion to LMIC but I am uncertain as to where this focus has come from? If this is a research question, it needs to be detailed in the background so it is clear to the reader why this is being discussed in depth- it seems to come from nowhere as the paper stands. The paper is written coherently and the figure, tables and references appear to be accurate. However, there are significant issues with the description of methodology and how the results are reported as I have detailed above.

REVIEWER	Cameron , Cheryl Monash University
REVIEW RETURNED	27-Jan-2023

GENERAL COMMENTS	Thank you for the opportunity to review this manuscript. Summary This scoping review set out to map the literature related to EMS and palliative care and follows a standardized framework (PRISMA-ScR) checklist. The protocol for this review was previously accepted for

	publication. This research is important for the profession and currently very contextually relevant. The manuscript will add value to the literature in both paramedicine and healthcare in general. Some revisions noted below will add to the rigor of the publication and impact for the reader. Ethics approval was not needed for this piece of work. Opportunities for Improvement • The methods section of the manuscript is light. Although the study protocol has been published previously, this manuscript needs to stand on effectively on its own. o Of note, the research questions for the study are not included in this manuscript, which doesn't orientate the reader well to what is to come, the purpose of the study, or allow the reader to see if the research questions were addressed in the review. I would suggest pulling forward the research questions from the study protocol, to this manuscript (note that this recommendation is in alignment with the expectations of the PRISMA-ScR checklist which specifically identify that an explicit statement of the questions AND objectives should be present). o Additionally, I would suggest pulling forward the brief summary of Arkeys and O'Malley's five steps that were followed in the review – this clearly identifies the methodology/framework of the review for the reader. The methodology is presented in a cleaner way in the protocol publication (headings that align to the methods). This structure could be considered in the review publication as it adds clarity for the reader and steps you through the methods/process/framework that was used to conduct the review. • Additional clarity is needed around the inclusion or role of "relevant grey literature" in this review in both the methods and results sections – I did not see any grey literature make the inclusion criteria (n=56) and there is no discussion in the results. According to the PRISMA diagram, there were n=0 pieces from additional sources identified that were even screened (was everything on google scholar a duplicate of a record in the database, as a significant number of publications/resources do populate from google scholar on this topic). Given the inclusion criteria for peer review is empirical studies and exclusion criteria of commentary and descriptive pieces – it's unclear what "relevant grey literature" was or could have been included (what was found when searching), how the grey literature search was conducted (key words, etc.) and what determination was used for "relevant". Clarity here is needed. • Consider adding a citation for the dichotomy of paramedic-led (Anglo-American), physician-led (Franco-German) - for those not from the profession, this dichotomy may not be clear (does not need to be explained any further in the paper, but I think a reference would be appropriate/needed here) - page 7 • Consider the use of the word burden (page 15) in relation to palliative care case load for EMS – while I appreciate this term can be neutral (ie: what is the caseload/impact on EMS services), it usually comes across as negative or "extra"/"on top of" – wonder if

	this could be adjusted to “scope” or just “number” or “impact” or something more neutral to avoid imparting any negative connotations/assumptions that patients with palliative care needs are a “burdon” on emergency services, EDs or the broader healthcare system in general – I think it’s important for us as advocates for palliative care within our own professional circles and literature, to ensure we are not instilling any stigma, myths or wrong assumptions about palliative care (as we know, there is already an uphill battle in healthcare around awareness and understanding of what palliative care actually is). Thank you for the opportunity to review your work. I hope my comments are clear and constructive.

VERSION 1 – AUTHOR RESPONSE

Reviewer: 1
Dr. Alix Carter, Dalhousie University

Comments to the Author:
Thank you for the opportunity to provide feedback on this excellent review. I have a few very minor suggestions.
- Thank you, Dr. Carter.

1. it may help the reader if you clearly state your question or objective at the end of your background/introduction. You state it more clearly in the methods section when you describe which papers are eligible, but it would be nice to see it round out the introduction and set the stage.
- The primary research question, as well as sub-questions from the protocol have been included at the end of the introduction.

2. The methods are well described. It is always a challenge when you have already published the protocol, but I think you have struck the right balance between this paper standing alone, and repeating the protocol here.
- Thank you, Dr. Carter. As per other reviewer comments we have, nevertheless, included further methodological detail for clarity. We trust this balance is maintained.

3. A very unique contribution of this paper is the perspective on EMS and palliative care in LMIC. I would suggest a) (assuming that this was a priori something you wanted to look at) state in your methods that this was part of your question, b)lay out the results to highlight these findings, and also c) in the abstract, the first mention of LMIC is in the conclusion, it should be introduced sooner.
- a) Thank you for highlighting this Dr. Carter. We failed to make this explicit in the paper by using the more vague term ‘setting’ as a point of data extraction. In the Methods section we have now clarified this by adding country income status as a specific point of data extraction under the Data Extraction and Analysis heading. We have also updated the summary table to include HIC and LMIC. b) The finding of LMIC vs HIC literature has now been included in the results section. c) With the new layout of the abstract according to the editor’s comments, we have removed the term LMIC and replaced it with ‘various contexts’ as including the LMIC concept in the results section of the abstract no longer appears to fit.

4. Regarding the discussion, it is well laid out in terms of a summary of your findings and then

situating in the published literature, then providing clinical and research implications. However, the focus of the discussion is very much on the LMIC context, and the 4 domains identified in the results section don't really feature. I think you could structure the discussion to highlight what is known about each of the domains, and then weave in the differences/similarities with LMIC- and as stated above, if this was a priori part of your question, it should be articulated in the objective and methods. I agree it is an important finding to highlight and discuss, it's more that the discussion and conclusion need to align with your question and results.
- To improve the coherence of the paper we have now added the HIC vs. LMIC variable into the methods and results sections as well as the summary table. Furthermore, we have also reworked the LMIC section in the discussion so it is more concise and balanced with the rest of the discussion.
- In keeping with the significance of the finding, rather than weaving the LMIC concept into the discussion, we would like it to remain a distinctly strong point. Up to 80% of patients with palliative needs reside in LMICs and yet palliative services there are either non-existent or in their infancy. In terms of the EMS, which may be a valuable tool in improved palliative care provision, the fact that only two such EMS palliative care LMIC articles exist is, in our opinion, significant and worthy of proportionate focus.
- While we have not necessarily structured the discussion according to the 4 domains identified, we have attempted to weave them into the discussion naturally and each element is present. Concurrently we attempted to highlight important findings and discuss the research questions without simply repeating the results section. With the changes made to the introduction, methods, results and discussion we have attempted to improve the coherence of the review.

5. The references appear to be complete and up to date. Overall a well done review, great job screening through so many papers.

- Thank you, Dr. Carter. We realise it would have also taken much time to review this submission and we are very grateful for your willingness.

Reviewer: 2
Dr. Sophie. Hancock

Comments to the Author:
Thank you for asking me to review this interesting manuscript regarding the existing literature for emergency medical services and palliative care. This is clearly an important topic and the paper has many strengths, however there are several areas which would need to be addressed.

- Thank you, Dr. Hancock.
Introduction- the introduction in your published protocol is much easier to follow and succinctly sets out the definition of palliative care and the potential integration with EMS- this hasn't translated in to this manuscript and is therefore lacking sufficient detail in background to your study when reading the rest of the paper.
- We have sought to add further detail to the introduction to set the stage more adequately. Each element highlighted in the protocol introduction is now highlighted here, although in slightly different order as we did not wish to simply copy the protocol introduction. We have also added palliative care, EMS and out-of-hospital definitions to the introduction. Furthermore, we have included more detail on the aim of the study by concluding the section with the primary research question and sub-questions.
You mention reference no 11- Juhrmann ML, Vandersman P, Butow PN, Clayton JM. Paramedics delivering palliative and end-of-life care in community-based settings: A systematic integrative review with thematic synthesis. Palliat Med. 2021;1-17- I am interested as to how your paper is different from this review? There needs to be much more detail on what the aim of this paper is- what are you actually looking at and why?
- Our review differs from that of Juhrmann, et al. in four primary areas which results in a significant

variance in the breadth of these two studies.
1) The setting of Juhrmann, et al. is narrower, involving only patient residence. Our setting is the out-of-hospital setting in its entirety which includes patient residence, interfacility patient transfers and any space to which EMS may be called.
2) Jurhmann, et al. were focussed on specialist community paramedic roles in palliative care provision. This is a relatively new paramedic speciality within only a handful of EMS systems globally, wherein paramedics provide primary healthcare services, and more recently palliative care, in patient homes in an attempt to avoid unnecessary hospital admissions and clinic visits by patients. This role is distinct from the traditional EMS role of emergency management and conveyance to a medical facility. Our review is inclusive of all EMS roles including new community-based roles and traditional emergency care.
3) Because this is a specialist paramedic role, the review by Juhrmann, et al. focusses primarily on Anglo-American EMS systems which are paramedic-led rather than physician-led as in Franco-German models. While Juhrmann, et al. do include 4 papers from Franco-German models, these papers each include paramedics as part of their sample and often contrast paramedics with the more well-trained EMS physicians. Our review is not primarily focussed on any particular EMS model, but rather EMS systems in general. Thus, we have included papers such as Wiese CHR, Bartels UE, Marczynska K, et al. Quality of out-of-hospital palliative emergency care depends on the expertise of the emergency medical team - a prospective multi-centre analysis. Support Care Cancer. 2009;17:1499–1506 (reference 8) which include only EMS physicians. This was not included by Juhrmann, et al. due to the lack of paramedics in the sample.
4) The methodology, aims and objectives of the two reviews substantially differ. The aim of Juhrmann, et al. was “to systematically synthesise the empirical evidence of palliative paramedicine in community-based settings”; a much narrower aim than ours, which was to “map existing EMS and palliative care literature”. Furthermore, the questions asked by Juhrmann, et al. were very specific to their topic and included current paramedic scope of practice, stakeholder perspectives and barriers. Ours involve literature types, key findings and knowledge gaps. Whereas Juhrmann, et al. performed a specific systematic literature review including 23 studies, we have performed a broad scoping literature review including 56 studies.
- We have attempted to reword the last paragraph of the introduction to provide this detail and clarification. Furthermore, at the end of the introduction we have included our primary research question and sub-questions which may assist towards this detail.
Method- I note 'in hospital setting' is an exclusion criteria- so what is the setting? Patient residence? If this is emergency services provided in the community, I would again ask how this review is distinct from ref 11 mentioned above.
- We have added additional detail concerning the setting in the last paragraph of the introduction to provide clarification. We are focussed on the out-of-hospital setting in its entirety as this is the primary work area for EMS. This includes patient residence, but also any space to which EMS may be called. The review by Juhrmann, et al. was focussed purely on patient residence and home-based care by specialised community paramedics (i.e. community-based setting).

How are you defining EMS? how is palliative care being defined- patients with pre-existing life limiting conditions or other end of life situations?
- Specific definitions of both EMS and palliative care have now been included in the introduction. The definition of palliative care includes both life-limiting conditions and end-of-life situations.

How were the topics for your data extraction table decided on? I note the a priori search strategy which you discuss in your protocol for defining search terms but not for data mined from the papers.
- Under the Data Extraction and Analysis Heading we detail the a priori data extraction matrix used to mine data from the papers. These variables include those common to scoping reviews and in line with the framework (Arksey and O’Malley) we have used to conduct the study (i.e. title, authorship, year of publication, aims, population and sample, methodology, key findings, conclusions and limitations).

EMS palliative care training was added as part of the peer-review process for the scoping review protocol and country income status has now been detailed based upon the current peer-review process.
you mention descriptive content analysis- this requires referencing and more detail.
- Further detail and a reference have been added. The data analysis was performed in line with the recommendations from Arksey and O'Malley's fifth step: (v) collating, summarising and reporting results.
Why was risk of bias not conducted? E.g reference 35 is a case study of one patient.
- Our aim was to simply map what literature currently exists on the topic, thus we chose to employ a scoping review, which typically would not include a risk of bias assessment, rather than a systematic review. This is in line with the framework of Arksey and O'Malley used for this review. That being said, we have highlighted the limitations of the existing studies and noted in the limitations section that the findings must be observed with these in mind. To further emphasize this point we have added the potential risk of bias into the limitations section.
- To provide context, this review is the first step in an overarching PhD Thesis aimed at developing EMS and palliative care in South Africa. Thus, as a starting point, a broad scoping literature review has been performed to identify what work has been previously done before embarking on specifically South African research. Future steps include qualitative studies in which experts will be consulted and their perspectives incorporated. Thus, on a related note, the optional sixth step of expert consultation as defined by Arksey and O'Malley, was likewise not employed and this has been added to the Design section.

Results- information regarding the setting of patients should be included.
- We have added further detail in terms of setting (HIC vs. LMIC) into the results section, however, this has more to do with where the literature derived. As noted in the summary table and results section, the majority of included papers did not involve patients. This is noted as a knowledge gap in the discussion and is a key finding of this review. However, where actual patients with palliative needs formed part of the sample under investigation, their setting is noted in the summary table.
Again, I would ask how palliative care is being defined for the purposes of this paper? Reference 37 is a paper regarding patients with intellectual disability- this would not normally be defined as a palliative care diagnosis in its own right.
- A formal definition of palliative care has now been included in the introduction.
- Reference 37 by McGinley, et al. is indeed a unique paper and we agree intellectual disability does not automatically fall into the palliative care category. However, this paper focussed on those intellectually disabled individuals who were at the end-of-life rather than those with intellectual disabilities in general. More specifically, the paper focussed on advance directives for these individuals and how they affect EMS provider decision-making. The aim of the study was "to describe how medical orders inform EMS providers' decision-making during emergencies involving people with intellectual disabilities who are near life's end…" Thus, given the end-of-life setting and advance directives investigated, the patients of this study appear to be those with both intellectual disability and palliative care needs. As an empirical, English, 2017 study gaining EMS provider perspectives on patients with palliative needs, it meets inclusion criteria for our review.

Decreased healthcare cost is discussed- was this measured? Are there any data or analysis of this?
- In the included literature, decreased healthcare costs were not measured. Rather, this was always discussed theoretically as a potential benefit. When discussing this concept in our paper, we have likewise presented decreased healthcare costs as a potential, theoretical benefit. To further clarify this, we have included the following in the last paragraph of the discussion section: "The potential benefit of decreased healthcare costs remains theoretical and requires investigation."

Discussion- your primary research question is "what literature exists concerning EMS and palliative care?" but this doesn't really seem to be the focus of the paper. You devote a lot of the discussion to

LMIC but I am uncertain as to where this focus has come from? If this is a research question, it needs to be detailed in the background so it is clear to the reader why this is being discussed in depth- it seems to come from nowhere as the paper stands.
- Although we have focussed on the LMIC finding in particular, we believe this to be a crucial finding and our level of focus commensurate with the state of and need for palliative care in LMICs. Up to 80% of patients with palliative needs reside in LMICs and yet palliative services there are either non-existent or in their infancy. In terms of the EMS, which may be a valuable tool in improved palliative care provision, the fact that only two such EMS palliative care LMIC articles exist is, we believe, significant and worthy of proportionate focus.
- We do, however, agree that in its current form, the heavy LMIC discussion may appear to come from nowhere. To correct this and provide coherence we have now added the HIC vs. LMIC variable into the methods and results sections. We have also reworked the LMIC section in the discussion so it is more concise and balanced with the rest of the discussion.

The paper is written coherently and the figure, tables and references appear to be accurate. However, there are significant issues with the description of methodology and how the results are reported as I have detailed above.

- Thank you, Dr. Hancock. We have attempted to improve these descriptions and are thankful for your assistance in improving the overall report and alerting us to areas which, indeed, required clarification.

Reviewer: 3
Ms. Cheryl Cameron, Monash University

Comments to the Author:
Thank you for the opportunity to review this manuscript.
Summary
This scoping review set out to map the literature related to EMS and palliative care and follows a standardized framework (PRISMA-ScR) checklist. The protocol for this review was previously accepted for publication.This research is important for the profession and currently very contextually relevant. The manuscript will add value to the literature in both paramedicine and healthcare in general. Some revisions noted below will add to the rigor of the publication and impact for the reader. Ethics approval was not needed for this piece of work.

- Thank you, Ms. Cameron
Opportunities for Improvement

• The methods section of the manuscript is light. Although the study protocol has been published previously, this manuscript needs to stand on effectively on its own.
o Of note, the research questions for the study are not included in this manuscript, which doesn't orientate the reader well to what is to come, the purpose of the study, or allow the reader to see if the research questions were addressed in the review. I would suggest pulling forward the research questions from the study protocol, to this manuscript (note that this recommendation is in alignment with the expectations of the PRISMA-ScR checklist which specifically identify that an explicit statement of the questions AND objectives should be present).
- We have now included the primary research question and sub-questions from the protocol at the end of the introduction.

o Additionally, I would suggest pulling forward the brief summary of Arkeys and O'Malley's five steps that were followed in the review – this clearly identifies the methodology/framework of the review for the reader. The methodology is presented in a cleaner way in the protocol publication (headings that align to the methods). This structure could be considered in the review publication as it adds clarity for

the reader and steps you through the methods/process/framework that was used to conduct the review.
- The five steps of this methodology have now been included in the Design section of the methodology. We have also included the reasoning behind not employing the optional sixth step to add further weight to the methodological description.

• Additional clarity is needed around the inclusion or role of “relevant grey literature” in this review in both the methods and results sections – I did not see any grey literature make the inclusion criteria (n=56) and there is no discussion in the results. According to the PRISMA diagram, there were n=0 pieces from additional sources identified that were even screened (was everything on google scholar a duplicate of a record in the database, as a significant number of publications/resources do populate from google scholar on this topic). Given the inclusion criteria for peer review is empirical studies and exclusion criteria of commentary and descriptive pieces – it’s unclear what “relevant grey literature” was or could have been included (what was found when searching), how the grey literature search was conducted (key words, etc.) and what determination was used for “relevant”. Clarity here is needed.
- What was meant by “relevant grey literature” was “grey literature fitting inclusion criteria”. We have removed the term “relevant” for the sake of clarity. We have also removed “relevant grey literature” from the inclusion criteria as it is redundant. Furthermore, we have now explicitly stated in the Results section that “no grey literature fitting inclusion criteria was identified”. As you have mentioned, everything we found on Google Scholar was either a duplicate or did not fit inclusion criteria.
- The grey literature search was conducted in the same manner as the other databases. With the above changes being made, this is hopefully clarified in the paper.

• Consider adding a citation for the dichotomy of paramedic-led (Anglo-American), physician-led (Franco-German) - for those not from the profession, this dichotomy may not be clear (does not need to be explained any further in the paper, but I think a reference would be appropriate/needed here) - page 7
- A reference in which the difference is described has been included.

• Consider the use of the word burden (page 15) in relation to palliative care case load for EMS – while I appreciate this term can be neutral (ie: what is the caseload/impact on EMS services), it usually comes across as negative or “extra”/”on top of” – wonder if this could be adjusted to “scope” or just “number” or “impact” or something more neutral to avoid imparting any negative connotations/assumptions that patients with palliative care needs are a “burdon” on emergency services, EDs or the broader healthcare system in general – I think it’s important for us as advocates for palliative care within our own professional circles and literature, to ensure we are not instilling any stigma, myths or wrong assumptions about palliative care (as we know, there is already an uphill battle in healthcare around awareness and understanding of what palliative care actually is).
- This is an important consideration which we failed to contemplate. We have changed the term ‘burden’ to ‘impact’. Thank you for highlighting this.

Thank you for the opportunity to review your work. I hope my comments are clear and constructive.
- Thank you, Ms. Cameron, your comments have indeed been clear, constructive and helpful.

VERSION 2 – REVIEW

REVIEWER	Carter, Alix Dalhousie University
REVIEW RETURNED	16-Feb-2023

GENERAL COMMENTS	This very thorough revision has greatly improved the flow and clarity

	of the paper. Identifying the LMIC question a priori and addressing it throughout as you have has integrated this concept. This also adds a unique contribution to the literature (even beyond the needed review of the whole concept).

REVIEWER	Cameron , Cheryl Monash University
REVIEW RETURNED	18-Feb-2023

GENERAL COMMENTS	Thank you for your detailed response and edits in relation to the comments of the peer review team. My comments from the first round of peer review have been addressed adequately. I briefly reviewed the comments from the other peer reviewers, the responses from the authorship team and the changes to the manuscript and it appears the comments of the other reviewers have also been appropriately addressed (however, ultimately this assessment lands with them or the editor). Thank you for the detail of your responses, and the manuscript is significantly improved with your additions/changes. I have no additional comments or feedback at this time. Cheers.