The structure and characteristics of Anglo-American paramedic systems in developed countries: A scoping review protocol

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Abstract

Introduction
Paramedicine has undergone significant change in the past two decades. While the Anglo-American paramedic system continues to grow there appears to be a dearth of published literature regarding modern categorisation of this evolving paramedic system. The objective of this scoping review is to examine and map the existing evidence to provide an overview of the characteristics and structural similarities and differences of Anglo-American paramedic systems in English-speaking developed countries.

Methods
Databases, including Embase, MEDLINE, Web of Science, EBSCOhost, CINAHL, Google Scholar and Epistemonikos, will be searched from inception. A grey literature search strategy has also been developed to identify non-indexed relevant literature. Citations and references of included studies will also be searched. Two reviewers will undertake title and abstract screening, followed by full text screening. Data extraction will be conducted using a customised instrument. Inclusion criteria: results examining management, leadership or governance in paramedicine related to the Anglo-American paramedic model in English-speaking developed countries will be included in the review. Included studies will be summarised using narrative synthesis structured around themes of management, leadership and governance in paramedicine.

Keywords:
ambulance; characteristic; EMS; paramedic; structure

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Introduction

Since the early 2000s there have been significant advances in paramedic practice around the world. One such historic advance was the registration of paramedics in the United Kingdom in 2000 by the then Council of Professions Supplementary to Medicine (1). Although paramedicine continues to evolve as a profession, there appears to be a dearth of published literature regarding modern categorisation of these evolving paramedic systems.

What is known is that less than half the world has formal out-of-hospital care systems. Throughout most of Europe and in most Nordic countries, ambulances are primarily physician-staffed and ambulance physicians are usually accompanied by a nurse, medical technician or paramedic. This system of delivery is generally referred to as the ‘Franco-German’ model of emergency medical services (2).

Canada, the United States, the UK, the Republic of Ireland, Australia, most of the Middle East and South Africa have advanced out-of-hospital care systems that follow what is known as the ‘Anglo-American’ paramedic model (2), in which the highest levels of ambulance-based clinicians are paramedic (2). This system of out-of-hospital care is the primary focus of this scoping review protocol.

Brief accounts of the differences in the leadership and management structure, education standards, governance, tiers of care and funding are noted in the literature. However, with the exception of O’Meara et al (3), there is paucity in research that critically analyses the difference in this model in any significant depth.

In the US and Canada, there are two common management and leadership features found within government and private paramedic systems: the medically directed paramedic system, in which a physician acts in both a clinical and supervisory role (4); and the fire-based paramedic system, which involves a fire-based operational leadership structure combined with physician medical direction (4,5). Although the fire-based paramedic system can be considered a subset of the medically directed paramedic system, it is important to recognise that many physician-directed paramedic systems are not a part of a fire-based reporting structure, and so two separate classifications are required.

In the UK, the Republic of Ireland, Australia and New Zealand there is a trend towards paramedic-led models of leadership. This has been driven in part by the recent introduction of professional regulatory boards in both Australia and New Zealand (6) and the continued professionalisation of paramedicine, including the establishment of a professional identity, continued development of tertiary education as well as an expansion of clinical roles such as community paramedicine (7). While these countries share similar characteristics, their leadership and management structures vary greatly.

This scoping review protocol outlines the process by which the authors will seek to examine and map the existing evidence to provide an overview of what is known about the structure and characteristics of Anglo-American paramedic systems in developed countries.

A preliminary search for existing systematic and scoping reviews on the topic was conducted on 16 October 2019. Databases searched include JBI Database of Systematic Reviews and Implementation Reports, Cochrane Database of Systematic Reviews, CINAHL, PubMed, EPPI and Epistemonikos. No conflicting systematic or scoping reviews were found.

Review question
This review is built on the work of O’Meara et al (3,8) in identifying and building on the narrative related to the different models of clinical leadership found within varying models of paramedic systems around the world. With the addition of a wider scope of review, the research question was developed by a multidisciplinary team of researchers including health-based academics and practising paramedics.

The review question is: How do the structure and characteristics of Anglo-American paramedic systems differ across English speaking developed countries?

Objective
The objective of this scoping review is to examine and map the existing evidence to provide an overview of the characteristics and structure similarities and differences of Anglo-American paramedic systems in English-speaking developed countries.

Key definitions
We use the term ‘developed country’ throughout to refer to a country that has a developed economy and advanced technological infrastructure relative to other less industrialised nations as reported by the United Nations World Economic Situation and Prospects Report (9). Countries of focus include English-speaking developed countries including Canada, the US, the UK, Ireland, Australia and New Zealand.

Inclusion criteria
To guide the search strategy, a set of parameters has been developed by the research team that includes inclusion and exclusion criteria, which scientific databases to search, where to search for grey literature, search terms of use (Table 1), search limitations applied, and which experts to consult with regard to review findings.

Participants
The review will include literature related to paramedic systems in English-speaking developed countries.
Technique of all relevant articles. Additionally, we will conduct a forwards-backwards search strategy. A specialist subject librarian will be consulted to provide guidance on search strategy. Needed to conduct efficient searches in health, business and industrial based journals (13). A specialist subject librarian will be consulted to provide guidance on search strategy. Needed to conduct efficient searches in health, business and industrial based journals (13). A specialist subject librarian will be consulted to provide guidance on search strategy.

Results will be excluded if the focus of the literature is volunteer paramedic systems, paramedic systems in developing countries, military-based paramedic systems or superseded or outdated reports. Outdated reports are considered reports describing a particular system which has since undergone significant change.

Context
This scoping review intends to determine the breadth and extent of the current published literature on differing models of paramedic leadership, management and governance within the Anglo-American paramedic model.

Types of studies
We will consider qualitative or quantitative study designs including original research, policy statements, government or industry reports, systematic, narrative and scoping reviews. Only peer-reviewed articles will be considered with the exception of government or industry reports and policy statements.

Methods
This scoping review will follow the JBI scoping review methodology (10).

The research team considered a scoping review to be the most appropriate design to address the objectives of this study for several reasons. First, the purpose of the review is broad and it aims to identify knowledge gaps, scope a body of literature, clarify key concepts and identify characteristics or factors related to the concept (11). Second, unlike a systematic review, the authors are not trying to answer a specific question but rather, examine the extent, range and nature of literature surrounding the concept (12).

Search strategy
A search strategy using the terms listed in Table 1 will be conducted in Embase, MEDLINE, Web of Science, EBSCOhost, CINAHL, Google Scholar and Epistemonikos to ensure that we search an optimal combination of databases needed to conduct efficient searches in health, business and industrial based journals (13). A specialist subject librarian will be consulted to provide guidance on search strategy. Additionally, we will conduct a forwards-backwards search technique of all relevant articles.

Due to the topic of this scoping review, it is likely that a great deal of information exists that is not in the scientific literature. Therefore, we will conduct a thorough search of the grey literature to identify non-indexed relevant literature. The search will focus on government or industry reports and policy statements. We will search Open Grey (grey literature database), Google and Bing using the same search terms listed in Table 1.

Table 1. List of search terms

| Search terms | Description |
|--------------|-------------|
| The search terms used will be ‘governance’, ‘regulation’, ‘registration’, ‘medical oversight’, ‘leadership’, ‘management’, ‘medical direction’, ‘EMS physician’, ‘leadership system’, ‘models of leadership’, ‘models of management’ and ‘bureaucratic’. A range of terms and combinations each then combined with either ‘prehospital’, ‘prehospital’, ‘prehospital’, ‘out of hospital’, ‘ambulance’, ‘EMS’, ‘emergency medical services’, ‘EMT’, ‘emergency medical technician’ and ‘paramedic’. |

In order to capture all literature related to the topic, we will search all articles dating to the inception of MEDLINE.

Finally, we will contact experts within the field of paramedicine to ensure we have explored all relevant literature. The panel will be made up of academics, paramedic leaders and physicians who are employed by an Anglo-American paramedic system in an English-speaking developed country. The experts will be invited to review the literature list and provide comment or feedback on our findings.

All searches will be conducted by members of the research team and a combination of reference management software, Covidence and Endnote X9 (Clarivate Analytics, PA, USA), will be used to store all relevant literature (14).

Study selection
We will conduct the study selection process in two stages. First, two reviewers will evaluate and assess titles, abstracts or website content based on the defined inclusion and exclusion criteria. If the reviewer is uncertain at this stage, the article or website will be included. In the second stage, full-text articles will be obtained, and both reviewers will independently review the articles and websites that have been collected in the first stage. The articles and websites will be grouped into three categories: included, excluded, and uncertain. The reviewers will then compare categories to ensure inter-rater reliability and validity. If there are any discrepancies that cannot be resolved, a meeting will be held with a third reviewer to discuss the articles and websites until a consensus is reached. If a
If consensus cannot be reached, the decision of the majority will be taken.

**Data extraction**

In this stage, we will extract the relevant data from included studies and websites that will help address the aims of the scoping review. The custom template was developed taking into consideration the nature of this scoping review, which includes mapping the range of literature within this broad field of paramedicine where it may not be necessary to extract data on a particular study finding (14). Reviews are more likely to be descriptive or aggregative than interpretive, and so the extent of immersion in the data may be less.

This template has been agreed to by the research team and will be utilised by two researchers and a random sample of articles will be chosen for review by a third researcher to ensure validity.

**Data presentation**

In order to adequately address the objective of this scoping review, the results will be presented in the following ways. First, we will use the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) flow chart template reporting the search process (15). Second, a narrative analysis which will include a description of key findings and a critical analysis of the literature.

**Ethics and dissemination**

This scoping review will be the first study to explore the structure and characteristics of Anglo-American paramedic systems in English-speaking developed countries on a wide scale. It will contribute to future studies in the field of paramedicine.

The results will be disseminated through a peer-reviewed publication and national and international conferences targeting paramedics and paramedic leaders. As the methodology applied consists of reviewing and collecting data from publicly available materials, this study does not require ethics approval.

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**Competing interests**

The authors declare no competing interests. Each author of this paper has completed the ICMJE conflict of interest statement.

**References**

1. Givati A, Markham C, Street K. The bargaining of professionalism in emergency care practice: NHS paramedics and higher education. Adv Health Sci Educ Theory Pract 2018;23:353-69.
2. Colbeck M. The Australasian consultant paramedic – an idea whose time has come. Australasian Journal of Paramedicine 2014;11.
3. O’Meara P, Wingrove G, Nolan M. Clinical leadership in paramedic services: a narrative synthesis. International Journal of Health Governance 2017;22:251-68.
4. National Association of EMSP, National Association of State EMSO. Medical Direction for operational emergency medical services programs. Prehosp Emerg Care 2010;14:544.
5. Wankhade PP, Mackway-Jones K, editors. Ambulance services: leadership and management perspectives. Springer Nature Switzerland, 2015.
6. Paramedic registration great for emergency ambulance services in NZ [press release]. Online, 05 November 2019. Available at: www.wfa.org.nz/about-us/news/paramedic-registration-great-for-emergency-ambulance-services-in-nz/
7. Reed B, Cowin L, O’Meara P, Wilson I. Professionalism and professionalisation in the discipline of paramedicine. Australasian Journal of Paramedicine 2019;16.
8. O’Meara P, Wingrove G, McKeage M. Self-regulation and medical direction. International Journal of Health Governance 2018;23:233-42.
9. World Economic Situations & Prospects Report. Online: United Nations, Secretariat EAAPEotDoEaSAotUN; 2019. Available at: www.un.org/development/desa/dpad/publication/world-economic-situation-and-prospects-2019/
10. Peters MDJ, Godfrey C, Mclnerney P, et al. Scoping Reviews 2017. In: Joanna Briggs Institute Reviewer’s Manual [Internet]. The Joanna Briggs Institute. Available at: https://reviewersmanual.joannabriggs.org/
11. Munn Z, Peters MDJ, Stern C, et al. Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. BMC Med Res Methodol 2018;18:143.
12. Levac D, Colquhoun H, O’Brien KK. Scoping studies: advancing the methodology. Implement Sci 2010;5:69.
13. Bramer WM, Reithlefson ML, Kleijnen J, Franco OH. Optimal database combinations for literature searches in systematic reviews: a prospective exploratory study. Syst Rev 2017;6:245-.
14. Booth A. Searching for qualitative research for inclusion in systematic reviews: a structured methodological review. ibid. 2016;5:74.
15. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. PLoS Med 2009;6:e1000097.