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Models of Care for Virtual Emergency Departments in High-Income Countries with Universal Health Coverage: Scoping Review Protocol

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ADMINISTRATIVE INFORMATION

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Review Stage at time of this submission - Piloting of the study selection process.

Conflicts of interest - None declared.

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Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 26 April 2026 and was last updated on 26 April 2026.

INTRODUCTION

Review question / Objective Population (P)
Adults and/or children with non-life-threatening illness requiring urgent care. Life-threatening conditions and virtual care used as a routine step prior to a physical ED presentation (e.g., pre-hospital telemonitoring of vitals in acute stroke or cardiac events) will be excluded.
Concept (C)
Virtual Emergency Departments (VEDs), defined as services delivering emergency care remotely employing video conferencing, for conditions that would otherwise result in a physical ED presentation (Schultz et al., Emerg Med J, 2026). Included services must: involve an emergency physician as part of the healthcare team; serve patients with non-life-threatening urgent care needs; and include video conferencing as the mode of care delivery.
Context (Con)
Implementation of VEDs in high-income countries with universal health coverage (HIC-UHC), specifically: Australia, New Zealand, Canada, United Kingdom, Ireland, France, Germany, Netherlands, Belgium, Switzerland, Austria, Denmark, Sweden, Norway, Finland, Iceland, Spain, Portugal, Italy, Greece, Luxembourg, Japan, South Korea, Singapore, Taiwan, and Israel. Studies from the United States are excluded given the absence of a national universal health coverage system. Studies published from January 2005 to present will be included. Both public and private health systems are eligible.
Review Questions
1. What are the existing models of care for VEDs in high-income countries with universal health coverage?
2. What taxonomy can be proposed from the evidence to organise VED models and governance?

Background Emergency department (ED) crowding is a persistent global challenge. In Australia alone, there were 9.0 million ED presentations in 2023-24, representing a sustained

increase of 3.2% per year in the five years preceding COVID-19. Virtual emergency departments (VEDs) have emerged as an innovative response, delivering emergency care remotely via video conferencing to patients with non-life-threatening presentations that would otherwise require physical attendance. VEDs aim to alleviate overcrowding, improve access, reduce costs, and maintain or improve patient outcomes.

Since the COVID-19 pandemic, virtual urgent care and emergency telehealth services have expanded rapidly across high-income countries with universal health coverage. However, VEDs vary significantly in their design, eligibility criteria, staffing models, referral pathways, and integration with broader health systems. This variation reflects a lack of standardised guidance on what constitutes a VED and how it should be governed. Clinical governance in virtual settings remains underexplored, with limited evidence on quality assurance, safety protocols, and accountability structures.

Existing evidence syntheses have primarily focused on technology use, implementation barriers, or regional practice, rather than systematically classifying VED models of care. No review has mapped or developed a taxonomy of VED models across planning, implementation, and governance stages. Without such a framework, comparison across services and settings remains difficult, limiting opportunities for evaluation, replication, and policy development.

This scoping review will map and synthesise evidence on VED models of care in high-income countries with universal health coverage, and develop a preliminary taxonomy to categorise VED service types and identify common features and points of divergence.

Rationale A scoping review was chosen to address this question, given the heterogeneity of VED models, the breadth of relevant study designs, and the exploratory nature of the aims. The JBI scoping review framework provides a structured approach to this type of evidence mapping, and the PRISMA-ScR reporting guidelines ensure transparency and reproducibility.

The rapid post-pandemic expansion of virtual emergency care across high-income countries with universal health coverage makes this review timely. While individual VED services have been described and evaluated, no synthesis has yet mapped the full landscape of models of care or proposed a taxonomy to organise and compare them. A structured classification is now needed to support service planning, policy development, and future evaluative research.

This review is led by a multidisciplinary team at Flinders University with established expertise in virtual emergency care, health services research, and clinical governance. The team includes investigators who contributed to the development of benchmarking indicators for Australian VEDs, providing methodological grounding and contextual knowledge to conduct and interpret this review.

METHODS

Strategy of data synthesis A descriptive and narrative synthesis will be conducted, consistent with JBI methodology for scoping reviews. Quantitative data will be summarised using frequencies, counts, and tabulations. Qualitative descriptions will be used to highlight patterns, variations, and gaps across included studies. Findings will be organised thematically according to key domains identified in the data extraction framework: models of care; target populations; organisational structure, scale and resourcing; integration with health systems; and clinical governance structures.

Where appropriate, studies will be grouped based on similarity of model of care, including structural components such as workforce composition, physical location, and level of system integration. A taxonomy of VED models will be developed using the Template for Intervention Description and Replication (TIDieR) framework, allowing identification and grouping of recurring VED types based on target population, clinical authority, mode of delivery, governance anchor, and level of system integration.

Results will be presented in tables, charts, and figures to facilitate comparison across studies. A PRISMA-ScR flow diagram will illustrate the study selection process. A narrative summary will accompany all visual outputs to contextualise findings in relation to the review objectives and research questions. No formal critical appraisal of study quality or risk of bias will be undertaken, consistent with scoping review methodology.

Electronic Databases

MEDLINE (Ovid), Embase, CINAHL (EBSCOhost), Scopus, Web of Science, and Cochrane Library. Grey literature will be identified via Google Scholar, ProQuest, OpenGrey, and trial registries. Reference lists of all included studies will be hand-searched. Search strategies were developed in consultation with a research and teaching librarian.

Search Terms (sample — full strategy in Appendix I of protocol)

Virtual emergency department; tele-emergency; emergency telehealth; virtual urgent care; telemedicine AND emergency department; models

of care AND virtual care; clinical governance AND virtual emergency; implementation AND virtual emergency department; virtual urgent care AND universal health coverage.

Eligibility criteria Types of Participants
Included: Adults and/or children with non-life-threatening illness requiring urgent care, presenting to or managed by a virtual emergency department service.
Excluded: Patients with life-threatening conditions, and patients receiving virtual care as a routine step prior to a physical ED presentation (e.g., pre-hospital telemonitoring of vitals in acute stroke or cardiac events).
Concept
Virtual emergency departments (VEDs), defined as services delivering emergency care remotely employing video conferencing, for conditions that would otherwise result in a physical ED presentation (Schultz et al., Emerg Med J, 2026).
For inclusion, all three of the following criteria must be met:
1. An emergency physician is included in the healthcare team.
2. Patients have a non-life-threatening illness requiring urgent care.
3. Video conferencing is specified as the mode of care delivery.
Studies must describe at least one of the following: organisational structure, scale and resourcing; integration with existing physical facilities and the health system; clinical governance (a systematic and integrated approach to ensuring services are accountable for delivering quality healthcare); or implementation, including barriers and facilitators.
Excluded concepts: stand-alone GP/primary care telehealth, tele-palliative, tele-psychiatry, tele-cardiology, or pharmacy-based teleconsultations without ED integration; pre-hospital telemonitoring or observation units; services where the ED includes only one virtual component (e.g., tele-triage only); and modelling or simulation studies using hypothetical or synthetic data.
Context
Included: High-income countries with universal health coverage (HIC-UHC): Australia, New Zealand, Canada, United Kingdom, Ireland, France, Germany, Netherlands, Belgium, Switzerland, Austria, Denmark, Sweden, Norway, Finland, Iceland, Spain, Portugal, Italy, Greece, Luxembourg, Japan, South Korea, Singapore, Taiwan, and Israel. Both public and private health systems are eligible. Studies published from January 2005 to present.
Excluded: Studies based in the United States, given the absence of a national universal health coverage system. Studies published before January 2005. Conference abstracts, editorials, commentaries, viewpoints, and opinion-only papers. Systematic reviews and other evidence syntheses are excluded as the aim is to map primary VED models of care.

Source of evidence screening and selection Following database searching, all identified citations will be collated and uploaded into Covidence and duplicates removed. Titles and abstracts will then be screened by two independent reviewers against the inclusion criteria. Potentially relevant sources will be retrieved in full and assessed in detail against the inclusion criteria by two independent reviewers. Reasons for exclusion of sources at full text that do not meet the inclusion criteria will be recorded and reported.
Any disagreements that arise between the reviewers at each stage of the selection process will be resolved through discussion or with an additional reviewer if necessary. The results of the search and the study inclusion process will be reported in full in the final scoping review and presented in a PRISMA-ScR flow diagram.

Data management All citations will be managed using Covidence systematic review software for deduplication, screening, and full-text review. Data will be extracted using a structured charting form developed in Microsoft Excel 365. The form will be piloted on a small number of included studies by one researcher to refine the variables and ensure consistency with the review objectives.
Data will be extracted by one researcher and cross-checked against original articles by a second researcher to ensure accuracy. Discrepancies will be resolved through discussion, with a third researcher moderating if necessary. Primary publication authors will be contacted to clarify reported data if required. All extracted data will be stored securely and version-controlled throughout the review process.

Reporting results / Analysis of the evidence Findings will be reported in accordance with the PRISMA extension for Scoping Reviews (PRISMA-ScR; Tricco et al., Ann Intern Med, 2018;169(7):467-473). A descriptive and narrative analysis will be used, with quantitative data summarised as frequencies and counts, and qualitative data analysed thematically. A taxonomy of VED models of care will be developed using the TIDieR framework.
Evidence gaps will be mapped to inform future research, policy development, and service design in virtual emergency care. Any amendments to the

protocol will be documented with version control if changes occur during the review process.

Presentation of the results Results will be presented using a combination of narrative summary, tabular data, and figures. A PRISMA-ScR flow diagram will illustrate the study selection process.
Tables will include: (1) a study characteristics table summarising first author, year, country, study design, and aim; (2) a target population table summarising patient groups and clinical profiles; (3) an organisational structure table covering workforce, staffing, and resourcing; (4) an integration table covering referral pathways and co-location; and (5) a clinical governance table covering governance frameworks and safety systems.
A proposed taxonomy of VED models will be presented as a classification framework using TIDieR domains (Who, What, How, Where, When, Tailoring, Modifications, Fidelity), grouping VED types based on target population, clinical authority, mode of delivery, governance anchor, and level of system integration. A narrative summary will accompany all visual outputs to contextualise findings and describe how they relate to the review objectives and research questions.

Language restriction English language only. Studies published in other languages will not be captured; this is acknowledged as a limitation of the review.

Country(ies) involved Australia.

Keywords Virtual emergency department; emergency telehealth; telemedicine; models of care; clinical governance; scoping review; urgent care; virtual care; implementation; universal health.

Dissemination plans The results of this review will be presented at international, national, and local health conferences and submitted for publication in a peer-reviewed journal.

Contributions of each author
Author 1 - brendan Major - Conceived the review, drafted the protocol manuscript, led INPLASY registration, and will coordinate all stages of the review including screening, data extraction, and synthesis. Author 1 drafted the manuscript.
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