

A Scoping Review of the use of Point of Care Ultrasound (POCUS) in Prehospital, Remote, Austere and Expedition Settings

Dr J Garrett Emergency Department, University Hospitals Dorset & University of Exeter



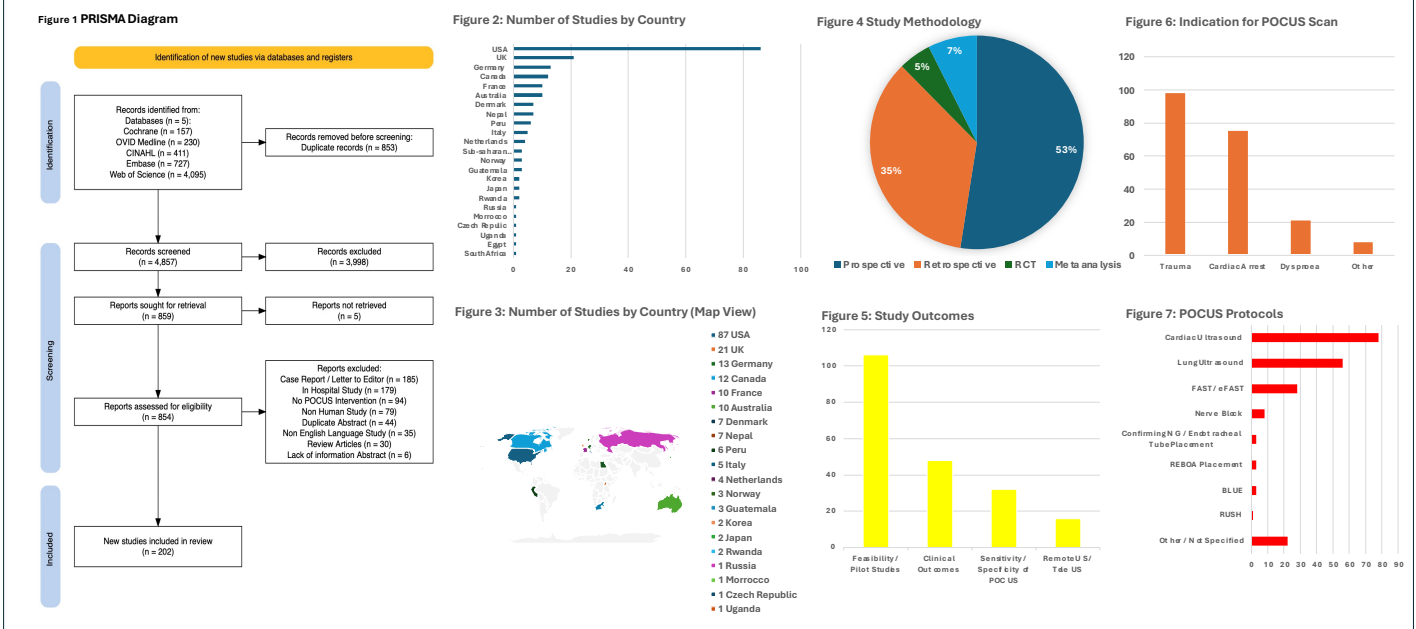
Background

- Point of Care Ultrasound (POCUS) has gained increasing attention due to the reducing size and cost of ultrasound probes, which makes them an increasingly viable option in out-of-hospital settings.
- POCUS may be of particular benefit in resource-limited settings - where other imaging modalities, such as Computerised Tomography (CT), are unavailable or impractical.
- POCUS has the potential to guide immediate diagnosis, treatment and interventions before transport to definitive care.
- Both the American College of Emergency Physicians and various European Emergency Medicine organisations have identified the use of Ultrasound in a prehospital setting to be a priority area for further research, along with the need for further studies showing a definitive effect on clinical outcomes.
- The current literature on pre hospital ultrasound can be divided into several broad groups: diagnostic studies, treatment studies (nerve blocks, vascular access, etc), feasibility studies and studies of effectiveness of education and training in ultrasound.
- This scoping review aims to map and characterises the current literature and evidence base for the use of Point of Care Ultrasound in prehospital, remote, austere and expedition settings, and to identify gaps in the literature and areas for further research.

Methods

- **Protocol:** developed in accordance with JBI Methodology for Scoping Reviews and in line with PRISMA guidelines.
- **Databases searched:** Medline (Ovid), Embase, Web of Science, CINAHL and Cochrane databases searched.
- **Keywords searched:** Point of Care Ultrasound, POCUS, nerve block, Focused Assessment Sonography in Trauma and extended Focused Assessment Sonography in trauma (FAST and eFAST), Rapid Ultrasound for Shock and Hypotension (RUSH), Bilateral Lung Ultrasound in Emergency (BLUE), Echocardiography, prehospital, remote, austere and expedition
- **Inclusion criteria:** Meta analyses, randomised controlled trials, cohort and case control studies published in the above databases since the year 2000.
- **Exclusion criteria:** Studies published in a non-English language, case reports, letters to the editor and editorial / expert opinion pieces and review articles.
- **De-duplication and Screening:** After removing duplicate studies in Endnote a two-stage screening process was undertaken in Rayyan - first titles and abstracts were screened and then the full text was reviewed for the above criteria.
- **Data Extraction:** Data was extracted on MS Forms for content analysis and study coding. Excel was then used to generate graphs.

Results



Discussion

- The evidence base for the use of POCUS in the prehospital, remote, austere and expedition setting is growing year on year.
- The evidence base remains heterogeneous, focusing largely on prospective studies examining trauma, dyspnoea and out of hospital cardiac arrest.
- The majority of the current research is comprised of descriptive accounts of prehospital ultrasound use or feasibility studies of ultrasound training or the use of ultrasound for various indications
- The majority of the studies are from the United States and focus on prehospital Ultrasound use by Physicians and Paramedics in an ambulance and air ambulance context.
- North America and Western Europe are over represented in the data, likely as a consequence of them having more developed prehospital infrastructure and more opportunities for research.

Study Limitations:

- Single reviewer.
- English language studies only.
- Grey literature was excluded.
- Animal studies were excluded.
- The quality of the individual studies was not formally assessed as this is outside the remit of a scoping review.

Recommendations

Recommendations:

- Further studies to establish if the use of prehospital ultrasound effects clinical outcomes and which examinations protocols have the largest effect on reducing morbidity and mortality.
- Establishing if the use of prehospital ultrasound has any negative effects such as prolonged scene time or extending interruptions to CPR.
- Further studies on the use of POCUS in more remote, austere or expedition environments, as well as in the developing world.
- Further studies on under served populations e.g. paediatric patients.

Appendix / References

