

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Medical Care for Humans in Space (3)

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METHODOLOGICAL INNOVATION/ADAPTATION FOR SYSTEMATIC REVIEWS FOR SPACE
MEDICINE

Abstract

Systematic collection, evaluation and synthesis of evidence to inform practice and policy and guide future research has become increasingly essential for conducting the best science. Over the past several decades systematic methodologies for conducting these tasks have been proven to have advantages over non-systematic approaches. Policy makers and clinicians increasingly rely on what are called systematic reviews (SR) to inform policy and practices. Systematic reviews are also used to structure and inform future research, and some funding agencies require that applications to fund new research are accompanied by systematic reviews as these reviews help to reducing avoidable research waste.

Methods: We conducted three systematic reviews and currently have a fourth one ongoing – the topics ranged from rehabilitation of astronauts to managing symptoms of ionised radiation and sex differences on the impact of ionised radiation. We have developed new methodology and adapted existing SR methods to address the complexity of questions in space medicine.

Results: The methodological innovation areas we identified and developed new approaches for include:
- Developing guidance on databases covering space medicine literature and data to develop best practices for space medicine search strategies - Developing and piloting a generalisability checklist for studies conducted in simulation environments, to rate their relevance to space missions - Developing and piloting checklists for quality assessment of in-vitro mechanistic studies to improve their synthesis with animal and human studies to answer complex research questions - Piloting an approach to prioritise outcome measures to inform the step-wise analysis of large amounts of data, to improve responsiveness of the evidence synthesis to inform operational procedures - Developing machine learning algorithms to automate steps of the systematic review process e.g. screening and data extraction to increase the speed to conduct the review.
Conclusion: The increase in the number, and diversity, of studies conducted in space medicine across different contexts, methods or approaches makes it more difficult to draw conclusions using traditional literature review and scientific consensus. To develop more systematic approaches to synthesize literature, we need to develop new methods to address the existing biases and meta-biases in the literature. This will optimise how we aggregate and evaluate space medicine evidence to inform best practices in space missions.