CROWD SOURCING MEDICAL DATA COLLECTION USING MEDICAL STUDENTS

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OBJECTIVE

We undertook an upgrade of the Evidence Library database of NASA HRP's Integrated Medical Model, assessing 120 medical conditions which integrate with a novel probabilistic risk assessment (IMPACT) tool of medical risk and resource utilization for long duration exploration human spaceflight. This data collection process included a selection of these conditions crowd sourced over one year via three 4-week medical student electives at the University of Colorado School of Medicine (*IDPT 8059 Space Medicine: Human Spaceflight Factors & Medical Risk Assessment*). Students undertook a rapid systematic review of each medical condition, under close preceptors with backgrounds in clinical medicine, library science, epidemiology, biostatistics, and evidence-based medicine. As part of the elective, students also received instruction in core space medicine concepts, evidence based medicine and problem based learning sessions as a flight surgeon supporting a simulated Mars mission.

METHODS

The list of 120 medical conditions includes both common, terrestrial illness/injury (epistaxis, diverticulitis) as well as spaceflight-specific ones (space adaptation conditions, EVA-related injuries). A rapid systematic review process was developed that would allow students to find the data for determining disease incidence/prevalence, return to definitive care (often a surrogate such as *hospitalization* rates), loss of crew life, and treatment duration. Each data point required a tailored, specialized search process using different databases and corresponding specialized search filters. Databases were selected on their ability to provide high quality literature in an efficient manner and prioritized by their ability to provide graded evidence via a set rubrics specific to human spaceflight. Students were responsible for performing all literature searches and identifying the highest quality available evidence for each data point. Completed student data sheets underwent initial review by faculty preceptors followed by a secondary editing review by the ExMC Clinical Science Team.

RESULTS

Over the course of three electives, approximately 105 medical conditions were researched by students using spreadsheets with pre-crafted search strategies. Overall, this process was successful in allowing students to perform the preponderance of work to update incidence, treatment duration, return to definitive care, and loss of crew life data points. Students were successful in running searches, identifying the necessary data points within the literature, and determining the types of terrestrial data that most aligns with the astronaut population for successful completion of their tasks. Limitations included variable student experience with search methodologies [PubMed], differing values of evidence grading [best practice evidence based medicine vs. relevant to spaceflight], and students' unfamiliarity with spaceflight specific conditions.

CONCLUSION

Finding the relevant literature for medical conditions in spaceflight within terrestrial databases in a systematic method is time consuming and not intuitive. However, the stepwise process that balanced sensitivity with specificity allowed for students to be highly successful in a short amount of time. Additionally, as the process was refined over the course of three electives, preceptors were better able to anticipate where students were likely to encounter barriers, which allowed the course to be adjusted to account for certain data points needing more time for completion. This replicable process may be an efficient way to accomplish rapid systematic reviews for a large volume of data in a short amount of time.