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# A WEB-BASED COLLABORATIVE ENVIRONMENT TO DEVELOP AN EXPLORATION MEDICAL CARE SYSTEM

**Abstract**

The ability of Space Medicine to deliver evidenced-based Mass/Power/Volume (MPV) requirements before the Preliminary Design Review of any previous space mission has been a challenge. Accordingly, the authors have created a Web-based relational database which will assist in the development and maintenance of a medical requirements knowledge-base system. This Exploration Medical Care System (EMCSs) catalogs the hardware needed to treat to resolution more than 300 medical conditions considered likely by several space agencies. Based on worst-case outcomes for each condition, the supplies needed were entered into the database. The MPV needed to provide primary and secondary medical prevention strategies for each condition was also included. The EMCS can therefore track the cumulative MPV required to maintain the heath and performance of all crewmembers. To bound the EMCS MPV, certain assumptions must be made, however they can also be dynamically changed (Only one crew member can be ill at one time, only one major medical event will occur per mission, etc..). The crew training (certification and sustaining activities) required to mitigate each condition can also be tracked. The EMCS supports the creation of multiple mission versions (destination, levels of gravity, crew compliment, length of mission, medical conditions supported, levels of care, etc..) resulting in different MPV requirements. Due to the complexity of the data, a report generator was created to publish the MPV based on each condition and the total MPV for the mission. When missions are created or altered, these EMCS reports can be rapidly regenerated. For the next phase of the EMCS project, we anticipate the creation of a collaborative environment where multiple experts can use an evidence-based approach to derive event-sequence-diagrams (ESD) on each condition. These ESD's will create more granularity to the MPV requirements and allow outcomes to be resolved differently (ie. advanced levels of care versus palliation). To aid in the data management and collation of information, this web-based EMCS will allow experts to collaborate in the creation and assessment of medical literature required for each condition. The EMCS was developed using industry standards (Java, Spring Boot, etc..) to interact with the database structure. It is anticipated that the EMCS will facilitate trade studies which allow mission design teams to determine the impact of changing certain resources (.ie removing a ventilator, adding hyperbaric treatment). The authors concepts for the EMCS were developed under contract for the Canadian Space Agency.