CONCEPT OF OPERATIONS EVALUATION FOR MITIGATING SPACE FLIGHT-RELEVANT MEDICAL ISSUES IN A PLANETARY HABITAT

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Introduction

Analogue environments assist the NASA Human Research Program (HRP) in developing capabilities to mitigate high risk issues to crew health and performance for space exploration. The Habitat Demonstration Unit (HDU) is an analogue habitat used to assess space-related products for planetary missions. The Exploration Medical Capability (ExMC) element at the NASA Johnson Space Center (JSC) was tasked with developing planetary-relevant medical scenarios to evaluate the concept of operations for mitigating medical issues in such an environment.

Methods

Two medical scenarios were conducted within the simulated planetary habitat with the crew executing two space flight-relevant procedures: Eye Examination with a corneal injury and Skin Laceration. Remote guidance for the crew was provided by a flight surgeon (FS) stationed at a console outside of the habitat. Audio and video data were collected to capture the communication between the crew and the FS, as well as the movements of the crew executing the procedures. Questionnaire data regarding procedure content and remote guidance performance also were collected from the crew immediately after the sessions.

Results

Preliminary review of the audio, video, and questionnaire data from the two scenarios conducted within the HDU indicate that remote guidance techniques from an FS on console can help crew members within a planetary habitat mitigate planetary-relevant medical issues. The content and format of the procedures were considered concise and intuitive, respectively.

Discussion

Overall, the preliminary data from the evaluation suggest that use of remote guidance techniques by a FS can help HDU crew execute space exploration-relevant medical procedures within a habitat relevant to planetary missions, however further evaluations will be needed to implement this strategy into the complete concept of operations for conducting general space medicine within similar environments.