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CASE-BASED MEDICAL LEARNING FOR LONG DURATION SPACE TRAVEL

Abstract

Policy research and medical operations considerations for the selection and use of medical communications, diagnostics, treatment and medical supplies during long duration space missions is a complex problem for the NASA Office of the Chief Health and Medical Officer. It is anticipated that the risk for acute medical conditions in crewmembers will increase the longer the space mission lasts and depends on how far the travelers are from earth as well as the length of the time that the crew must be on the moon or Mars (due to orbital mechanics). Medical care needs may be different if the crew are on the spacecraft in deep space compared to when the crew are living and exploring at their moon or planetary destination. The problems include in part 1) spacecraft onboard medical expertise, 2) expected communication delay of up to 40 minutes between earth and Mars and back, 3) onboard medical equipment and supplies, and 4) the shelf life of the medical supplies.

One possible aid, which would enhance established medical therapy guidelines, would be the development and use of case-based learning and medical knowledge refresh for both the flight crew and earth-based flight surgeons both before the space mission and during the space mission. The case-based learning objectives would be for both the mission crew medical officer (or other crewmembers) and the earth based flight surgeon to help them be able to distinguish the 1) severity of the illness, 2) determine if the appropriate expertise is available at the site of the illness and whether just in-time training would be beneficial, 3) is there appropriate diagnostic and therapeutic supplies available, 4) then develop a plan for diagnosis and treatment, and 5) a plan for follow-up for both the patient and healthcare providers.

Examples of case-based learning scenarios will be presented including:

1. In route to Mars 48 yo male who complains of sudden onset abdominal pain..... 2. On Mars 51 yo female falls and suffers blunt force trauma over her head and upper extremities...

The establishment of medical guidelines treatment for spaceflight is well underway with many mission specific conditions completed. Case-based learning has the potential to improve new medical knowledge learning and retention and improve preflight simulations for space medicine.