Progressively Enabling Earth Independent Medical Operations (EIMO)

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This panel presents the findings from a series of Technical Interchange Meetings (TIMs) hosted by the Exploration Medical Capability Element (ExMC) in NASA's Human Research Program. The topics for the TIMs were derived from a 2-day conference of senior leaders and subject matters experts that collectively outlined a multi-faceted strategy designed to optimize crew health and performance through an increasingly autonomous medical approach. The first abstract in this panel outlines the scope of issues related to data collection, usage, transmission and computing capacity to facilitate EIMO. The second presentation provides an overview of the challenges in developing curricula and advanced training tools to baseline knowledge, skills and abilities (KSA), verify clinical competency and assure retention during prolonged durations inherent in exploration-class missions. An overview of the complicated medical supply and resource chain necessary to facilitate EIMO is provided in the third presentation of this panel. The final presentation in this EIMO panel surveys the breadth and depth of demands on cognitive load expected to be experienced by crew on an exploration mission and proposes strategies to mitigate the prospect of cognitive overload through methods to shift task load from the crew to multi-modal artificial intelligence based medical support systems. Taken together, these presentations summarize the challenges to be expected and potential solution spaces to be explored and developed to progressively enable increasing autonomous medical operations to support crewed missions beyond low earth orbit. Through EIMO focused pre-mission planning, integrated data architecture design, innovative training development and AI-assisted task load management, the gradual transition of medical care and decision making from terrestrial to space-based assets enabling support of astronaut health and performance and reducing overall mission risk is achievable.