EXPLORATION MEDICAL CAPABILITY

The Exploration Medical Capability (ExMC) Element, one of six elements within NASA’s Human Research Program (HRP), is charged with reducing the risk of the “inability to adequately recognize or treat an ill or injured crewmember” during an exploration mission. To address this risk, the Element must: Define requirements for crew health maintenance Develop treatment scenarios Extrapolate from the scenarios to health management modalities Evaluate the feasibility of these modalities Develop technology and informatics that will enable the availability of medical care and decision support systems.

THE CONDITION LIST

There are approximately eighty conditions on the evidence-based medical condition list, approved by NASA’s Space Medicine Division in July 2009. The conditions were gathered from several sources: Space flight mission incidents Conditions on the Shuttle medical checklist Conditions on the International Space Station medical checklist Expert opinion. The conditions were prioritized by a panel of flight surgeons, physician astronauts, engineers, and scientists based on incidence, consequence, and mitigation capability.

The condition list is a “living document” • New conditions can be added to the list • The priority of conditions on the list can be adjusted as screening, diagnosis, or treatment capabilities change, or if mission assumptions are updated. From the prioritized condition list, ExMC annually determines the capabilities needed to address the medical conditions of concern. Where such capabilities are not currently available, a gap is identified. ExMC currently identifies gaps in the following areas: • Validation of Medical Standards • Risk technology • Risk Mitigation • Monitoring and Treatment of Conditions of Concern • Enabling Capabilities. For each gap, ExMC conducts a Technology Watch to identify emerging high-impact technologies that • Augment ongoing efforts • Accelerate the development of medical care and research capabilities.

ORGANIZATIONAL STRUCTURE

The Exploration Medical Capability (ExMC) Element addresses requirements and capabilities identified by knowledge and technology gaps that are derived from a discrete set of medical conditions that are most likely to occur on exploration missions. These gaps are addressed through readiness level assessments, market surveys, collaborations and distributed innovation opportunities. Ultimately, these gaps need to be closed with respect to exploration missions, and may be achieved through technology development projects. Information management is a key aspect to this process where Tech Watch related meetings, research articles, collaborations and partnerships are tracked by the HRP’s ExMC Element. In 2011, ExMC will be introducing the Tech Watch external website and evidence wiki that will provide access to ExMC technology and knowledge gaps, technology needs and requirements documents.

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IDENTIFICATION OF GAPS

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APPLICATIONS

The list of applications is a “living document” • New applications can be added to the list • The priority of applications on the list can be adjusted as screening, diagnosis, or treatment capabilities change, or if mission assumptions are updated.

LINKS

ExMC Tech Watch Wiki Site TBD HRP Roadmap http://humanresearchroadmap.nasa.gov/