ROOT CAUSE ANALYSIS OF THE DATA REFINEMENT PROCESS – MEDICAL CONDITIONS CAPABILITY RESOURCE TABLES

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Abstract:
The medical system for spaceflight thus far has been designed to support missions in low earth orbit (LEO). Crew capabilities are limited and heavily dependent on the team of medical support staff at Mission Control Center (MCC) to guide diagnosis and management. However, missions to the Moon and Mars will suffer from several constraints that will make this ground support focused approach to care ineffective. In order to update and modify medical system design, NASA has relied on Probabilistic Risk Assessment (PRA) modeling to mitigate medical risk through trade space analysis. Specifically, capability resource tables (CRT's) were developed to create a dataset of resources required to manage a list of accepted medical conditions significant in exploration spaceflight. With 120 conditions, this dataset contained hundreds of capabilities and thousands of resources with tens of thousands of cells of data. Initially these tables were built in excel for high throughput during development, but ultimately had to be transferred, managed, and modified into the Evidence Library database for modeling purposes. The process of collating and reviewing the Evidence Library revealed numerous errors in the dataset that had to be corrected through iterative changes. Several error types emerged during this process and can be broken into specific classifications defined as "input," "transcription," "structural," "branching," and "information." In reviewing these error types through the root cause analysis (RCA) approach, we were able to identify the contributors to these errors which included single data review points, changing product end goals, limited software selection, time constraints and several others. By reviewing and evaluating the underlying causes we can provide possible system improvements that can be implemented for current and future data management in PRA model inputs.