MICROBIOLOGY AND CREW MEDICAL EVENTS ON THE INTERNATIONAL SPACE STATION

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The closed environment of the International Space Station (ISS) creates an ideal environment for microbial growth. Previous studies have identified the ubiquitous nature of microorganisms throughout the space station environment. To ensure safety of the crew, microbial monitoring of air and surface within ISS began in December 2000 and continues to be monitored on a quarterly basis. Water monitoring began in 2009 when the potable water dispenser was installed on ISS. However, it is unknown if high microbial counts are associated with inflight medical events. The microbial counts are determined for the air, surface, and water samples collected during flight operations and samples are returned to the Microbiology laboratory at the Johnson Space Center for identification. Instances of microbial counts above the established microbial limit requirements were noted and compared inflight medical events (any non-injury event such as illness, rashes, etc.) that were reported during the same calendar-quarter. Data were analyzed using repeated measures logistic regression for the forty-one US astronauts flew on ISS between 2000 and 2012. In that time frame, instances of microbial counts being above established limits were found for 10 times for air samples, 22 times for surface samples and twice for water. Seventy-eight inflight medical events were reported among the astronauts. A three times greater risk of a medical event was found when microbial samples were found to be high (OR = 3.01; p = .007). Engineering controls, crew training, and strict microbial limits have been established to mitigate the crew medical events and environmental risks. Due to the timing issues of sampling and the samples return to earth, identification of particular microorganisms causing a particular inflight medical event is difficult. Further analyses are underway.