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LAB IN SPACE: POINT OF CARE TESTING FOR ASTRONAUTS

**Abstract**

Abstract: Point-of-care testing (POCT) is essentially provides laboratory testing at or near to the site of patient care. POCT cuts down the time to clinical decision-making with the potential for improved medical outcome on site, e.g. for astronauts in space station or deep space missions. At present, POCT on earth ranges from basic blood-glucose measurement, blood gas analysis, routine liver and kidney function testing to complex coagulation assays. Molecular diagnostics is also increasingly becoming point-of-care with miniaturization of instruments. POCT if performed incorrectly or utilized inappropriately can generate misleading results that require additional follow-up at increased cost and risk to the patient. This paper will focus on the advantages and limitations of POCT in Space Environment. We will also describe how to manage the quality of POCT in space stations and deep space missions in order to achieve optimal health outcomes. It is extremely essential to maintain the analytical accuracy of point of care tests in a microgravity environment. Other major concerns are pre-analytical errors, competency mapping, analytical interferences, interface challenges for quick transmission of data to physician/researcher, difference of capillary, venous or arterial sample results and storage of consumables for testing. Industrial management techniques, such as failure mode and effects analysis(FMEA), Lean Six Sigma, can be applied to POCT to isolate and reduce the sources of testing error in all phases of the testing cycle. In deep space missions one of the fundamental foundation of quality POCT testing will be data management. Real time analysis of POCT data can show quality trends before they affect the result. With increasing venture of humans to space POCT will become an integral part to monitor astronaut health in future missions. The development of better technologies for POCT designed specifically to monitor astronaut health can also be used in low resource settings back on earth.

Keywords: Point-of-care testing (POCT), Astronaut Health, Deep Space Missions, Quality, Data Management, FMEA, Lean Six Sigma