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## MEDICAL ETHICS OF LONG DURATION SPACE FLIGHT

**Abstract**

As humanity prepares to explore space beyond Low Earth Orbit to the Moon, Mars and beyond, we are faced with challenges posed to astronaut health during long-duration spaceflights. Although these health challenges remain unlikely, they pose a significant risk to crew health and overall mission success. Our experience with health problems on Earth gives us an invaluable insight into the medical ethical dilemmas that may arise during spaceflight. Specific Earth-based scenarios will remain unchanged on space missions. However, due to the uncertainty and novelty of long-duration missions, astronauts may find themselves facing unanticipated ethical dilemmas. Consequently, the health risks and related ethical issues during long-duration spaceflight remain poorly characterized, uncertain, and certainly unpredictable.

Medical ethics is a set of moral principles, beliefs and values that guide us in making choices about medical care. This set of principles provides the foundation for our sense of right and wrong and helps us make fair and just decisions. This paper investigates ethical issues likely to arise from medical complications during spaceflight based on conceptual considerations and analyses, keeping in mind current health standards for astronauts. The paper explores broader themes of ethical issues, including but not limited to beneficence, non-maleficence, respecting autonomy, justice, and fidelity, while delving deeper into more specific scenarios under each of these themes. The paper seeks to recommend a collection of guiding ethical principles and a framework for their application to negotiate the resolution of complex ethical scenarios.

Space travel and its inherent risks are only likely to increase with the advent of emerging technologies. An honest and grounded ethical framework is essential to guide decision-making for future challenges. Creating a solid framework based on ethical principles will ensure that future astronauts are never discriminated against nor medically mistreated, opening the door for a more comprehensive array of spaceflight participants.