

INFECTIOUS DISEASE

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Long Duration Space Missions

Major Concern:

- Recurrent outbreaks of Infectious Diseases that jeopardize the health, safety and/or performance of crewmembers.

Preventative Measures

- Preflight Microbiological Screening
 - Immune status (viral and bacterial)
 - Microbiological examination for bacteria/parasite pathogens
- Preflight Quarantine
 - Prevent contact with ill personnel
 - Covers most viral incubation periods
- Review of Payloads/Experiments
 - Limit risk of zoonotic diseases
- Environmental Surveillance
 - Air, water, food, and surfaces

Antarctic Environment

- **NASA Relevance**
- **May allow additional insight into the effect of stressors on the human immune system.**
- **Provide excellent model for more refined epidemiological studies.**
- **Provide additional information on persistent viral infections (viral reactivation)**

Proposed Studies

- **Measure physical parameters of environment (eg., temperature, relative humidity, ventilation rate, make-up air, etc.)**
- **Measure Airborne Contaminants**
 - **Bacteria/Fungi**
 - **Volatile organic compounds**
 - **Gas composition (eg., CO, CO₂, etc.)**
- **Measure Effects on Immune System**
 - **Humoral**
 - **immunoglobulin and antibody levels**
 - **antibody formation**
 - **immunoglobulin and antibody levels in external secretions**
 - **Cell Mediated**
 - **PMN number and function**
 - **macrophage function**
 - **lymphocyte proliferative response**
 - **lymphocyte phenotype numbers**
 - **delayed hypersensitivity**

- **HSV Shedding**
 - **Collect oral secretions before, during , and after isolation**
- **Refined Epidemiological Studies**
 - **Collect nose/throat swabs (weekly) before, during, and after isolation**
 - **Collect serum samples monthly**
 - **Utilize latest techniques for storage/handling of specimens**
 - **Utilize latest technology for viral/serology studies**
- **Institute a case control study for occurrence of all apparent infectious disease; collect appropriate specimens.**

Questions

1. **What is the laboratory capability?**
2. **Are there good and complete medical data on symptoms and illnesses for repeated years at the pole? If so, does it reveal anything other than URI?**
3. **What has been done with monitoring of normal flora? Have there been no cases of staphylococcal or streptococcal disease?**
4. **How do they prepare their food?**
5. **How are gastro-intestinal upsets treated? Are causative agents identified?**
6. **What type of viral/microbiological studies are performed before they go to Antarctica?**