

POSTER PRESENTATION

Drug Information in Space Medicine

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Introduction

Published drug information is widely available for terrestrial conditions. However, information on dosing, administration, drug interactions, stability, and side effects is scant as it relates to use in Space Medicine. Multinational crews on board the International Space Station present additional challenges for drug information because medication nomenclature, information available for the drug as well as the intended use for the drug, is not standard across countries. There are unique needs for drug information and how the information is managed in Space Medicine.

Methods

- A review was conducted of the drug information requests submitted to the Johnson Space Center Pharmacy.
- From January 2003 to March 2009; 108 detailed drug information requests catalogued by the JSC Pharmacy Team.
- Requests from Space Medicine and Occupational Medicine practitioners, astronaut crewmembers and researchers.

Results

The wide range of information was reviewed.

Topic	% of requests
General drug information	40.74%
Drug information support - flight or dive physicals	29.63%
Stability of medications	4.63%
Identification of Non-U.S. medications	4.63%
Drug-Drug Interactions with commonly used medications for reduced gravity flights as well as space flight	3.70%
Interactions with medications in medical kit	3.70%
Side effect profiles of commonly used medications for reduced gravity flights as well as space flight	2.78%
Use of herbal supplements and interactions with labs/other drugs	1.85%
Drug information in support of a medication improving a space physiology change	1.85%
Interactions with other countermeasures	1.85%
Antidote questions – space flight specific	0.93%
Alternative therapeutic suggestions for medications in med kits	0.93%
Drug-Drug Interactions of contents in the landing kit	0.93%
Pharmacologic/pharmaceutic considerations in space flight	0.93%

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- Due to the information needs for the medications in the on-board medical kits, the Drug Monograph Project was created.
- Drug monographs are written for clinician use and are to be used as an aid from the ground.

What is a Drug Monograph?

- A statement that specifies the kinds and amounts of ingredients a drug or class of drugs may contain, the directions for the drug's use, the conditions in which it may be used, and the contraindications to its use (Mosby's Medical Dictionary, 2009).
- A Space Medicine drug monograph is tailored to the population and health status of space flight crewmembers.

Contents of the Space Medicine Monograph

- Brand Name
- Drug Category
- Rx/OTC
- ISS Dosage Form
- Description / Major Actions
- Indications
- Contraindications / Precautions
- Allergy Alert
- Effects on Cognition and Performance
- Notable Adverse Reactions
- Antidote Availability
- Drug-Drug Interactions
- CYP450 Interactions
- Drug-Food/Herbal Interactions
- IV Compatibility
- Terrestrial Dosage Administration
- Microgravity Dosage Information
- Special Instructions
- Storage Instructions
- Earth Shelf Life
- Microgravity Stability Information
- Analog

Differences from Terrestrial Drug Monograph

- Indications:
 - Acute indications listed
- Contraindications/Precautions:
 - No chronic disease related information
 - Concurrent drug therapy only as it applies to other contents of kit
 - No pediatric information
 - No pregnancy information
- Effects on cognitive performance:
 - Highlighted due to nature of work

Differences from Terrestrial Drug Monograph

- Drug-Drug Interactions:
 - Information specific to contents in the kit
- CYP450 Interactions:
 - Specific interactions with traditional and alternative medicines highlighted
- Microgravity dosing:
 - Provided if available from research literature
- Special instructions:
 - Special considerations or instructions for use of medication in microgravity

Differences from Terrestrial Drug Monograph

- Microgravity stability information:
 - Provided as information is published from the stability studies
- Analog:
 - Russian medical kit on orbit
 - Review of contents and match to U.S. drug
 - If an analog is available in the Russian kit, information is listed in this section
 - Provides options for the crew surgeon

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- Screen shots of monographs (requires graphics assistance)

Information Management

- References used include primary and tertiary sources
 - PubMed review of literature
 - Traditional pharmacy drug information references
 - International drug information reference - Martindale
- Complete review of contents occur annually
 - Updated as needed for new precautions, dosing, stability

Information Management

- Extramural reviewers
 - Pharmacists in clinical practice review contents and provide input

Future Considerations for Drug Information

- U.S. Space Program
 - Drug utilization reviews of medication usage could provide insight into microgravity dosing
 - Rotation of International Partners could mean more Non-U.S. medications, require drug information and identification
- Commercial space flight
 - Population changes and more medication use will require greater use of drug information
 - Multinational space flight participants require review of medication with existing countermeasures