

HAND HYGIENE ON THE INTERNATIONAL SPACE STATION

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INTRODUCTION

- The WHO and CDC recommend alcohol-based hand sanitizers as the standard of care for routine hand hygiene^{7,17}
- Alcohol-based sanitizers cannot be used on the ISS due to the risk of contamination to the water supply
- There is conflicting data on sanitizer efficacy on Earth and it is unknown whether sanitization practices are effective against pathogens in space



No Rinse Body Bath is the hand sanitizer used on the ISS. It contains a detergent called Triethanolamine Lauryl Sulfate.

METHODS

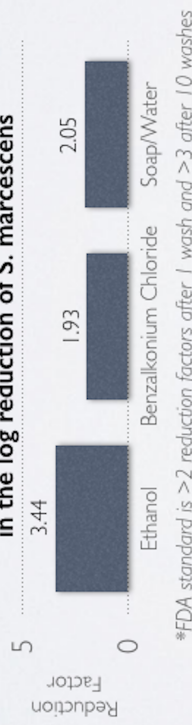
- A systematic review of cohort studies was done searching Google Scholar and PUBMED through February 2017
- Studies were included if they compared alcohol-free sanitizers to alcohol-based sanitizers, soap and water, or no intervention
- 13 studies were identified: 5 reported on incidence of illness, 8 evaluated hand colonization rates

RESULTS

Alcohol-free sanitizers decrease pathogens on the surface of hands

- Alcohol-free sanitizers appear non-inferior in reducing colonization with Serratia, Ecoli, Staphylococcus, and Enterobacter, study power may be lacking^{15,19,21}
- Repeated washes with alcohol-based sanitizers may reduce their efficacy^{5,20}
- Spores, fungi, and non-enveloped viruses may be best removed by physical force or alcohol rubs^{17,20}

Fig 1. Benzalkonium chloride vs alcohol-based sanitizers in the log reduction of S. marcescens



Alcohol-free sanitizer use is associated with reduced illness incidence

- School students have significantly fewer illness-related absences when using alcohol-free sanitizers vs soap and water^{5,11,23}
- However, teaching and monitoring were provided to the study groups but not control groups^{5,11,12,23}

Fig 2. Percent risk reduction in school absences with alcohol-free sanitizers



DISCUSSION

- Current sanitization practices on the ISS are based on expert opinion and design constraints^{6,13}
- Alcohol-free sanitizers appear to correlate with a decreased incidence of illness, but there are no studies which directly compare outcomes to alcohol-based sanitizers
- There are no in-vitro studies on the sanitizer utilized on the ISS
- Future areas of study may include:
 - Alternative methods for sanitizer application
 - Pathogen mutations after prolonged sanitizer exposure in microgravity

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