

In order to address these situations, sampling microorganisms in sand should be considered a public health policy priority, and therefore included in regulatory programs aimed at protecting recreational users from infectious disease.

Lessons

Overall, environmental and epidemiological studies to investigate the link between fungi exposure in sand and human health are recommended. Also, sand analysis and sampling procedures need to be reviewed in order to ensure representativeness of the site. Efforts should focus on evaluating viruses believed to be the main cause of GI illness in beach environments.

Key messages:

- Sampling microorganisms in sand should be considered a public health policy priority, and therefore included in regulatory programs aimed at protecting recreational users from infectious disease
- Awareness of decision-makers and regulators at different levels of decision is of utmost importance

Microbiology of sands and its impact on human health

Rita Carvalho-Fonseca

R Carvalho-Fonseca¹, H Solo-Gabriele^{2,3}, C Matias-Dias⁴, J Brandao⁵

¹Research Unit on Health Services and Policies, Department of Epidemiology, National Institute of Health Dr. Ricardo Jorge, Lisbon, Portugal

²University of Miami Center for Oceans and Human Health, Key Biscayne, USA

³Department of Civil, Architectural, and Environmental Engineering, University of Miami, Coral Gables, USA

⁴Department of Epidemiology, National Institute of Health Dr. Ricardo Jorge, Lisbon, Portugal

⁵Reference Unit for Parasitic and Fungal Infections, Department of Infectious Diseases, National Institute of Health Dr. Ricardo Jorge, Lisbon, Portugal

Contact: ritacfonseca@gmail.com

Issue

Recent studies suggest that sand constitute a reservoir potential pathogenic microorganisms at beach sites, sandboxes and recreational areas world-wide, leading to public health threats, health costs and economic losses. Recreational water quality monitoring mainly focus on bacterial indicators that cause gastro-intestinal (GI) illness.

Description of the problem

The most recent European bathing water directive indicates that areas surrounding recreational water constitute a possible contamination source. However the directive lacks the 2003 WHO recommendation of sand monitoring, especially in regions where beach users stay mainly on the sand due to low water temperatures.

Recent epidemiological studies and data collected during a 5 year beach sand monitoring program of the Portuguese coast support this recommendation.

Changes

Given the diversity of microbes found in sand, further studies are needed to identify the most significant aetiological agents of disease and to relate these to human health risk. Although other microbes have been documented, monitoring sandboxes is currently limited to measurements of *Toxocara* eggs.

An emerging group of fungi of particular relevance includes black, endemic and azole resistant fungi. In non-coastal settings. *Cryptococcus gattii*, has also been gaining significance as the cause of a serious meningitis outbreak in Vancouver, Canada.