Microbial Communities of Bilge Water, Boat Surfaces and Port Water: A Global Comparison
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Introduction and Objectives
- Boats carry ballast water all over the world which can act as a conduit for dispersal of invasive species and pathogens.
- Microbes are ubiquitous in nearly every environment on earth.
- Shipping regulations aim to prevent further introduction of invasive species.
- Microbes also colonize ships’ surfaces and bilge compartment.
- Bilge water is disposed of into the environment; very little work has been done on bilge microbial communities.

Hypotheses
- The swabs taken from the hull of the boat and bilge samples will reflect the microbial community in the open water.
- The microbial community on the boat is seeded by the microbial community in the water.

Approach
Twenty-one locations on three continents were sampled

Results
- Diversity varies with sample type and location
- Cyanobacteria are present in the bilge
- Pathogens are present at relatively high abundances

Water microbial signatures are present on the boat
- Port water seeds a variable portion of the microbial community on a boat, both the boat surface and bilge water.
- Ships may spread pathogens and other harmful microorganisms in bilge water and via hull fouling, in addition to in ballast water.

Future Directions
- Further quantify the “unknown” portion of the output from Source Tracker to look for additional sources to the boat microbiome such as air, soil, etc.
- Look for persistent microbial signatures in bilge water to determine if there is a microbial fingerprint from one location which persists as the boat travels to additional locations.

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