Abstract

Background

Indoor air quality impacts the health and performance of the crew. Most seagoing vessels are equipped with a centralised system for heating, ventilation and air conditioning (HVAC). HVAC systems, if maintained properly, improve indoor air quality and decrease the concentration of airborne bacteria and fungi. The case study of the outbreak of COVID-19 on board the cruise ship *Diamond Princess* shows that centralised HVAC systems can cause the spread of pathogens.

Method

Samples of indoor and outdoor air on board 3 ships were taken by exposing Petri dishes, allowing airborne bacteria and fungi to sediment. The obtained colonies were quantified and, using DNA sequencing, identified.

Outcomes

Bacteria are more prevalent in indoor air, the most prevalent bacterial genus being *Staphylococcus*. The concentration of *Staphylococcus spp.* can be used as an indicator to check whether the air change rate is sufficient for the density of occupants of that space. The indoor concentration of fungi is lower compared to outdoor air. The concentration of airborne micro-organisms (CFU/m^3) in indoor air is significantly lower compared to outdoor air, and conforms to the criteria set up by the WHO and the Flemish government.