



## Royal Caribbean Group

### **Royal Caribbean Group, in collaboration with the University of Nebraska Medical Center and the National Strategic Research Institute, release study on cruise ship HVAC system**

*- Independent study by University of Nebraska Medical Center and the National Strategic Research Institute on board one of the world's largest cruise ships examines air flow, and movement of particulate matter indoors*

*- Scientists found that the risk associated with transmission of airborne particles between spaces, through the HVAC system, is exceptionally low and undetectable both in the air and on surfaces*

*- This study is part of broader recommendations put forth by the Healthy Sail Panel, a group of industry-leading public health experts, to ensure a healthy and safe global return to sailing*

**MIAMI, Feb. 26, 2021** – Royal Caribbean Group (NYSE: RCL), in collaboration with the University of Nebraska Medical Center (UNMC), announced today the results of an independent study on the transmission of aerosol particles through a cruise ship's heating, ventilation and air conditioning (HVAC) system.

Royal Caribbean Group engaged UNMC and the National Strategic Research Institute (NSRI) at the University of Nebraska with the support of the [Healthy Sail Panel](#), a group of globally recognized experts assembled by Royal Caribbean Group and Norwegian Cruise Line Holdings Ltd., to guide the cruise industry's way forward in response to COVID-19. The study by UNMC and NSRI scientists, conducted in July 2020 on *Oasis of the Seas*, helped inform the Healthy Sail Panel's 74 detailed best practices to safeguard the health of guests, crew and communities cruise ships visit. The Healthy Sail Panel's science-based recommendations were outlined in a 65-plus-page report submitted in September and is open sourced for others to incorporate in their protocols as well.

A team of five medical scientists specializing in bioaerosols, led by Josh Santarpia, PhD. – associate professor, pathology and microbiology, UNMC; and research director, chemical and biological programs, NSRI – were called on to understand in detail the role of HVAC systems in spreading airborne particles on cruise ships. The study specifically explored the effectiveness and efficiency of ship air management strategies – ventilation, filtration and supply – and examined air flow across different areas of the ship, including guest staterooms, crew staterooms, lounges and other public spaces.

Researchers found the transmission of aerosol particles between spaces, through the ventilation system, to be undetectable on surfaces and in the air. A leader in modern cruise ship design, Royal Caribbean Group has long been at the forefront of the industry's latest innovations and advancements; and so, the existing HVAC systems were created to be robust and efficient in providing maximum ventilation, continual fresh air intake and layers of filtration for both incoming and outgoing air.

Based on the findings of the UNMC study and at the recommendation of the Health Sail Panel, Royal Caribbean Group is adopting new practices, incorporating additional layers of protection that further minimize the possibility of spread by adjusting shipboard settings to allow for the maximum air changes per hour and upgrading to MERV (Minimum Efficiency Reporting Value)

13 filters throughout the system. In addition, Royal Caribbean Group already equipped its medical facilities with an independent ventilation system and has added HEPA filters for additional precaution.

An overview of the study, as well as full details on how the onboard HVAC system works, can be found at [www.royalcaribbeangroup.com/news/a-breath-of-fresh-air-science-leads-the-way-for-royal-caribbean-groups-hvac-system/](http://www.royalcaribbeangroup.com/news/a-breath-of-fresh-air-science-leads-the-way-for-royal-caribbean-groups-hvac-system/). The findings of the UNMC study can be found at [www.royalcaribbeangroup.com/wp-content/uploads/2021/02/UNMC-Aerosol-study-findings.pdf](http://www.royalcaribbeangroup.com/wp-content/uploads/2021/02/UNMC-Aerosol-study-findings.pdf). For more information on Royal Caribbean Group's healthy return to sailing, visit <https://www.royalcaribbeangroup.com/healthy-sailing/>.

Royal Caribbean Group is applying the recommendations of its [Healthy Sail Panel](#) of public health and scientific experts to provide a safer and healthier cruise vacation on all of its sailings. Health and safety protocols, regional travel restrictions and clearance to visit ports of call, are subject to change based on ongoing evaluation, public health standards, and government requirements. U.S. cruises and guests: For more information on the latest health and travel alerts, U.S. government travel advisories, please visit [www.royalcaribbeangroup.com/cdcnotice](http://www.royalcaribbeangroup.com/cdcnotice) or consult travel advisories, warnings or recommendations relating to cruise travel on applicable government websites.

#### **About Royal Caribbean Group**

Royal Caribbean Cruises Ltd., doing business as Royal Caribbean Group (NYSE: RCL), is a cruise vacation company that owns four global brands: Royal Caribbean International, Celebrity Cruises, Azamara and Silversea. Royal Caribbean Group is also a 50% owner of a joint venture that operates TUI Cruises and Hapag-Lloyd Cruises. Together, our brands operate 61 ships with an additional 15 on order as of December 21, 2020. Learn more at [www.royalcaribbeangroup.com](http://www.royalcaribbeangroup.com) or [www.rclinvestor.com](http://www.rclinvestor.com).

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