

Title: Investigating the Epidemiology of an Outbreak of COVID-19 on a Cruise Ship

Activities: Initiate Epidemiological Investigation; Confirm diagnoses; Interview initial case(s)

Stakeholders: National and subnational health authorities; National and subnational animal health authorities; National and subnational environmental protection authorities

Phases: Surveillance and preparedness; Detection; Early response; Intervention; Post-intervention and recovery

Years: 2020

Countries: Japan

Agent: SARS-CoV-2 / COVID-19

Case study prepared by: Madison Alvarez, March 31, 2020

Please include full case study text below this line.

On February 3, 2020, the Diamond Princess cruise ship reported a potential outbreak of COVID-19. The first confirmed case was identified on February 1st, and the passenger was removed from the ship. Two days later, as it declared the outbreak, the ship and all 2,300 people aboard were quarantined outside the Port of Yokohama. Upon arrival, all symptomatic passengers were tested, and those whose results were positive were removed from the ship. All remaining passengers and crew were quarantined for fourteen days in their individual cabins. Until February 6, testing was only given to those who reported to the medical clinic symptoms. After that, systematic testing and a formal epidemiological investigation began. By February 9, there were twenty cases confirmed among passengers and crew.¹ That number of positive tests increased to 619 by February 20.² By the end of quarantine, 700 people had contracted COVID-19, likely in part because of their isolation in such close quarters.

As part of the epidemiological investigation, on February 12, interviews began to track how the virus spread. The outbreak began among passengers on deck three, three of whom reported contact with crew before their symptoms began. The first crew member infected worked in food

¹ Initial Investigation of Transmission of COVID-19 Among Crew Members During Quarantine of a Cruise Ship - Yokohama, Japan, February 2020. (2020, March 20). Retrieved March 31, 2020, from <https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e2.htm>

² Rocklöv, J, H Sjödin, and A Wilder-Smith. "COVID-19 Outbreak on the Diamond Princess Cruise Ship: Estimating the Epidemic Potential and Effectiveness of Public Health Countermeasures." Journal of travel medicine. U.S. National Library of Medicine, February 28, 2020. <https://www.ncbi.nlm.nih.gov/pubmed/32109273>.

service, and the food service crew was soon heavily impacted by the virus. Likewise, of the eight crew members who eventually became infected had cabin mates, and five of those also developed the disease.³ Later analysis of this study suggested that the initial R_0 was 14.8 but dropped to 1.78 with the implementation of social distancing measures, preventing around 2,000 potential additional cases.⁴ This investigation was essential for understanding the spread of the disease, identifying patterns useful for predicting other potential cases, and was eventually used to determine who could safely be allowed to disembark from the Diamond Princess.⁵

Please include case study summary text below this line.

Epidemiological investigations by laboratory testing and interview were used to trace the spread of COVID-19 on the Diamond Princess cruise ship.

³ Initial Investigation of Transmission of COVID-19 Among Crew Members During Quarantine of a Cruise Ship - Yokohama, Japan, February 2020. (2020, March 20). Retrieved March 31, 2020, from <https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e2.htm>

⁴ Rocklöv, J, H Sjödin, and A Wilder-Smith. "COVID-19 Outbreak on the Diamond Princess Cruise Ship: Estimating the Epidemic Potential and Effectiveness of Public Health Countermeasures." *Journal of travel medicine*. U.S. National Library of Medicine, February 28, 2020. <https://www.ncbi.nlm.nih.gov/pubmed/32109273>.

⁵ Initial Investigation of Transmission of COVID-19 Among Crew Members During Quarantine of a Cruise Ship - Yokohama, Japan, February 2020. (2020, March 20). Retrieved March 31, 2020, from <https://www.cdc.gov/mmwr/volumes/69/wr/mm6911e2.htm>