

# NOROVIRUS - The Gift That Keeps on Giving

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( Norwalk) single stranded RNA virus)



# Problem of contamination in cruise ships



**NOROVIRUS:**  
YOU DON'T WANT IT.



# Norovirus Characteristics

- **Highly contagious**
- **Multiple mode of transmission**
- **Stable in the environment**
- **Resistant to the routing cleaning methods**
- **Carriers may not be symptomatic**



# Usual Symptoms with Norovirus

- Diarrhea
- Vomiting
- Nausea
- Stomach cramping

## Other , less common symptoms may include

- Muscle aches
- General sense of fatigue
- Low –grade fever
- Headache
- Chills



# Press article Norovirus in cruise ships

- **Norovirus vomiting bug epidemic on San Francisco cruise liner infects more than 150 tourists on their way to Hawaii**
- **In total 135 tourists and 16 crew were infected during 15-day Hawaiian trip**
- **Norovirus outbreak began shortly after boat departed from San Francisco**
- **Infected passengers said they were only allowed out of their cabins to eat**
- **Said staff served them from buffet and salt pots were removed from tables**
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# Press article Norovirus in cruise ships

- **More than 250 passengers and crew members on board the first cruise ship to dock in Portland this season were sickened by the norovirus during their voyage, according to the U.S. Centers for Disease Control and Prevention.**
- **The Balmoral arrived Sunday morning at the Portland Ocean Terminal, the first of 76 cruise ships that are expected to visit the city this year. The Balmoral had 919 passengers and 520 crew members when it sailed into Portland Harbor.**



# Press article Norovirus in cruise ships

- **Dirty Dining: 10 Florida cruise ships hit with norovirus in 2016 and 2017 still passed inspections**
- **The cruise lines contaminated with the norovirus?**

Oceania, Princess, Disney, Carnival, Royal Caribbean, Norwegian, Holland America and more.

In March of this year, the norovirus hit the Coral Princess Ship with 157 passengers getting sick along with 25 crew members.

But just ten days before the Coral Princess set sail, the ship scored 100 percent on their vessel sanitation inspection.

And the Oceania's Riviera Cruise ship hit rough waters in the last year with three different cruises, all out of Miami carrying the norovirus.

Two back to back cruises in February and another in March with hundreds on-board falling ill.

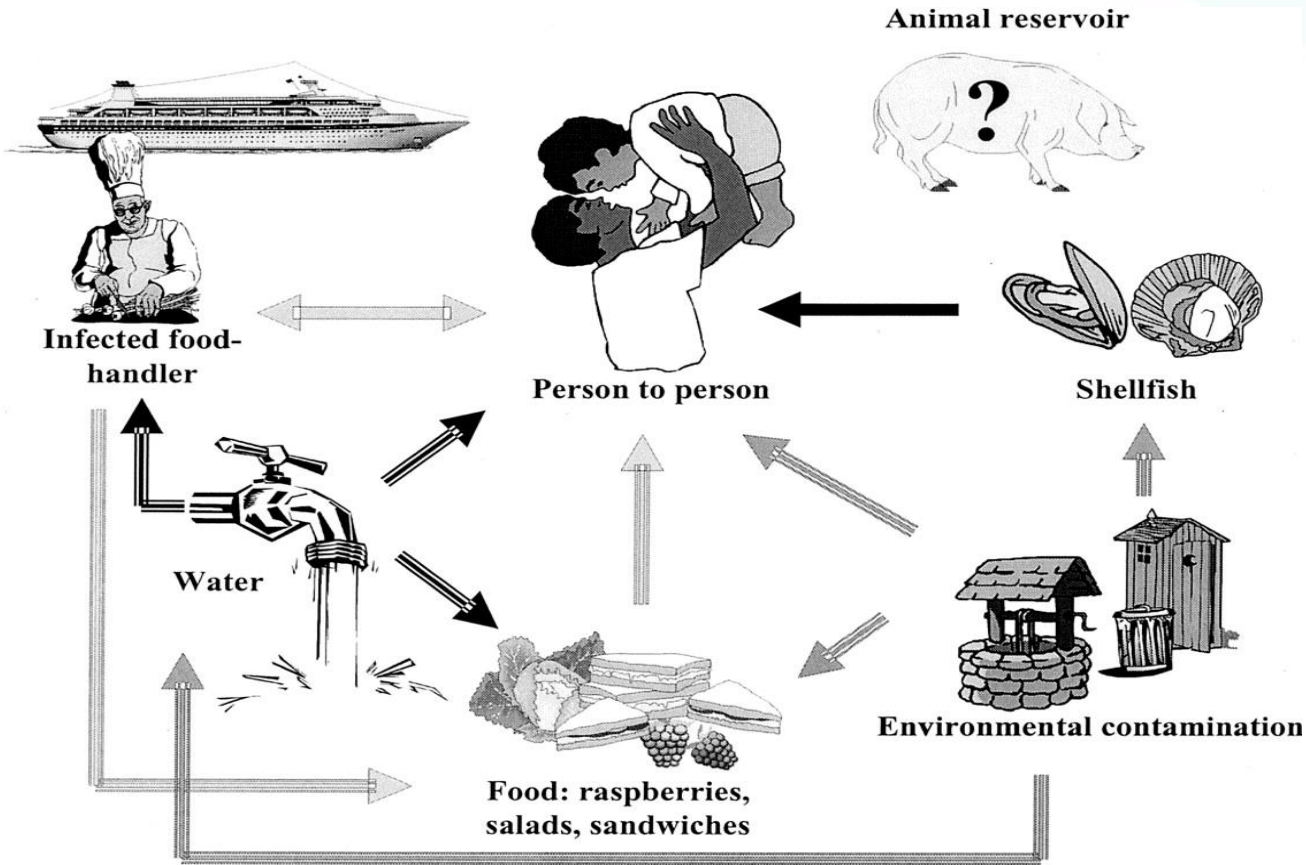
But the ship still received a 96 percent inspection score during that time.!

# Problem ? Inadequate procedures





# Transmission mode



# Gastro-intestinal infection during cruises registered by the CDC

	Cruise Line	Cruise Ship	Period in 2013
2013	Royal Caribbean Cruise Line	Vision of the Seas	25/02 – 08/03
	Princess Cruises	Ruby Princess	03/03 – 03/10
	Celebrity Cruises	Celebrity Infinity Celebrity Solstice Celebrity <u>Millenium</u> Celebrity Summit	17/03 – 01/04 08/04 – 25/04 25/04 – 10/05 21/09 – 05/10
	Holland America Line	<u>Veendam</u>	13/04 – 05/04
	Crystal Cruises	Crystal Symphony	29/04 – 06/05
	Norwegian Cruise Line	Norwegian Gem	16/11 – 25/11 05/01 – 19/01/2014

# Gastro-intestinal infection during cruises registered by the CDC

	Cruise Line	Cruise Ship	Period in 2012
2012	<i>Royal Caribbean Cruise Line</i>	<b>Voyager of the Seas</b>	28/01 – 04/02
	<i>P &amp; O Cruises</i>	<b>Aurora</b>	04/01 – 26/01
	<i>Princess Cruises</i>	<b>Crown Princess</b>	28/01-04/02 04/02 – 09/02
		<b>Ruby Princess</b>	26/02 – 04/03 28/01 – 11/02 28/10 – 09/10
	<i>Celebrity Cruises</i>	<b>Sun Princess</b>	08/07 - 21/07
		<b>Dawn Princess</b>	21/08 – 13/09
		<b>Emerald Princess</b>	17/12 – 27/12
	<i>Celebrity Cruises</i>	<b>Celebrity Constellation</b>	28/01 – 04/02
		<b>Celebrity Silhouette</b>	29/01 – 10/02
	<i>Carnival Cruise Line</i>	<b>Carnival Glory</b>	06/08 - -11/08
<i>Royal Caribbean</i>	<b>Rhapsody of the Seas</b>	24/08 – 31/08	
<i>Holland America Line</i>	<b>Amsterdam</b>	11/11 – 05/12	
<i>Prestige Cruise Holdings</i>	<b>Oceania Riviera</b>	15/11 – 29/11	
<i>Cunard Line</i>	<b>Queen Mary 2</b>	22/12 – 03/01	

# Gastro-intestinal infection during cruises registered by the CDC

2016

Cruise Line	Cruise Ship	Sailing Dates	Causative Agent
Holland America Line	<i>Oosterdam</i>	<a href="#">11/3 – 11/18</a>	Norovirus
P&O Cruises	<i>Adonia</i>	<a href="#">10/16 – 10/23</a>	Unknown
Disney Cruise Line	<i>Disney Wonder</i>	<a href="#">4/27 – 5/1</a>	Norovirus
Fred Olsen Cruises	<i>Balmoral</i>	<a href="#">4/16 – 5/20</a>	Norovirus
Oceania Cruises	<i>Oceania Riviera</i>	<a href="#">3/20 – 4/2</a>	Norovirus
Norwegian Cruise Line	<i>Norwegian Gem</i>	<a href="#">3/12 – 3/22</a>	Norovirus
Silversea Cruises	<i>Silver Spirit</i>	<a href="#">3/3 – 3/21</a>	Enterotoxigenic <i>E. coli</i> (ETEC)
Carnival Cruise Line	<i>Carnival Sunshine</i>	<a href="#">2/21 – 3/5</a>	Norovirus
Royal Caribbean Cruise Line	<i>Anthem of the Seas</i>	<a href="#">2/21 – 3/4</a>	Norovirus
Princess Cruises	<i>Ocean Princess</i>	<a href="#">2/13 – 3/7</a>	Norovirus and Enterotoxigenic <i>E. coli</i> (ETEC)
Oceania Cruises	<i>Oceania Riviera</i>	<a href="#">2/12 – 2/22</a>	Norovirus
Oceania Cruises	<i>Oceania Riviera</i>	<a href="#">2/2 – 2/12</a>	Norovirus
Princess Cruises	<i>Crown Princess</i>	<a href="#">1/8 – 1/18</a>	Norovirus

# Cruise Ship Norovirus Disinfection Video

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- <https://youtu.be/z54CY0NQuVY>

# How can protect myself ?



**HOW CAN I PROTECT MYSELF<sup>10</sup>?**

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Practice good hand hygiene washing hands with warm water and soap for 20 seconds
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Avoid eating unwashed or raw food, which could harbor the virus
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Try not to share towels and flannels
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Disinfect the toilet after each bout of sickness and diarrhoea
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Wash infected bedding and clothing

# Conclusions

- In healthcare settings, cleaning products and disinfectants used should be EPA-registered and have label claims for use in healthcare settings; personnel performing environmental services should adhere to the manufacturer's instructions for dilution, application, and contact time.
- Heat disinfection (i.e., pasteurization to 140°F [60°C]) has been suggested and used successfully under laboratory conditions, for items that cannot be subjected to chemical disinfectants such as chlorine bleach.
- **Other disinfection approaches such as ozone, hydrogen peroxide, or coating surfaces with antimicrobial materials (e.g., titanium dioxide [TiO<sub>2</sub>] film) also have been proposed for routine environmental control of noroviruses.**

**(CDC Issues Updated Guidance for Norovirus Disinfection: Created on March 13th, 2011. Last Modified on March 13th, 2011)**