



PRESS RELEASE HYG18M

CONTROL OF NOROVIRUS ON CRUISE SHIPS AND OTHER AREAS OF POTENTIAL INFECTION

In order to critically review the management of norovirus outbreaks, Hygiena International ATP test systems (involving a hand-held SystemSURE luminometer and UltraSnap swabs) have been used to evaluate the effectiveness of cleaning post-disembarkation, following two norovirus outbreaks on a cruise ship.

Norovirus is the most prevalent cause of infectious gastroenteritis in the UK, and the ATP Bioluminescence technique has been used for many years to identify potential sources of contamination in the food chain, in production and preparation areas as well as many other industrial and commercial applications. It has also been utilised more recently to monitor surface cleanliness, and used in conjunction with varying infection control measures to monitor many other areas of potential infection. These include confined environments as found in care homes and hospitals, where secondary or subsequent outbreaks often re-occur even after initial cleaning and sanitation procedures have been undertaken. Other potential areas of application include naval and commercial maritime vessels (both surface and subsea) as well as offshore oil and gas rigs.

Any cleaning procedure is designed to remove residues of food and body fluids such that the subsequent application of disinfectants can function correctly and inactivate residual microbial contamination. Foods and body fluids contain large amounts of ATP i.e. adenosine triphosphate (the universal energy carrier) such that residues of ATP remaining on surfaces after cleaning provide a direct, objective measure of the efficacy of the cleaning process and residual contamination risk.

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The UltraSnap swabs contain a reagent known as luciferase/luciferin in the bulb of the swab. Once the swab is snapped and the bulb squeezed, an oxidation reaction takes place with any ATP present, emitting light. The light produced is directly proportional to the amount of ATP in the area tested. This is a rapid method showing a strong correlation between ATP and microbial cells, with results measured in relative light units (RLU) can be obtained within 15 seconds.

Norovirus is not notifiable but ships are required to notify Port Health Authorities of cases prior to berthing on the Maritime Declaration of Health. Key to preventing the spread of norovirus is thorough and effective cleaning and disinfection during and after an outbreak. The effectiveness of decontamination should be evaluated by Port Health Officers, as described by the Health Protection Agency (2007). The Hygiena SystemSURE test procedure is swift, provides a PASS/CAUTION/FAIL result and can be undertaken by personnel after only minimal training.

Previous research on outbreaks of norovirus on cruise ships have inadequately described the control measures implemented. Other more specific detection methods for norovirus are also expensive and it can take some time before results become available. The short turnaround time of <8 hours for a cruise ship, however, leaves little time for Port Health Officers to assess whether a ship is safe to continue sailing.

With the SystemSURE equipment, samples were taken in infected cabins and toilets on all decks including some adjacent non-infected cabins, and also before embarkation, at the port terminal following deep cleaning. The areas swabbed were random and taken from various sampling points immediately after cleaning, and focusing on typical high hand touch areas which can transmit infection. This study was moderate in size with 601 swabs/sampling sites measured in both outbreaks including sampling of 53 cabins and the public areas on the ship. A benchmark of 100 RLU was used as the maximum acceptable safe reading, since previous studies showed that this is achievable in hospital near patient areas as well as at commercial catering establishments. Accordingly a traffic lights system was adopted of Pass (green) indicating <50 RLU, Caution (orange) representing 51 - 100 RLU being present and Fail (red) where >100 RLU existed.

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Post-cleaning data was generated after both outbreaks which indicated that most of the surfaces tested were actually cleaned to a high standard (generally <50 RLU). However, a small number of unclean surfaces were identified with very high RLU values of 1600 - 6946 which suggested that these locations were either poorly cleaned or not cleaned at all. The highest failure rate and highest RLU values were associated with handrails, toilet area taps and shower holders with average RLU values of 182, 468 and 978 respectively.

Additional figures showed that a better level of cleaning was achieved after a second infection outbreak. In the first outbreak involving 514 passengers and 298 crew, 59 of the passengers (12%) and 3 crew (1%) became ill with norovirus over 10 days. Three months later, on the same cruise ship, of the 661 passengers on that cruise and 287 crew, only 36 passengers (5%) became ill over 6 days. Higher attack rates and a prolonged outbreak could be linked to greater residual environmental contamination.

ATP testing performed on the public areas of the ship generally showed good cleaning after the first outbreak with low average ATP results. Sample sites included hand rails, hand contact areas in washrooms, restaurants and bars, and the Internet centre. The port terminal had 60% fails with some very high ATP scores of several 1000's RLU taken from the terminal desk. However, several other areas of poor cleaning on the ship were identified from worktops, restaurant trolley handles, ice machines and taps. The café at the port terminal had the highest recorded result of public areas sampled at 4635 RLU - taken from the men's toilet taps.

There had been many failures in implementing control measures, possibly due to the rapid turnaround period between cruises. However, it seems clear that enhanced hygiene measures can significantly reduce norovirus transmission in outbreaks by as much as 85% when properly implemented to ensure of breaking the chain of infection and so reducing the transmission potential. For effective decontamination of fomites and to avoid subsequent successive outbreaks, cruise ships may have to be taken out of service for a short period following an outbreak.

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Clearly the consistency and thoroughness of the delivery of cleaning and decontamination services are crucial to managing and preventing norovirus outbreaks. Organising dedicated teams to clean specific areas in a controlled manner is often advantageous, e.g. bathrooms and washrooms where vomiting incidents have or are likely to have occurred. Environmental sampling is recommended in all outbreaks on cruise ships to evaluate the efficacy of control measures. ATP swabs are not a substitute for microbiological culturing methods, they are an invaluable tool for the rapid assessment of cleaning standards. They have served to identify areas and surfaces regularly inadequately cleaned, resulting in ships changing their cleaning procedures.

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Hygiena

Hygiena is a microbiology and life science company that serves industrial food and beverage processors, healthcare institutions, sanitation suppliers, and life science researchers. Hygiena manufactures and sells a broad range of rapid monitoring systems, environmental collection devices, and rapid dilution devices. Hygiena is committed to the mission of providing customers with innovative technologies that are simple, easy to use, and reliable, with excellent customer service and support. All products are made under strict GMP standards, ensuring excellent product quality and reliability. With offices in the US, UK, China, India, and over 100 distributors worldwide, Hygiena products span the globe. For more information visits www.hygiena.com

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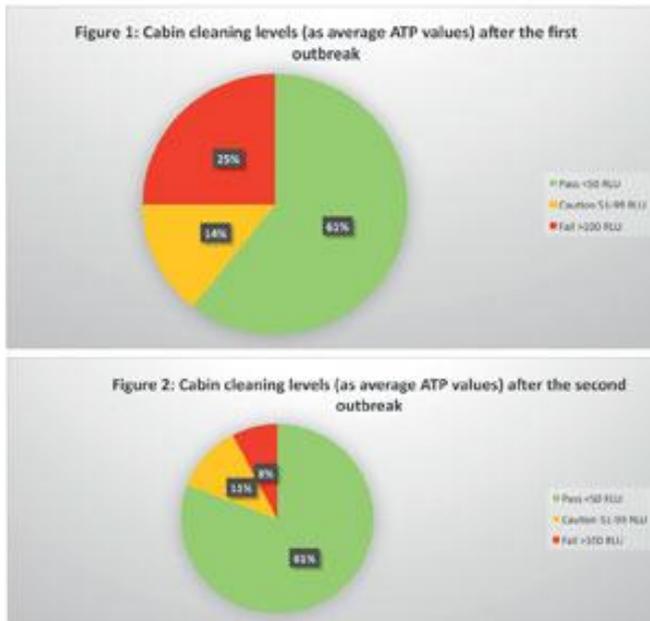


The Hygiena International SystemSURE hand-held luminometer, together with UltraSnap swab as utilised in norovirus outbreak control on cruise ships and other locations of potential infection.

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Pie chart indications of overall Pass/Caution/Fail percentages of average ATP values on tested areas indicating potential contamination after initial and subsequent outbreaks of norovirus on a cruise ship.

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CELEBRATING SUCCESS

Building on >30 years of manufacturing experience in ATP bioluminescence, the company continues to innovate to develop simple rapid detection products and solutions for its customers.

Hygiena's market leading qualities of proven high performance, repeatability and cost effectiveness have made it the system for choice for many leading blue chip companies around the world.

- 1st liquid stable ATP detection reagent (1999)
- 1st universal ATP reagent swab device (2000)
- 1st truly portable low cost ATP Hygiene monitoring system (SystemSURE, 2003; improved 2006)
- Independently verified and proven to give the best performance (2006, 2010, 2011)
- Business award recognition in several industries
- >25,000 systems sold
- Range of simple colour hygiene tests
- New test platform for 21st Century
 - New EnSURE instrument (2011)
 - More sensitive reagent (SuperSnap) supporting allergen control
 - Detection of microbes and specific bacteria in less than 8 hours (MicroSnap)
 - Detection of process indicators minutes (ZymoSnap)

Hygiena's mission is to supply products that deliver simplicity, convenience, excellent performance and value for money, backed-up by expert knowledge with first class service and support.