



Hand Hygiene & Rewards Program Feasibility Study



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The Problem:

Guest and Crew Safety is of paramount importance to the Cruise Line industry. Similar to Hospitals in their effort to reduce Healthcare Associated Infections (HAIs), the Cruise Line industry has taken significant measures and implemented processes, like hand washing regimens and disinfection of rooms and high-touch surfaces throughout a ship to reduce the incidents of outbreaks.

While hospitals and cruise ships face similar challenges with pathogen transmission, the Cruise Line industry has a unique set of challenges having travelers from diverse regions of the world together in often crowded, semi-enclosed environments with passengers frequently disembarking for excursions and re-boarding the ship, all of which help to create an ideal environment for pathogen transmission.

The largest percentage of recorded outbreaks on cruise ships is the norovirus, which causes GI illness, however there are other viruses and bacteria that impact cruise ships including Salmonella spp., enterotoxigenic Escherichia coli (E-coli), and Staphylococcus aureus (MRSA) to mention a few. Each of these can impact the health of passengers and crew, as well as the economic health of the ship.

There is a potential infectious risk in these travels. This risk may be from introduction of a pathogen in the food and water supply or in the ship's sanitation system or spas. Passengers and crew may also transmit respiratory or gastrointestinal pathogens because of close contact. Occasionally, individuals may get sick from acquiring an infection while on shore.

The prevention of these infections involves meticulous care of the ship's sanitary conditions, receiving appropriate vaccinations as necessary, and following basic infection control mechanisms, especially hand washing.

Hand hygiene is generally regarded as the most important element of an effective infection prevention strategy and plays a vital role in improving infection prevention aboard cruise ships.

In a field as crowded as the cruise industry, bad press for a small handful of brands – or even a single one – can have negative repercussions for major players across the board."

Americans continue to have more favorable attitudes toward air travel than toward cruises. Roughly six in ten think that air travel is much more reliable than taking cruises and a majority agree that air travel is much safer than taking cruises. A majority of Americans also agree that they're less likely to take a cruise now than they were a year ago.

The scope of the problem:

2019

Cruise Line	Cruise Ship	Sailing Dates	Causative Agent
Viking Ocean Cruises	<i>Viking Sea</i>	1/18 – 28	Unknown
Royal Caribbean International	<i>Oasis of the Seas</i>	1/6 – 13	Norovirus

2018

Cruise Line	Cruise Ship	Sailing Dates	Causative Agent
Viking Ocean Cruises	<i>Viking Star</i>	12/13 – 1/3, 2019	Rotavirus
Crystal Cruises	<i>Crystal Symphony</i>	11/8 – 12/2	Norovirus
Holland America Group	<i>Volendam</i>	11/3 – 18	Norovirus
V. Ships Leisure U.S.A.	<i>Pearl Mist</i>	9/1 – 12	Unknown
Regent Seven Seas Cruises	<i>Seven Seas Mariner</i>	6/20 – 30	Unknown
Holland America Group	<i>Zaandam</i>	6/18 – 7/2	Unknown
Silversea Cruises	<i>Silver Shadow</i>	5/10 – 5/24	Norovirus
Celebrity Cruises	<i>Celebrity Infinity</i>	4/17 – 5/2	Norovirus
Cunard Line	<i>Queen Victoria</i>	2/21 – 3/9	Norovirus
Azamara Club Cruises	<i>Azamara Quest</i>	1/25 – 2/8	Unknown
Princess Cruises	<i>Island Princess</i>	1/9 – 1/24	Norovirus

2017

Cruise Line	Cruise Ship	Sailing Dates	Causative Agent
Royal Caribbean	<i>Independence of the Seas</i>	12/11 – 12/16	Norovirus
Celebrity Cruises	<i>Celebrity Reflection</i>	11/17 – 11/27	Norovirus
Princess Cruises	<i>Crown Princess</i>	10/25 – 11/8	<i>perfringens</i>
Lindblad Expeditions	<i>National Geographic</i>	9/26 – 10/2	Unknown
Holland America	<i>Noordam</i>	7/30 – 8/6	Norovirus
Holland America	<i>Nieuw Amsterdam</i>	7/22 – 7/29	Norovirus
Holland America	<i>Noordam</i>	7/23 – 7/30	Norovirus
Holland America	<i>Volendam</i>	7/19 – 7/26	Norovirus
Holland America	<i>Volendam</i>	7/12 – 7/19	Norovirus
Oceania Cruises	<i>Regatta</i>	3/29 – 4/14	Norovirus
Princess Cruises	<i>Coral Princess</i>	3/8 – 3/18	Norovirus

Conclusions:

Modern passenger cruise ships are effectively “mini cities” at sea, with populations of several thousand and hence with all the complexity in hygiene provision of a typical urban infrastructure, with the added complication of isolation for long periods of time (no-one leaving or entering the environment).

These conclusions address the requirements for hand hygiene and specifically the role of waterless hand sanitizers within the cruise ship eco-system. This is only one part of a holistic hygiene or hand hygiene strategy.

We consider the scenarios and responsibilities of individuals for hand hygiene within the cruise ship ecosystem, and the role waterless hand sanitizer plays within this.

Washroom Hand Hygiene:

Hygiene in washrooms (either public or in passenger/staff quarters) is a vital element of any holistic infection prevention strategy. Washrooms present an infection risk via two main pathways; infection from feces (either an infected individual or an asymptomatic carrier) and infection following contamination of on-board water supply (e.g. Legionella). The role for thorough surface cleansing and disinfection in washrooms, and for effective water quality control, is clear and will not be covered here.

Regarding hand hygiene and the selection of the most appropriate solution, two factors are important in washrooms:

1. Water for rinsing is commonly (and should be) available
2. Physical cleansing in addition to hand sanitizing is required

Passenger and Public Washrooms:

Given the above, the primary hand hygiene solution for passenger and public washroom should be a high quality non-soap hand cleanser designed for frequent use and with mild, skin-friendly properties.

Additional considerations for Healthcare and Food Handlers:

Staff involved in healthcare and food handling have an additional duty of care and risk profile following any visit to the washroom. For this reason, it is strongly recommended that either a suitable broad-spectrum antimicrobial cleanser is adopted in place or a general washroom cleanser for the specific washrooms used by staff in these departments. When this is not possible, a regime of washing with a non-soap cleanser followed by sanitizing with a suitable waterless hand sanitizer should be adopted.

Opportunities for adoption of the former strategy would include instances where washrooms are used uniquely by such employees (e.g. in kitchen areas). Opportunities for adoption of the latter strategy would include instances where such employees use public washrooms in the course of their duties (e.g. a doctor visiting a passenger room). In this case, both washroom hand cleanser and waterless hand sanitizer should be provided, and instructions for use given to key staff.

Food Storage and Food Preparation Areas:

In these environments, two main pathways for contamination and infection can occur; food contamination from an infected individual and food contamination from other contaminated food. In addressing these risks, the role for robust surface cleansing is clear, as is the role for effective food management (storage, separation and control) and personnel management.

Food contamination can take a number of forms; bacterial, fungal or viral. Of key concern are bacterial contaminations such as Listeria and Salmonella, and viral contaminations such as Norovirus. It is important to note a key distinction in that bacterial colonies can grow and multiply on or inside contaminated food, while viral contaminants typically lay dormant awaiting transport to a human host.

The safest and most effective means to ensure good hygiene is to wash hands thoroughly according to established best practice. Washing with an appropriate hand cleanser and water ensures the physical removal of greasy soiling as well as any microbiological contamination. Given the high duty of care for such situations, a high level of sanitizing (>99.99% reduction) is desired. As noted above, this can be achieved either through combination of standard non-soap hand cleanser and waterless hand sanitizer or by using a suitable antimicrobial hand cleanser.

The latter strategy should be strongly encouraged for food handlers as it provides a more convenient solution unless a suitable product is not available. When cleanser and sanitizer are used, it is important that hands are both physically clean and dry before the sanitizer is applied. It is not considered that frequent requirements for hand hygiene away from the provision of running water is likely or desired for food handling environments.

Healthcare Areas:

Within on-board healthcare areas, we consider that individuals can be healthcare professionals, passengers (as patients or visitors) and other non-associated staff members (also as patients or visitors). In terms of the key duty of care for hand hygiene, we will focus on healthcare professionals, with comments as to suitable provision for the other groups.

Within healthcare areas, control of infection is vital. Typical pathways for contamination leading to infection include transmission of pathogens from one patient directly to another, or via surfaces touched by both or by healthcare workers engaged in the treatment of both. Specific opportunities for infection include feeding of patients and particularly treatment of open wounds or execution of aseptic procedures. In addition to the requirement for effective surface cleansing not covered here, there is a very clear and effective strategy for hand hygiene outlined in the [World Health Organization \(WHO\) 5 moments for Hand Hygiene](#).

In terms of the key concerns for healthcare workers, clearly prevention of transmission of all pathogens is important however paramount is prevention of transmission of multi-drug-resistance-organisms (MDROs) such as MRSA and VRE which are endemic in healthcare settings due to regular contact with antibiotic drugs. Additional activity against key infection strains such as C. difficile and norovirus is also highly desirable.

For healthcare staff, very frequent hand hygiene may be required in order to fully comply with the risk based approach of the 5 Moments. In many cases, hand hygiene at the point of care (away from the provision of running water) is needed. For these reasons it is strongly recommended that a suitable waterless hand sanitizer is adopted as the primary strategy for hand hygiene for healthcare staff, supplemented by either a standard or an antimicrobial hand cleanser when necessary. Only when hands are physically dirty, or following key risk indicators such as Moment 3 (after body fluid exposure risk) should hands be washed with cleanser and water. In most other cases, better disinfection and better skin care is achieved by using a suitable waterless hand sanitizer designed for frequent use.

Non-healthcare workers (either passengers or non-involved staff) should be encouraged to sanitize with a waterless hand sanitizer on entry to and exit from the healthcare area, or following clear risk indicators such as touching a passenger.

General Public Areas:

Beyond washrooms, main pathways for infection in public areas will be touching contaminated surfaces and airborne pathogens. Robust surface cleansing strategies clearly must play a role. In addition, sensible hand hygiene practices can effectively mitigate spread of non-airborne pathogens and can assist in the control of airborne (aerosol) pathogens.

Provision of waterless hand sanitizer at key locations such as entry/exit to open spaces and along thoroughfares is a very effective means to tackle such infection risks, which will be dominated typically by control of “herd” contagions, including Norovirus, and E. coli.

Elements for Selection:

The primary criterion for selection of a waterless hand sanitizer must be antimicrobial efficacy, but this is not the only aspect. Other key selection criteria for a successful outcome include skin compatibility, likely build-up of microbial resistance and user preference in use. The latter is especially important in driving compliance either when very frequent use is required (e.g. Healthcare) or when professional responsibility cannot be assumed (e.g. public areas).

Alongside robust water treatment, food handling and management and surface cleansing procedures, and supplemented where appropriate by water rinsed hand cleansers, waterless hand sanitizers can play a vital role within hygiene and hand hygiene strategy for infection prevention aboard modern cruise ships.

The Solution

Hand Hygiene Electronic Compliance Monitoring on Cruise Ship

Ship Safe an Innovative **electronic system** for the automatic monitoring of hand hygiene compliance is a hybrid of TSG’s Sanitrack hand hygiene monitoring for healthcare. This system allows continuous monitoring over time along with real time reports, analytics and feedback to key personnel.

So why is hand hygiene monitoring so important? Presently, in healthcare environments the average is 40% compliance for hospital personnel only. You can imagine what it must be of visitors and non-hospital personnel if it is this low when tracked. It is a documented fact that when people know they are being monitored their compliance rates will go up (see Hawthorne effect)

These systems are also capable of providing analytics and feedback to administration either immediately at the point of use or later in reports on passenger hygiene events and crew team data. Location tracking, procedure monitoring and potential habit formation are possible analytics which can be mined to better position the cruise ships products and services.

With ship board infections on the rise, hand hygiene is the easiest way to bring down the overall cost of hygiene compliance while improving passenger safety. It's the reason hand hygiene compliance tops the list of priorities at the nation's safest cruise ships.

The overall goal of this system is to prevent the spread of the norovirus bacteria among other cotangents. Most passengers will not do this on their own even if being told. In our opinion they must be incentivized. Our High Tides Rewards Program ties number of sanitization events to potential credits the cruise line will offer the passenger. This is completely up to the cruise line marketing department regarding what they are willing to offer but it literally could range from credit on future cruises to couponing for spa treatments. We have an active relationship with oracle Hospitality so if the applicable API is written you could access and redeem credits at POS.

We feel that by incentivizing the passenger and holding accountable the crew for hand hygiene occurrences Norovirus and other cotangents can be stopped in its tracks. This will not only render the passengers and all shipboard people safe but should revitalize the cruise line industry perceptions along with potentially increasing revenue with the High Tides Rewards program.

Steramist, a VHP vapor formulation is also meant to be a preventative measure to eradicate the Norovirus bacteria and other particulates at its earliest stages. There are a variety of cleaners and chemical formulations that are also meant to contain this bacterium. This bacterium is invisible to the naked eye and the traditional way of applying these cleaners is by hand. Steramist, a revolutionary technology, originally developed by DARPA. Using mobile application equipment, a vapor is directed in areas to be decontaminated. This formulation not only blankets the area but will present a six log kill rate of not only Norovirus but other particulates. This formulation is not only safe on foods should they be exposed but the final residue is a water droplet.

By enabling these programs, the chances of an outbreak will be drastically reduced and quite possibly eliminated. The numbers below quantify that something must be done, not only to protect the cruise participants but to assure the continued growth and prosperity of the cruise line industry.

The financial breakout 7-day cruise:

Crew size: 1,500

Passenger count: 3,000

Fuel cost: \$579,000

Food/beverage cost: \$321,000

Pre-paid Dockage fees: \$105,000

Pre-paid agent commissions: \$699,000

Entertainment salary's: \$70,000

Capt. Salary: \$7,000 per cruise

Ship's Crew salary: \$591,000

Additional operating costs: \$948,000

Healthcare personnel:

- \$3,375 (3 nurses on board)
- \$2,000 (1 doctor on board)

Ticket fees and passenger expenditures:

- Tickets: \$3,879,000
- Total passenger expenditures: \$1,494,000
 - Includes, casino, bar, spa, % shore expenditures, misc. spending

The before taxes profit on a cruise of the length is **\$681,000**

Potential Lost Revenue Due to Cruise Turn-A-Round:

Crew Size: 1500

Passengers: 3000

Cruise Length: 7 days

The figures stated below reflect a revenue loss based on a ship wide infection, resulting in a turn-a-round after 3 days of home port and cancelation of the cruise.

Industry average refund policy in this circumstance is a 60% refund on ticket price, and a 25% discount on the another cruise.

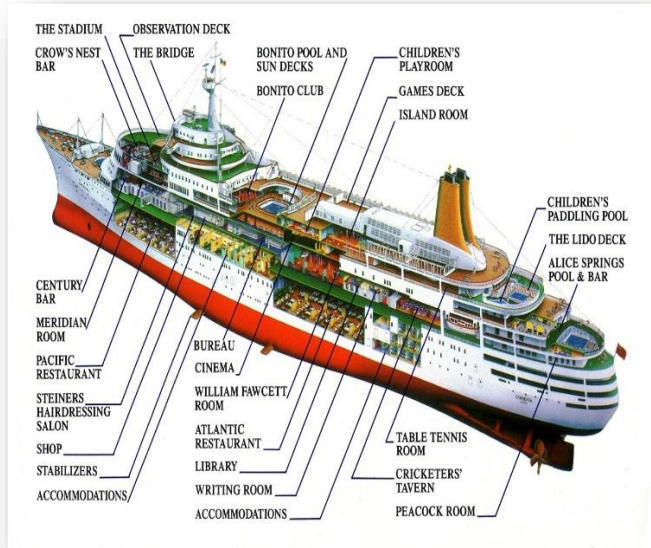
- Ticket refunds: \$2,327,400
- Lost Passenger expenditures: \$747,000
- Fuel cost: \$579,000
- Food/beverage cost: \$321,000
- Pre-paid Dockage fees: \$105,000
- Pre-paid agent commissions: \$699,000
- Entertainment salary's: \$70,000
- Capt. Salary: \$7,000 per cruise
- Ship's Crew salary: \$591,000
- Additional operating costs: \$948,000
- Health based expenditures:
 - \$3,375 (3 nurses on board)
 - \$2,000 (1 doctor on board)
- Discount extended on next cruise: \$969,750

The estimated cost of cancellation after 3 days: <**\$6,421,525.**>

The aforementioned loss does not include any ancillary costs such as negative PR and the harm to the cruise line reputation.

Additionally, The Centers for Disease Control and Prevention (CDC) tracks outbreaks of norovirus infections on cruise ships and has strict requirements that every single case must be reported, which is not the case with outbreaks on land. Every ship that enters US waters must report the number of passengers and crew with gastrointestinal illnesses to the CDC.

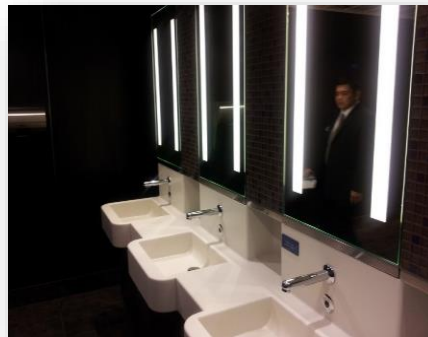
Example of service and common areas on a cruise ship



Examples Cruise ship infirmary



Examples Cruise ship public restroom



Examples cruise ship stateroom



Example cruise ship kitchen areas



Examples of cruise ship passageways



Example of Viking Cruises hygiene station



Viking mounts hand sanitizer stations at most venue entryways and exits throughout the ship. Shipboard public restrooms are well-equipped so that guests are not required to touch door handles.

Single-use cloth towels are available for drying hands and opening the doors to the anterooms, and anteroom paper towel dispensers assist guests with opening exit doors.

Designers of land-based public restrooms should take note.



Sample quotation for 3000 passenger cruise line

Estimate:

Passenger count: 3,000

Crew compliment: 1,500

Verify Mesh Modules:

- 4,200 staterooms and crew's quarters
- 2,500 common areas, public rest rooms, hallways, casino, spa, and all entry/exits.

Sani-track wall units:

- 100 kitchen, prep and serving areas
- 6 medical areas
- 4 Pharmacy/dispensary

Passenger/Crew wrist bands

- 3,000 passengers
- 1,500 crew

Ship Safe Software	\$ 26,000
Verify Modules:	\$ 971,500
Sani-track units:	\$ 220,000
Wrist Bands:	\$ 35,550
	<u>\$1,250,050</u>

Fleet Wide Implementation:

Average Fleet size: 18 ocean capable ships (total avg. 4 cruise lines)

Average Capacity: 3,000 passengers

Crew Complement: 1,500

Ship Safe Software	\$ 468,000
Verify Modules:	\$17,487,500
Sani-track units:	\$ 3,960,000
Wrist Bands:	\$ 635,900
	\$22,551,400

The cost of deploying a ship wide hygiene monitoring system, can be mitigated by the following factors:

1. reduction in all aspects of ship board infections large and small
2. tracking and monitoring hygiene protocols
3. preventive action on violations before an infection manifest
4. a faster response in locating, tracking and isolating patient zero
5. reduction in labor costs involved in sanitization of infected areas
6. reduction in medical costs incurred by crew
7. reduction in ticket refunds
8. increased public confidence
9. an excellent public relation opportunity by press releasing the fleet wide install

In Summary:

According to the final tally released by the CDC, only 547 cases of gastrointestinal illnesses were reported in 2018. By comparison, that's less than half the number reported in 2017.

A cruise line is required to report an outbreak to the CDC if over three percent of passengers are stricken by illness. This means that it's possible — perhaps even likely — more cruisers fell ill, but in small enough numbers that it did not turn into a full-blown outbreak.

While one of 2018's reports involved a much higher than normal percentage of passengers falling ill (8.56%) it was actually only 28 passengers out of the 326 sailing on the Silversea vessel the *Silver Shadow* when the outbreak took place in May.

The other ships which wound up filing reports with the CDC in 2018 were:

- Crystal Cruises' *Crystal Symphony*
- Holland America Group's *Volendam*
- V. Ships Leisure USA's *Pearl Mist*
- Regent Seven Seas Cruises' *Seven Seas Mariner*
- Holland America Group's *Zaandam*
- Celebrity Cruises' *Celebrity Infinity*
- Cunard Line's *Queen Victoria*
- Azamara Club Cruises' *Azamara Quest*
- Princess Cruises' *Island Princess*

While mainstream media outlets love nothing more than to report on norovirus outbreaks on cruise ships, it's important to note that the illness is far more prevalent on land than it is at sea.

So why do we rarely hear about land-based outbreaks? Because there's a significant difference in the way outbreaks of the virus are reported. Essentially, health officials track illnesses aboard ships, which means that once several passengers have fallen ill, it is reported as an outbreak. Once you've come into contact with the virus, the incubation period is generally between 12 and 48 hours.

This means that if a passenger contracts the virus at the beginning of a cruise, the infected passenger will pass it on to at least quite a few other people as well. The cruise line is required to report the outbreak to the CDC and the next thing you know, there's yet another headline about an outbreak on a cruise ship.

The following statistics shows the number of cruise ship illness outbreaks in recent years. You can compare number of reports (CDC and news media sources) and total number of infected (passengers and crew).

Year / Number of reported cruise ship outbreaks	Total infected (passengers / crew)
2018 - 15 reports	1177 (of which 1099 pax, 78 crew)
2017 - 21 reports	2535 (of which 2450 pax, 85 crew)
2016 - 23 reports	2504 (of which 2378 pax, 126 crew)
2015 - 23 reports	2570 (of which 2458 pax, 112 crew)
2014 - 14 reports	3530 (of which 3354 pax, 205 crew)

Please note: our loss figures are based on a complete cruise turn-a-round after 3 days of a 7-day cruise and have used cruise industry averaged number to compute the negative financial impact to the Cruise line. Without question, said figures reflect the worst-case scenario.

One number not reflected in this document, is the impact of negative publicity to the carrier as it is impossible to quantify in a financial sense. Its axiomatic however, said impact is extremely harmful to the line's public image.

Given the competitive nature of the industry, public confidence is a paramount consideration in maintaining full bookings. In 2019, 19 cruise lines are previewing new ships. An estimated 30 million passengers are expected to take cruises.

With market saturation fast approaching, the public perception in a Cruise lines ability to keep passengers healthy and happy goes hand in hand with full bookings.



Ship Safe's Sani-track Wall Mounts for critical hygiene work spaces...



Ship Safe's Verify wireless, battery operated mesh module, for general areas, hallways, common spaces and state rooms...

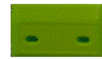




The Verify Hygiene Compliance System:

- Enables 24/7 monitoring at the community level.
- Seamlessly converts real-time data into actionable, usable information.
- Provides continuous feedback to the healthcare team.
- Can be customized to monitor a specific floor, unit or room.
- Cost effective replacement to “Secret Shopper” compliance monitoring.
- 24/7 feed back on hand hygiene compliance rates with no re-direction of labor.
- Completely wireless installation
- Battery Operated
- Utilizes existing wireless networks
- Attaches to all brands of dispensers and delivery enclosures.
- Installs in minutes, no room down-time

Alcohol



Soap



Gloves





The hand hygiene problem

Hand hygiene as it is understood today requires three to 30 applications of hand rub per hour during patient care, which translates to one hand rub application up to every 2 minutes during intensive care activities.

The reality, however, is that unobserved healthcare workers perform very few hand hygiene actions during their work day. The magnitude of the task of fixing this substandard quality of care has challenged infection control professionals worldwide for many years.

How Sani-Track can help

The patented generic **Sani-Track** wall mount, accommodates all models of soap and sanitizer dispensers, with one of the lowest infrastructure/installation disruption room down time in the industry. **Sani-Track** can be easily implemented in any hospital, outpatient clinic, nursing home, dental office or other patient care environment.

Most hygiene verification products depend heavily on calling attention to noncompliance i.e. whether through blinking lights, beeps or vibrations. **Sani-Track** compels compliance through positive reinforcement, behavior modification, and creating healthcare worker efficiency. **Sani-Track** is designed to become a part of the daily activities of caregivers without causing a disruption in workflow or becoming a source of annoyance.



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Sani-Track Benefits

- Uses existing hand hygiene stations and dispenser wall mounts with minimal infrastructure disruption
- Designed to adapt to all makes and models of dispenser units
- Room install time is 20-45 minutes installation per unit
- Wi-Fi and web based for access over existing wireless network
- Internet assessable for service and support room by room if necessary
- Benign impact on daily operations
- Allows Infection Control Department to deal with non-compliance in a private and professional manner, without any in-room disturbances involving the employee and/or patient
- The system is scalable into full employee/visitor access control security within hospitals

Made from ANTI-MICROBIAL Plastics



How the Sani-Track system works

The Sani-Track generic wall mount system utilizes existing Hospital ID badges or badges that we can supply to monitor hygiene compliance by employee ID.

Technologies Solutions Group has developed a generic wall mount which can accommodate most of the existing wall mounted sanitizer/soap dispensers currently in use in the healthcare industry. The mounting plate houses RFID signal technology, and Infra-red proximity sensors to monitor hygiene compliance at the source.

When hospital employee and/or visitor enters the room, a door sensor trips a signal to our wall plate and times out a predefined count-down for the employee/visitor to use the sanitizer dispenser. The entry time is stamped and matched with the employees badge number. The compliance event and/or violation event (failure to sanitize) is immediately sent to the Infection Control Office or a monitoring entity defined by the Client. A complete log is stored by shift for review and action by the appropriate internal entity(s).

The Sani-Track reporting structure logs the following information as well as incorporates open report architecture so the client may design their own reports around pending FDA and Medicaid/Medicare hygiene mandates.

Daily room time stamp reports

Time in
Employee number
Visitor number and/or a non-read entry
Sanitize-in event stamp
Hard scrub event stamp
Sanitize-out stamp
Violation stamp

End of shift by employee, department, clinic & wing

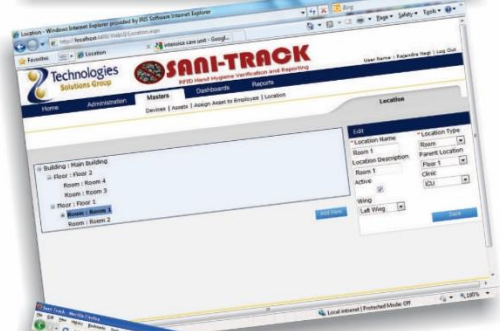
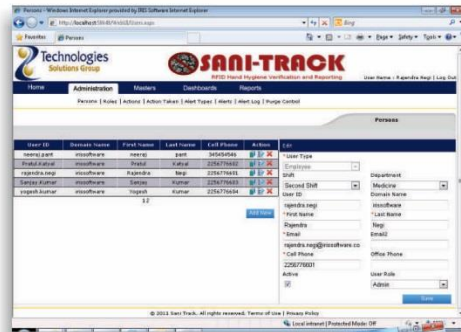
Violations highlighted in yellow
Violations include unidentified room entries
Summary report daily, weekly, monthly, quarterly, annual

Violation log report

Employee number
Visitor number and/or non-read entry
Room number
Time/date of event
Department
Clinic
Wing
Action taken
Summary reports daily, weekly, monthly, quarterly, annual

Statistical analysis compliance/non-compliance

Shifts
Department
Clinic
Wing
Summary report daily, weekly, monthly, quarterly, annual



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Cruise Ships Lines across the world are continuously searching for better ways to limit the spread of infections and improve their disinfection terminal cleans. Passengers and crew can encounter a variety of infectious diseases that are easily spread throughout the ship from all surfaces including those hard to clean contaminated equipment and high touch surfaces.

SteraMist powered by Binary Ionization Technology (BIT) provides fast acting biological kill and inactivation of harmful microorganisms, including those hard to kill MDRO's such as *C.diff* spores, MRSA, and the inactivation of Norovirus and influenza flu virus. (*Please refer to EPA Reg. 90150-2*).

STERAMIST™

ENVIRONMENT SYSTEM

Description

The SteraMist™ Environment System is transportable and provides complete room disinfection/decontamination, deodorization, and mold mitigation using multiple treatment applicators per unit.

Effective whole complete room treatment in just under 45 minutes* for a room (3,663.7 ft.³/104 m³).

*Less time is typically needed for smaller sized rooms.

Benefits

- ① Can be configured for small or larger spaces, with no maximum requirements.
- ① Automated/remote controlled system with downloadable data sets.
- ① Six-Log Kill (99.9999%) on *Clostridium difficile* spores.³
- ① Less down time than competing technologies.
- ① May also be converted into three hand-held Surface Units.



Feature	TPO-300
Voltage	120 V AC, 5A
Disinfection/Decontamination Technology	Ionized Hydrogen Peroxide (IHP™)
Number of IHP™ spray ports	3
Dimensions	1.2 m Length x 0.61 m Width x 0.61 m Depth (approximately 47" x 24" x 24")
Weight	Approximately 63.50 kg (-140 lbs.)
Particle Size	2-4 Microns
Broad Spectrum Kill	Yes
Safe for Sensitive Equipment	Yes
Flow Rate	25 ml per minute per applicator
Treatment Method	Complete Room Disinfecting System
Dose Application	.5 ml. per ft. ³
Application Rate/Time	Effective complete room treatment in just over 75 minutes for a room 3,663.7 ft ³ /104 m ³ including application time, contact time, and aeration time. Less time is typically needed for smaller size rooms.
Contact Time	Room is safe to enter once hydrogen peroxide is below 0.2 ppm.
Aeration Time	
Warranty (parts & labor)	12 months

SteraMist™ Environment System
 Streptococcus aureus (ATCC #4536), Pseudomonas aeruginosa (ATCC #15442),
 Methicillin Resistant Staphylococcus aureus (ATCC #13339), Salmonella enterica
 (ATCC #13091), Clostridium difficile spores (ATCC #13698)
 *Norovirus (Feline Calicivirus) (FCV) (ATCC #VR-782)