touchpoint SUPPORT SERVICES

nimbus®

CASE STUDY

Implementation of Nimbus Automated Fogging Technology to Reduce Healthcare-Associated Infections

Nearly

1.7 million

hospitalized patients acquire a HAI while receiving treatment for another health issue.

Nimbus automated fogging technology has achieved an additional

97.99% reduction

in colony-forming units beyond manual cleaning.

Traditional methods of cleaning patient rooms can

fall short

due to human error, resulting in increased risks of pathogen transfer and HAIs.

All tested surfaces exceeded the cleanliness criterion, with reductions of over

96.70%

across all high-touch areas.

Healthcare-associated infections (HAIs) are a critical threat to patient safety, affecting approximately one in 31 hospital patients annually. These infections contribute to higher rates of readmission and mortality, prolong hospital stays, and place significant financial burdens on healthcare systems. Meanwhile, environmental contamination within patient rooms plays a pivotal role in the spread of pathogens, including Methicillin-resistant Staphylococcus aureus (MRSA), Vancomycin-resistant enterococci (VRE), Clostridioides difficile (C. difficile), Acinetobacter baumannii, and Candida auris.

Seeking a Solution

A hospital served by TouchPoint Support Services recently faced challenges in effectively reducing pathogens during cleaning of patient rooms. Traditional methods such as manual cleaning and electrostatic spraying often fell short, resulting in increased risks of pathogen transfer and HAIs. Studies indicate that manual cleaning is less than 50% effective at disinfecting high-touch surfaces, largely due to inconsistencies in application and human error. Even advanced methods like electrostatic spraying depend heavily on proper technique, dilution ratios, and wet times, limiting their overall reliability and effectiveness.

Automated Technology

Research has shown that whole room fogging with disinfectants is an effective method for eliminating surface pathogens and reducing the risk of pathogen transfer. With this in mind, the team aimed to adopt whole room fogging to minimize human variability and ensure a consistent, repeatable disinfection process. The TouchPoint team partnered with Infection Prevention to integrate Nevoa's Nimbus automated fogging technology with Microburst™ disinfectant. This advanced fogging system was deployed in the 612-bed hospital as part of terminal cleaning protocols for patient rooms in the medical intensive care unit (MICU) and the adjacent step-down unit.

Nevoa Nimbus Fogging Technology

Nevoa Nimbus automated fogging technology was chosen and paired with the Microburst™ hypochlorous acid (HOCl) disinfectant because of its superior efficiency and consistency compared to electrostatic spraying. Unlike manual methods, which rely on operator precision, Nimbus automates the disinfection process, ensuring consistent application and adequate wet time. UV technology was excluded due to prior experiences that indicated limited efficacy.

Microburst™, an EPA-registered, hospital-grade disinfectant, contains HOCl as its active ingredient. Atomized through Nimbus technology, HOCl effectively eliminates a broad spectrum of pathogens, including viruses, bacteria, fungi, spores, and Candida auris.

By integrating Nimbus automated fogging technology and Microburst™ disinfectant into cleaning protocols, the hospital aimed to minimize human variability, ensure consistent disinfection, and improve pathogen reduction on high-touch surfaces.

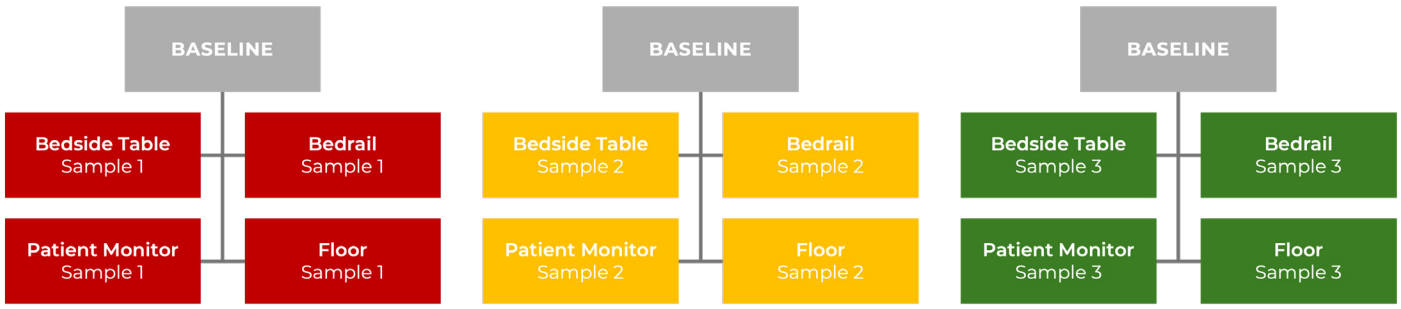
Implementation

- Nimbus fogging was employed for terminal cleaning in the MICU and stepdown unit.
- Fogging cycles were programmed for 30 minutes in MICU rooms and 29 minutes in stepdown unit.
- The process was conducted following manual cleaning and final floor mopping.

Sampling and Testing

- Swab samples were collected from high-touch surfaces, including bedside tables, bed rails, patient monitors, and floors, in 20 discharge rooms.
- Samples were taken at three stages:
  1. Post-patient discharge
  2. Post-manual cleaning
  3. Post-Nimbus fogging
- Samples were analyzed for colony-forming units (CFUs) to evaluate pathogen reduction.

FIGURE 1: Sequence and Location Model



Results

Over a two-week period, a total of 240 samples were collected and analyzed from 20 random discharge rooms. Fourteen of the rooms were in MICU and the remaining six rooms were located on the stepdown unit. Over 23,000 CFUs were cultured from the four locations sampled in the twenty rooms. The summarized data are presented in Table 1.

TABLE 1: Aerobic Colony Count Comparison Data

Aerobic Colony Count								
Average Colony Forming Units (CFU/cm²) by Surface				Percent Change		Log Reduction		
Location	Baseline	After Manual Clean	After Nimbus	Average Manual Clean from Baseline Reduction	Average Nimbus from Manual Clean Reduction	Average Manual Clean Log Reduction from Baseline	Average Nimbus Log Reduction from Manual Clean	Maximum Nimbus Log Reduction from Manual Clean
Floor	46.32	39.19	0.85	-15.39%	-97.84%	0.07	1.67	3.32
Bed Rail	42.81	14.39	0.21	-66.39%	-98.57%	0.47	1.85	2.16
Bedside Table	27.75	1.82	0.06	-93.44%	-96.70%	1.18	1.48	2.00
Monitor	4.59	4.33	0.09	-5.67%	-97.92%	0.03	1.68	> 1.79
Grand Total	**30.36**	**14.93**	**0.30**	**-50.83%**	**-97.99%**	**0.31**	**1.70**	N/A

Baseline Bioburden:

- The floor exhibited the highest contamination levels, followed by bed rails, bedside tables, and monitors.

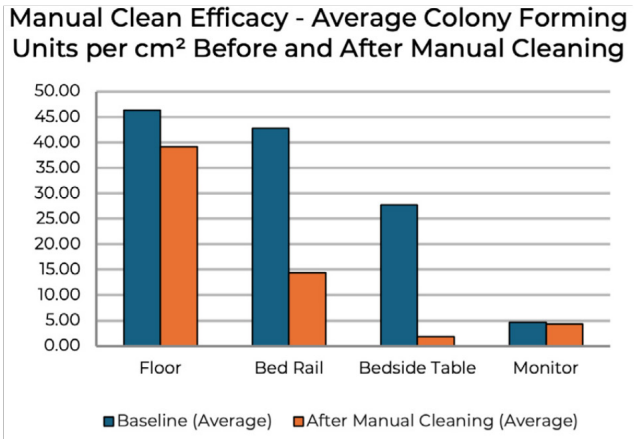
Post-Manual Cleaning:

- Manual cleaning achieved an average bioburden reduction of 50%. However, achieving the target bioburden level of <2.5 CFU/cm² was only possible with the addition of the Nimbus fogging solution.

Post-Nimbus Fogging:

- Nimbus fogging achieved an additional 1.70 log reduction in CFUs beyond manual cleaning.
- All tested surfaces exceeded the cleanliness criterion, with reductions of over 96.70% across all high-touch areas.

Figure 2: Manual Cleaning Efficacy by Average Colony Forming Units



Operational Considerations

Use of the Nimbus fogging system includes machine setup and post-operation requirements, followed by completion of patient room setup. These steps are factors to be considered as they may impact bed throughput metrics and staffing requirements.

The Nimbus system should be operated by a trained associate following all requirements for effective system performance. The Nimbus should be deployed post-manual clean and disinfection but prior to completion of the patient room setup. This requires the bed to be unmade, and all cabinets opened. Vents are blocked off using the supplied vent covers to assist in maximizing the effectiveness of the process.

After the cycle is complete, the machine should be properly shutdown and removed. Any remaining disinfectant condensation that has puddled should be properly cleaned. The patient room setup should then be completed and returned to the facility's available bed inventory.

Over a six-month period, the average time a bed was in Nimbus process was 66 minutes. This included Nimbus setup. With operation and removal time factored in, the average time of discharge increased by 66 minutes. Reviewing the 140 discharges, cumulatively this added approximately 73 seconds to the total time. The average turn time for this location is 64 minutes, including beds that required use of the Nimbus system.

	Discharge Count	Suspended / Nimbus Rooms	Average Suspend/ Nimbus	Average Response Time	Average Clean Time	Average Turn Time
July 2024	1080	6	0:53:16	0:38:24	0:33:40	1:12:05
August 2024	1180	3	1:21:09	0:31:26	0:34:12	1:05:38
September 2024	1243	23	1:15:51	0:29:28	0:33:53	1:03:22
October 2024	1355	44	1:08:16	0:28:04	0:35:03	1:03:08
November 2024	1429	25	0:56:30	0:27:41	0:33:31	1:01:16
December 2024	1388	39	1:03:35	0:30:10	0:33:47	1:03:59

Conclusion

The Nimbus automated fogging system demonstrated exceptional efficacy in reducing surface pathogens compared to manual cleaning alone. By eliminating human variability, Nimbus provided a consistent, repeatable disinfection process, significantly lowering environmental bioburden and reducing the risk of HAIs. Integrating Nimbus fogging technology with Microburst™ HOCl disinfectant has proven to be a valuable addition to TouchPoint's infection prevention protocols. This evidence highlights the critical role of automated disinfection systems in enhancing infection control practices and improving patient safety.