

Reducing Hospital Onset *C. difficile* infections in an Oncology Unit with Advanced Disinfection Using Hypochlorous Acid

Abstract: Healthcare Associated Infections (HAIs) are an enormous problem in hospitals that contribute to the morbidity and mortality of patients. Oncology and similar high-risk patients are extremely susceptible to the development of HAIs because of their compromised immune systems. *Clostridioides difficile* (*C. difficile*) infection (CDI) incidence is increasing nationally among cancer patients admitted to US hospitals.¹ This study demonstrates increasing the use of the Nimbus™ advanced disinfection technology system with its Microburst disinfectant, whose active ingredient is Hypochlorous Acid (HOCl), significantly contributes to the reduction of CDI cases for in-patient oncology units.

Method: A 177 bed, regional hospital incorporated the use of the Nimbus™ advanced disinfection technology and Microburst HOCl based solution as part of their discharge cleaning process for patient rooms on its Oncology and Bone Marrow Transplant (BMT) unit. Trained EVS technicians administered the protocol. For two consecutive years Nimbus usage and CDI rates were tracked, documented, and compared by Environmental Services (EVS) and Infection Prevention (IP) department directors.

Results: There is a direct correlation between the higher use of Nimbus™ with Microburst HOCl as part of the discharge cleaning protocol and decrease in the annual numbers of CDI infections. Mandated use of Nimbus™ technology (>76% compliance on annual basis) in this oncology unit during patient discharge delivered a 69% reduction rate in the unit's annual CDI cases, compared to the previous year when Nimbus usage compliance fell below 17% of room discharges.

Conclusion: HAIs are a prevalent problem for hospital oncology patients. Consistent use of advanced disinfection technology, proven in the Nimbus™ robot with Hypochlorous Acid (HOCl), effectively contributes to the reduction of CDI cases. Application of proven innovative technology should be a priority for the prevention of CDI in the hospital cancer population.

ABSTRACT

Healthcare Associated Infections (HAIs) continue to be an enormous problem for patients and healthcare facilities. In hospitals alone, the Centers for Disease Control and Prevention (CDC) estimate HAIs account for 1.7 million infections and more than 98,000 deaths each year. *Clostridioides difficile* (*C. difficile*), formerly called *Clostridium difficile*, is the most common pathogen contributing to healthcare associated infections accounting for roughly 500,000 cases per year.² Oncology patients are more susceptible to the development of HAIs due to their compromised immune systems and prolonged hospitalizations. A 2017 study found that the rate of hospital-onset *C. difficile* infection (CDI) was twice as high in oncology patients as compared to all other inpatients.³ To reduce HAIs, many hospitals are employing advanced disinfection technology as part of their discharge cleaning practices.

Nevoa® offers Nimbus™, a robotic technology that atomizes Nevoa Microburst Solution™, an EPA-registered, hospital-grade disinfectant, whose active ingredient is Hypochlorous Acid (HOCl). This whole-room atomization (fogging) system has proven to be highly effective in pathogen reduction, as proven by rigorous independent laboratory efficacy testing required to achieve EPA registration. Nimbus™ results often achieve > 6.0 Log₁₀ reduction.

METHOD

In an effort to decrease the number of annual CDI cases on its thirty-six bed Oncology and Bone Marrow Transplant (BMT) unit, an Arizona regional hospital implemented the use of Nevoa’s advanced disinfection technology, Nimbus™ and Microburst, as part of its discharge cleaning protocol. Unit dedicated EVS technicians completed certification training for the application of Microburst using the Nimbus robot. Room cleaning tasks were the same for all oncology and BMT rooms. EVS team members administered the entire discharge protocol inclusive of the Nimbus™ disinfection technology. Beginning in January 2021, Nimbus™ usage and CDI infection rates were tracked, documented, and compared by EVS and IP department directors. In 2022 the same room cleaning methodology inclusive of the Nimbus protocol was employed. However, major emphasis was placed on increasing the Nimbus utilization rate. Hospital administration mandated Nimbus™ use for every discharge clean in the BMT unit, with a goal of 100% compliance. 2021 and 2022 Nimbus usage and CDI infection rates within the unit were tracked and compared.

Greater usage of the Nimbus technology with its hypochlorous acid Microburst solution, as part of the hospital’s discharge cleaning protocol, resulted in decreased annual CDI rates on the oncology unit. In 2021 the Nimbus protocol was used on less than 17% of all oncology room discharges. There were 13 documented CDI cases during that same timeframe. In 2022 Nimbus use on the same unit increased to over 76% of discharges. There were only 4 CDI cases during 2022 when Nimbus usage dramatically increased. This represents a 69% reduction in the number of CDI cases year over year for 2021 to 2022.

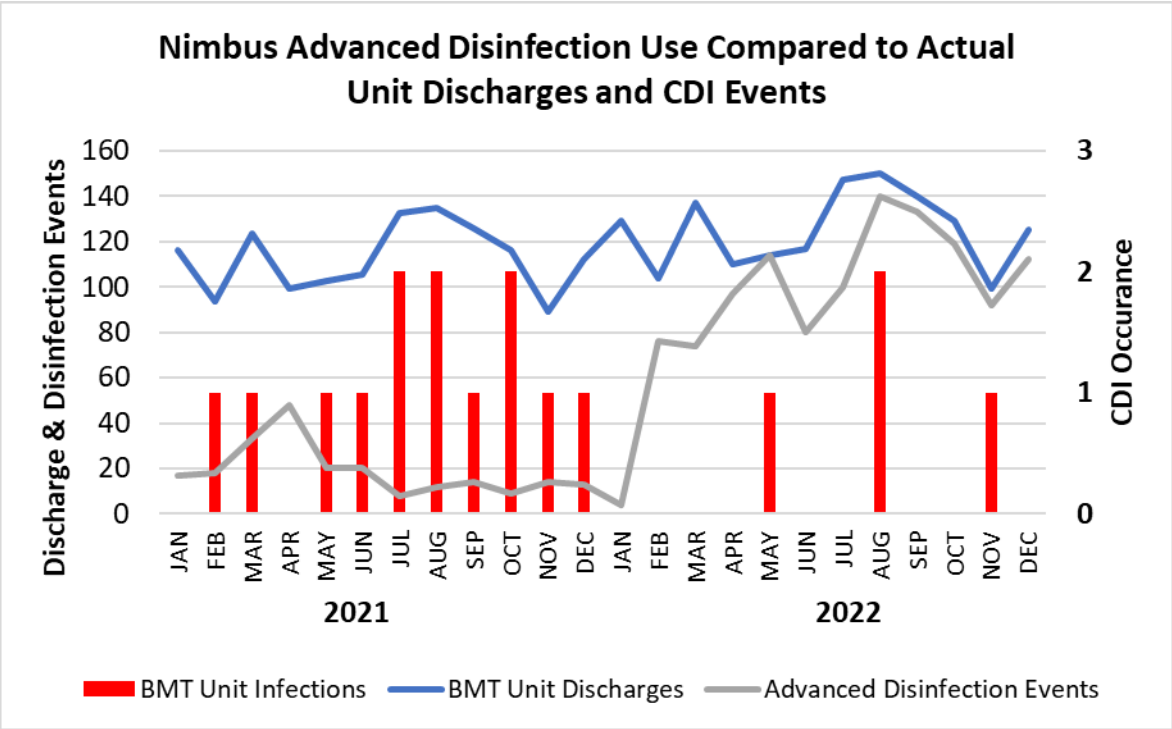


Figure 1 above shows actual unit discharges and the portion of discharges in which Nimbus Advanced Disinfection occurred versus CDI occurrences for 2021 and 2022.

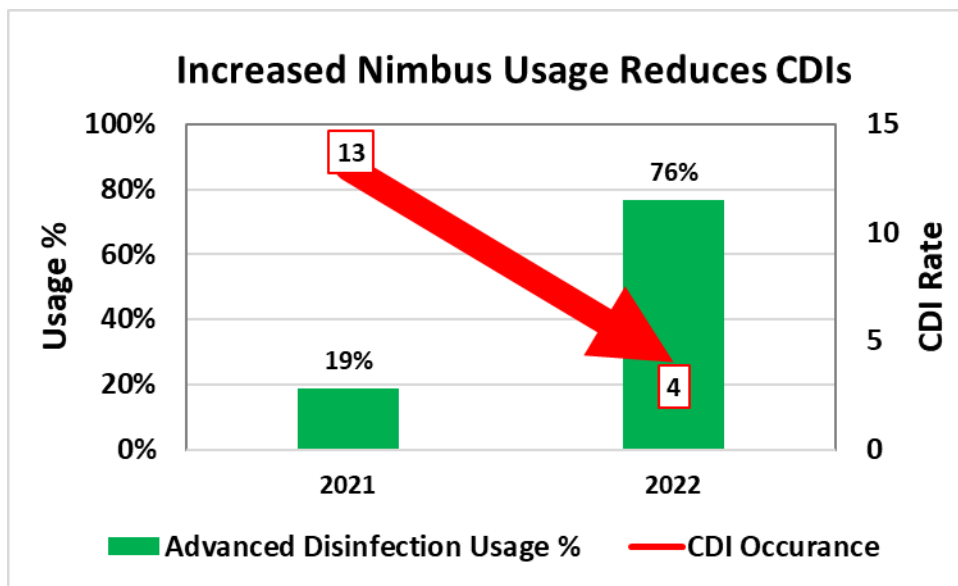


Figure 2 above illustrates Nimbus usage as a percent of total annual discharges on the oncology unit (green columns) relative to the documented annual number of CDI infections (red line).

CONCLUSION

HAIs continue to be a major problem in the healthcare environment. The oncology patient population has an even greater risk in developing a Healthcare Associated Infection. Greater attention to infection prevention is warranted in the care of oncology patients. Hospitals that incorporate the advanced Nimbus disinfection technology and Microburst hypochlorous acid solution into their room discharge cleaning protocol can expect substantially improved infection rate outcomes.

¹ <https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-017-2553-z>

² <https://www.cdc.gov/media/releases/2015/p0225-clostridium-difficile.html>

³ <https://bmcinfectdis.biomedcentral.com/articles/10.1186/s12879-017-2553-z>