HYPERDRYMIST[®] MICRO-NEBULIZED HYDROGEN PEROXIDE: **EFFICACY IN REDUCING CLOSTRIDIUM DIFFICILE INFECTIONS** IN A TERTIARY HOSPITAL VIA ROUTINE AND PREVENTIVE USE

Background

Infections caused by *Clostridium Difficile* (CD) are an increasingly major problem for healthcare facilities at all levels. CD spores are known to persist on the inanimate surfaces of healthcare facilities for long periods of time, especially in rooms previously occupied by CD affected patients, and represent a persistent threat to newly admitted patients.

In order to interrupt nosocomial cross-transmission between patients of Clostridium Difficile Infections (CDI), the use of an environmental disinfection technology, consisting of a novel hydrogen peroxide's aerosolization methodology, was introduced in addition to the already existing cleaning and disinfection procedures.

In this particular instance, the addition of the no-touch disinfection equipment was planned with the specific goal of making a preventive use of the technology instead of a remedial one, thus benefiting of shorter disinfection cycles, easier room set up and inherently safer operations for the clinic's personnel.

Preventive disinfection cycles were therefore applied in all known contaminated rooms and delivered via the use of HyperDRYMist[®] (HDM[®]) Technology in order to lower the overall incidence of CDI at the tertiary hospital complex. The same technology was successfully deployed in quelling a CDI outbreak one year earlier in two wards of the same complex¹.

Materials/methods

The levels of CDI incidence were monitored for two 10-month periods. The first period in 2012 and the second in 2015 spanning from January 1st to October 31st for both observational periods. CDI was diagnosed in patients affected by new diarrhoea started 48 hours after admission and positive stool for CDI toxins according to CDC definitions.

Deep cleaning of surfaces with a detergent/chlorine agent at 5'000 ppm concentration was executed both in 2012 and 2015. In 2015 however, HDM[®] was added as the sole additional hygiene and prophylaxis measure after room change at patient's dismissal of all CDI's affected individuals. The additional measure was implemented throughout the 10-month study period in 2015. The HDM no-touch high-level environmental disinfection technology is based on the micronebulization of a proprietary hydrogen peroxide based disinfectant solution which is evenly and pervasively deposited on air-exposed surfaces during the disinfection process.

The ratio of disinfectant solution micro-nebulized per cubic meter of disinfected space was of 1 ml for each for each of the rooms of the discharged CD affected patient.

Results

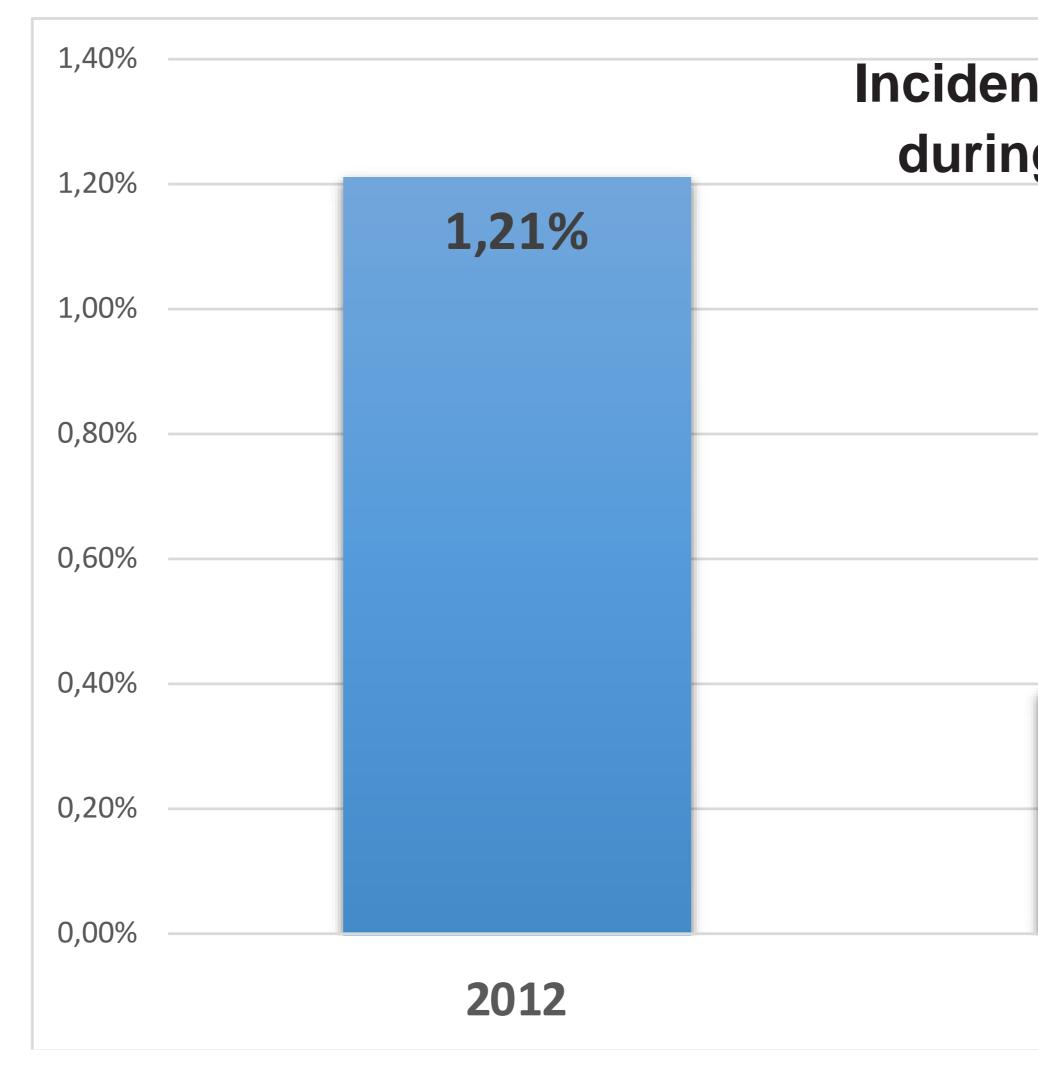
In 2012, out of 20'112 admissions occurred during the 10-month study period, the CDI incidence was at 1.21% for the entire hospital complex. In 2015, after HDM[®] introduction, CDI cases decreased to 0.39% of the total number of admissions set at 19'921, and recorded during an equivalent time period of 10 months and again for the whole healthcare facility. Admittance capacity at the tertiary hospital complex remained unchanged at 627 beds. Drop in CDI incidence was therefore equivalent to 67.77% when the two 10-month study periods are compared.

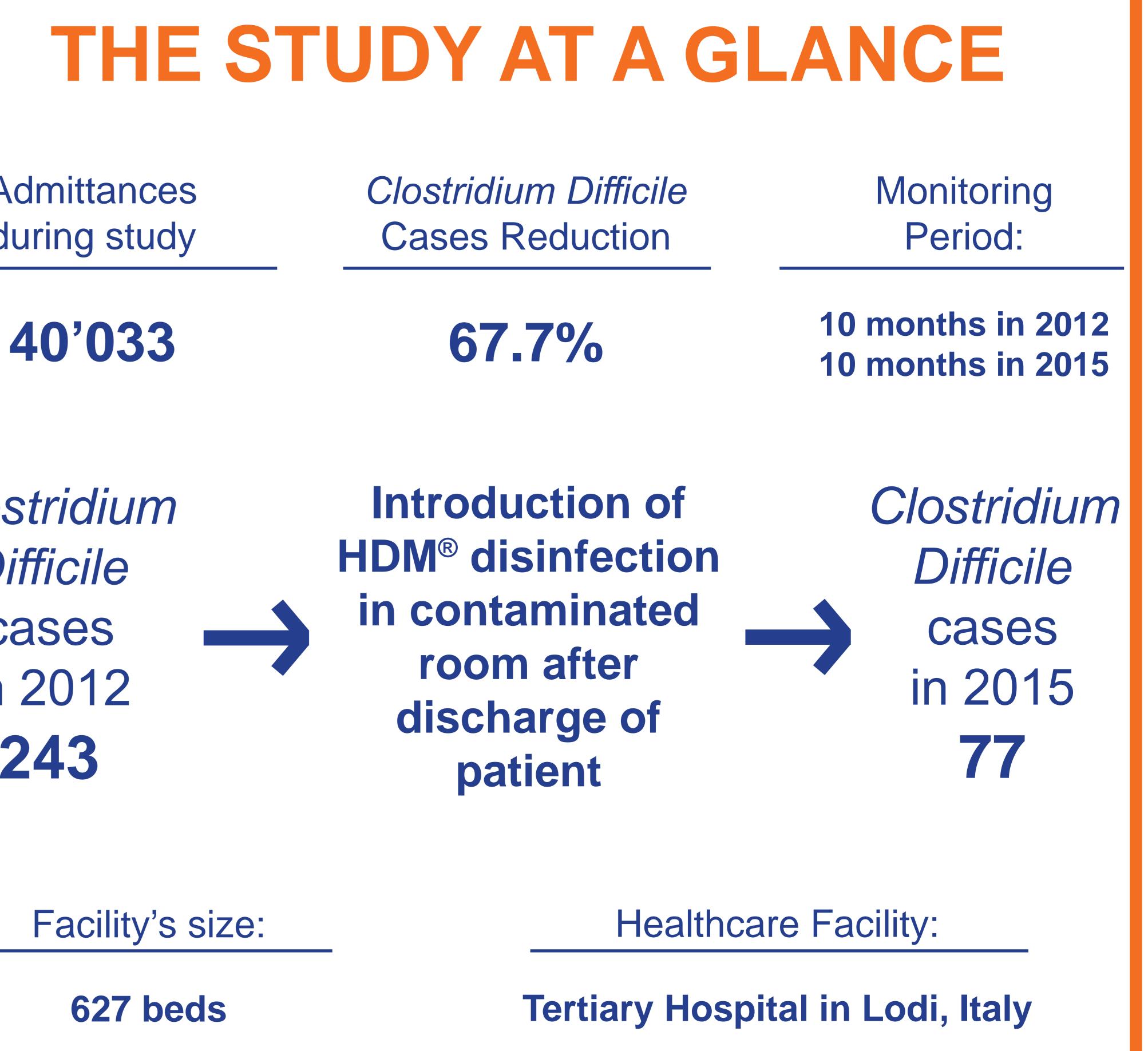
Conclusions

The routine and extensive integration of the HDM technology at hospital complex-wide levels evinced a significant impact on the reduction of CDI incidence, and further substantiated the clinical benefits of adding HDM[®] to ordinary cleaning/disinfection procedures.

The removal of CD spores is known to be difficult via traditional cleaning methods and the effectiveness of HDM disinfection can be ascribed as a highly plausible cause for the dramatic drop in CDI incidence considering that no other infection control measure was implemented in 2015.

In a previous study we showed that the microbial load reduction's capabilities of the HDM technology effectively controlled a CDI outbreak in a couple of wards of our institution. With this study, we demonstrated that embedding HDM technology into routine disinfection procedures and extending its regular use by implementing preventive schemes can generate a wider and systemic reduction of CDI incidence throughout healthcare facilities.





Admittances during study

Clostridium Difficile cases in 2012 243

Incidence of *C. Difficile* in % during monitoring periods 0,39% 2015



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