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ARTICLE

Researchers Study MDRO Presence in Biofilms Collected From Hospitals in 4 Countries

APR 17, 2017 | SARAH ANWAR

At the Society for Healthcare Epidemiology of America (SHEA) Spring 2017 Conference, scientists from Australia, Saudi Arabia, Brazil, and the United Kingdom, presented research that investigated the prevalence of multidrug-resistant organisms (MDROs) on biofilms collected from “dry hospital surfaces” in the aforementioned countries to determine if this was a worldwide phenomenon.

The study researchers set out to conduct the study knowing that some of the bacteria found on biofilms within hospitals can endure on dry and disinfected surfaces, which may be the reason that MDROs are able to survive for prolonged periods in Intensive Care Units within some of these hospitals.

The researchers collected study samples from the hospitals after “environmental cleaning” procedures were undertaken. Some of the areas from which the samples were collected included hospital curtains and nurse station sinks. These samples were sent to Australia for examination. In addition, the researchers identified MDROs using “sonication in tryptic soya broth,” after which they took cultures of methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), and extended spectrum beta-lactamase (ESBL) for analysis. Finally, the researchers verified bacterial presence on the biofilms by either conducting “live/dead staining combined with confocal laser scanning microscopy (CLSM)” or through “scanning electron microscopy (SEM).”

Results of the study showed high contamination rates on dry hospital surfaces; as a matter of fact, most dry surfaces in the hospitals that were included in the study had bacterial biofilms, report the researchers. Furthermore, these bacteria were found to have lived for 1 year after sample collection, which “suggests biofilms tolerance to desiccation.”

In terms of the “microbiological analysis” of live bacteria and MDRO isolates collected “from dry hospital surface biofilms,” the results varied. In Brazil, 40 samples were obtained, 26 of which were culture positive; a total of four MDROs were cultured from these samples, and 100% of the samples were biofilm positive. However, the authors write that there were “only four MDRO positive samples tested to date” from this cohort. In Australia, 44 samples were collected and 23 were culture positive; thirteen MDROs were cultured, and 93% of the samples were biofilm positive. In Scotland, where the UK samples were collected for the study, 8 samples were retrieved, 4 were culture positive, 2 MDROs were cultured, and 100% of the samples were biofilm positive. Finally, in Saudi Arabia, 20 samples were taken, 13 were found to be culture positive; there were no MDROs cultured, and 70% of the samples were biofilm positive. In addition, “All isolated MDRO were from biofilm positive samples.”

Because the study samples were collected from multiple countries on different continents, the researchers concluded that MDRO presence in biofilms on dry hospital surfaces is a “worldwide scenario,” that “commonly contaminates hospital furnishings and equipment.” Moreover, the bacteria isolated from the study samples were found to be “tolerant to disinfection,” which may be why they were able to survive for prolonged periods, and may have even contributed to a rise in healthcare-associated infections.

The authors concluded that, “More frequent and better cleaning [is] needed to



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remove biofilms and MDROs from hospital surfaces and the environment.”

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