What is ‘Antimicrobial Copper’?

“Antimicrobial Copper” is a term used to describe copper alloy surfaces made from solid, uncoated, copper-based metals (e.g. brass and bronze) containing >60% copper content. These surfaces have the intrinsic ability to kill human pathogens that land on the exposed metal surfaces.

What did this clinical trial investigate?

Will replacing frequently touched items in ICU rooms with surfaces made from Antimicrobial Copper reduce the amount of infections received by patients staying in these rooms?

How big of a problem are Hospital Acquired Infections (HAIs) in the United States?

It is estimated that HAIs kill more people each year in the U.S. than auto accidents, breast cancer, and AIDS combined. 4.5% of US hospitalized patients develop HAIs annually, resulting in an estimated 100,000 deaths and adding 35.7 to 45 billion dollars to healthcare costs.

How was the trial funded?

The trial was supported by Congress, and funded through the Department of Defense under the auspices of the Telemedicine and Advanced Technologies Research Center (TATRC), a section of the U.S. Army Medical Research and Materiel Command (USAMRMC), which performs medical reconnaissance and special operations to address critical gaps that are underrepresented in DOD medical research programs.

Where were the trials conducted and by whom?

The study was conducted at three medical centers: the Medical University of South Carolina, Memorial Sloan-Kettering Cancer Center, and the Ralph H. Johnson Veterans Administration Medical Center.

Clinicians specializing in infection control and microbiology from each participating hospital as well as biostatisticians helped design, execute, and capture data from the trial. Representatives from the copper industry were only involved in helping source the components.

How long was the trial conducted?

The trials started in 2007. Bacterial levels on hospital component surfaces were measured for 43 months in each ICU room. In parallel, patient infection data was collected from July 12, 2010 to June 14, 2011 to measure the impact on HAI rates.

What items were converted to Antimicrobial Copper in the ICU rooms, and why were those surfaces selected?

Researchers sampled objects in the ICUs to identify which components were the most contaminated. The following six items were identified as “hot-spots”: Hospital bedrail, IV pole, nurse call device, data input device (computer mouse, monitor bezel, laptop palm rest), overbed table, and the visitor chair arms. These six items were converted to Antimicrobial Copper versions in half of the study rooms.
About how much Antimicrobial Copper was installed in each ICU room?

Less than 10% of the available surface area in each ICU

Were the Copper surfaces cleaned differently than the pre-existing surfaces?

No, each facility followed similar cleaning protocols with hospital-grade disinfectants. No additional cleaning measures were adopted or omitted at each of the participating hospitals.

Did the antimicrobial effect of copper wear off?

No. Unlike coatings, the antimicrobial properties of copper-based metals are inherent to the materials and cannot be scratched off or worn away. The Antimicrobial Copper surfaces in the Trial were still killing bacteria after three years of active use.

How were Hospital Acquired Infections measured?

HAI rates were recorded using National Healthcare Safety Network definitions by a study clinician at each hospital that was blinded to room assignments.

What were the major findings of this Trial?

Antimicrobial Copper surfaces installed in the ICUs consistently had 83% fewer bacteria per area on average compared to equivalent items made from standard materials (plastic, steel, wood). Less bacteria in the environment meant that patients treated those ICU rooms with Antimicrobial Copper surfaces had 58.1% fewer HAs.

Why is this study so important?

This is the first study to establish a clear correlation between the amount of bacteria on hospital surfaces and the chance of obtaining an infection. The study proved that incorporating copper surfaces into ICUs can significantly reduce the amount of infections acquired by patients during hospital stays.

How much did the copper items cost? Was there a return on the investment?

When the trial was started, there were no commercial sources of products made from Antimicrobial Copper materials. As such, most of the components tested in the trials were prototypes or hand-fabricated. It was estimated that fabricating the six Antimicrobial Copper items for all eight of the study rooms in the three hospitals cost approximately $50,000.

Published figures estimate that each hospital acquired infection can add between $29,000 and $43,000 to treatment costs. The number of infections prevented during the study by introducing Antimicrobial Copper suggests a payback of several months.

Has this research been published?

Yes. A series of papers, abstracts and posters have been published on this work. Most notably, a paper was published in the May issue of the Journal of Infection Control and Hospital Epidemiology which describes the reduction in hospital-acquired infections.

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