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UCLA study to determine if copper surfaces can reduce hospital-acquired infections

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Hospital-acquired infections are a huge public health burden, and hospital environments play a key role in harboring potentially deadly bacteria such as *E. coli*, *C. difficile* and methicillin-resistant *Staphylococcus aureus*.

These microbes may persist for extended periods in the hospital, on surfaces such as bed rails, doorknobs, chairs, tray tables, toilet seats and even call buttons in patient rooms.

Copper surfaces, which are not routinely used in hospitals, are known to kill bacteria on contact, and studies have found much lower levels of bacteria living on copper surfaces than on standard hospital surfaces.

Now, an interdisciplinary team from UCLA is taking this research to the next level. In one of the first randomized clinical trials of its kind, researchers will determine if the reduction of surface bacteria due to the use of copper will result in a decreased number of hospital-acquired infections.

Funding for the $2.5 million study will be provided by an RO1 grant (HS021188-01) from the Agency for Healthcare Research and Quality, part of the U.S. Department of Health and Human Services. The project will involve teams from the David Geffen School of Medicine at UCLA, the UCLA Fielding School of Public Health and the Henry Samueli School of Engineering and Applied Science. The collaborative research initiative is a project of the UCLA Sustainable Technology and Policy

Program.

For the clinical trial, two intensive care units at Ronald Reagan UCLA Medical Center will be outfitted with copper, sham stainless steel, or conventional surfaces such as plastic or other types of coatings. Over a four-year period, all three surface types will be sampled for bacteria levels, and patient-infection outcomes rates will be compared among the three surfaces.

"We will be studying if lowering the level of bacteria on hospital surfaces results in reduced infection rates in patients, better outcomes and even lower costs," said the project's principal investigator, Dr. Daniel Uslan, director of the antimicrobial stewardship program at the Geffen School of Medicine and an assistant clinical professor of medicine in the division of infectious diseases.

Additional environmental microbiologic studies and evaluations of surface cleaning will be included in the research, as well as a detailed cost–benefit analysis.

Dr. Peter Sinsheimer, executive director of the UCLA Sustainable Technology and Policy Program, a joint initiative of the Fielding School of Public Health and the UCLA School of Law, helped arrange the interdisciplinary collaborations.

"Being at UCLA makes it easy to pull together diverse teams of top-flight scientists to conduct such important prevention-based research," said Sinsheimer, whose program focuses on primary health prevention through materials substitution.

The initial idea for the hospital-based study came from Sinsheimer's research on the viability of alternatives to lead-based copper piping in delivering safer drinking water.

Hospital surfaces selected for the study will include bed rails, chairs, a bedside table that can also be positioned on top of the bed, and a mobile treatment cart-top used by nursing staff that includes handles, a keyboard and a mouse.

A team at UCLA Engineering will assist with the testing of the copper and other surfaces used in the clinical trial.

"We will be incorporating copper, plastic or sham stainless steel materials into the selected everyday surfaces used by patients and staff in the hospital," said Vijay Gupta, a professor of mechanical and aerospace engineering.

The cost-effectiveness analysis will be conducted by Dr. Gerald Kominski, director of the UCLA Center for Health Policy Research and a professor in the department of health policy and management at the Fielding School of Public Health.

"Finding effective interventions to reduce hospital infection rates in a cost-effective manner is an emerging priority for U.S. hospitals," Kominski said. "This study will provide valuable information on whether copper-touch surfaces are a cost-effective technology for achieving this goal."

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