

## Mankind's "Alloy" in the War Against Bacteria

### *Copper Battles Disease on Common Touch Surfaces*

Long before the advent of modern medicine and the scientific discovery of germs, ancient healers recognized that copper had medicinal powers.

Egyptians used copper to sterilize drinking water and wounds. Hippocrates, a fifth-century B.C. Greek who led the development of the Hippocratic Oath taken by doctors, treated open wounds and skin irritations with copper. The Aztecs applied copper to heal sore throats. And the Romans catalogued numerous diseases for which copper could be used as a treatment.

These antimicrobial uses of copper and copper-based alloys throughout history have led to today's efforts to determine the effectiveness of the metals in stemming infectious disease—a problem of growing concern in healthcare facilities. The U.S. Centers for Disease Control and Prevention (CDC) estimates that infections acquired in U.S. hospitals affect some two million individuals each year, resulting in nearly 100,000 deaths annually at a cost of \$30 billion.

Studies sponsored by the Copper Development Association (CDA) and the International Copper Association (ICA) have shown that uncoated copper and copper alloys can eradicate common disease-causing bacteria such as *E. coli*, *Streptococcus* and *Staphylococcus*. Copper and copper alloy surfaces, including brass and bronze, have even proven effective against Methicillin-resistant *Staphylococcus aureus* (MRSA), one of the more virulent strains of antibiotic-resistant bacteria associated with hospital-acquired infections.

In laboratory studies at the University of Southampton, U.K., MRSA was eliminated on brass surfaces in 4.5 hours and on pure copper in just 1.5 hours. Brass surfaces also wiped out an often-deadly strain of *E. coli* in less than two hours. On stainless steel, which is typically used for touch surfaces in hospitals, the pathogens can survive unabated for more than 30 days. The studies also show that the higher the copper content of the alloy, the more quickly bacteria die.

### APPROVAL PENDING

In the United States, health claims must be verified, approved and registered by the Environmental Protection Agency (EPA). To obtain registration, CDA has submitted substantial documentation to support the laboratory results. Upon approval of this application by EPA, copper will become the first and only metal to be granted approval to make human health claims.

In hospital and healthcare facilities, the first lines of defense against the spread of infection are hand-washing and routine sterilization of surfaces, particularly those that are frequently touched or in close proximity to patients. These "touch surfaces" include door and furniture hardware, bed rails, intravenous (IV) stands, medical monitoring equipment, faucets, sinks and work tables. Unfortunately, disinfectants and antimicrobial coatings work only for short periods before wearing off or losing their germ-killing potency. Identifying and employing surface materials—such as copper and its alloys—that provide continual antimicrobial protection, accommodate the demands of everyday use, and require minimum maintenance, may help reduce cross-contamination.

Congress recently approved funding for clinical trials to determine the effectiveness of copper touch surfaces in hospital environments. This research, under the direction of the U.S. Department of Defense, will be conducted at Memorial Sloan-Kettering Cancer Center in New York City, the Medical University of South Carolina and the Ralph H. Johnson VA Medical Center, both in Charleston, South Carolina. A series of three trials will determine how well natural copper, brass and bronze surfaces mitigate infectious microbes, decrease cross-contamination and ultimately help reduce the incidence of hospital-acquired infections in patients.

Not unlike those ancient men of medicine who discovered copper's innate healing ability through trial and error, modern scientists are re-examining this marvelous metal as a defense against murderous 21st century maladies. If they succeed, the warm glow of copper and its alloys could again become mankind's dependable shield in our ongoing battle against illness, infection and disease. **Cu**