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The rise in antibiotic resistance; contributing factors and possible solutions

I would highlight my work on hog confinements, hospitals and the athletic center in a talk titled "The rise in antibiotic resistance; contributing factors and possible solutions". The lecture would begin with an introduction to the current state of antibiotic resistance and its implications on human health and health care. I will explore reasons for the increased resistance, specifically the use of antibiotics in animal agriculture. I will discuss my recent work to monitor antibiotic resistance genes in hog manure, agriculture soils and sediments. The second half of the talk will examine possible ways to combat the spread of antibiotic resistance in hospitals and community centers. To reduce the risk of hospital-acquired infections, we need to limit the number of bacteria surrounding patients. I will share our recent studies in which we compared the bacterial loads on high touch surfaces made of either copper alloys or conventional materials such as stainless steel or porcelain. This study was conducted at Grinnell Regional Medial Center, a 49-bed rural hospital, primarily in medical-surgical suite rooms with a few items throughout the hospital. Surfaces were sampled in both occupied and unoccupied patient rooms. We found that copper alloy surfaces significantly reduced the bacterial loads by an average of 98% compared to control surfaces. We found no significant difference in bacterial loads between control occupied and unoccupied rooms; suggesting that although a room may look clean, it does not guarantee the surfaces are free of bacteria. This study demonstrated that patients entering rooms with high touch copper alloy surfaces are exposed to substantially fewer bacteria than patients entering rooms with standard surfaces. It also highlighted the ability of copper alloy surfaces to maintain bacterial loads at or near cleanliness standards following terminal cleaning of the hospital room. We expanded this work to our athletic center, a community site in which antibiotic resistant bacteria are commonly shared. This is the first study of copper alloys in an athletic center setting and we found a 94% reduction in bacterial counts by these surfaces. We also identified the most common bacteria found on copper and control surfaces and tested their sensitivity to antibiotics. Both the hospital and athletic center studies were published in the American Journal of Infection Control. infections.

Speaker Biography

Shannon Hinsa Leasure is an associate professor of biology and an environmental microbiologist at Grinnell College in Iowa. Her research interests include microbial diversity, antibiotic resistance and genetic exchange, as well as bacterial adaptations to varied environments. Most recently she has investigated the ability of copper alloy materials to reduce bacterial loads in hospitals and fitness centers. Additionally, she is studying antibiotic resistance gene profiles on farms, in collaboration with researchers at Iowa State University and the Agricultural Research Service at the USA. Department of Agriculture. As time permits, she continues her study of microbial diversity and biofilm formation in Siberian permafrost. At Grinnell, she teaches courses in microbiology, environmental microbiology, cell biology and microbial pathogenesis. She also maintains an active laboratory with undergraduate students. She earned her B.S. in bacteriology at the University of Wisconsin-Madison and her Ph.D. from Dartmouth Medical School in molecular and cellular biology.

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