



Detailed Background Sheet

We are losing the battle in the fight against Healthcare-Associated Infections (HAI's), but a Canadian breakthrough could change the game.

Thousands of health care professionals are preparing to assemble in Halifax to explore the pressing and critical issues surrounding infection prevention and control. The 2014 National Education Conference is being put on by Infection Prevention and Control Canada: www.IPAC-CANADA.org and it will take place at the World Trade and Convention Centre in Halifax from May 25th – 28th, 2014.

Losing the battle: infectious pathogens live on high touch surfaces for months and there are no new antibiotics in sight.

Traditional therapeutic approaches to dealing with HAI's are failing and what is more frightening is the fact that there are no promising new antibiotics in development with the potential to fight increasingly common antibiotic-resistant strains of HAI's like C-difficile and MRSA. According to the Centre for Disease Control alcohol rubs do not kill C. difficile and even with routine use of soap and water, the removal of *C. difficile* spores is more challenging than the removal or inactivation of other common pathogens. What is more alarming is that EPA approved hospital disinfectants are ineffective at killing C. difficile¹.

1. http://www.cdc.gov/hai/organisms/cdiff/cdiff_faqs_hcp.html

The Public Health Agency of Canada prescribes multiple low cost tactics to prevent infections²

- Education and reminders
- Accessibility to alcohol-based hand rubs and washing stations in key locations
- Limiting touching of patients
- Working with infection control specialists, and following advice for additional precautions where necessary (e.g. wearing gowns, gloves, limiting number of visitors, need for isolation rooms)
- Monitoring rates of infection, and evaluating and improving preventive programs
- Using checklists to ensure best practices in infection prevention are followed
- Detecting and identifying outbreaks of infection with careful and continuous monitoring and surveillance

2. <http://www.phac-aspc.gc.ca/cphorsphc-respcacsp/2013/infections-eng.php#a4>

Canada's status quo approach is not doing enough.

- Annually in Canada 200,000+ patients get infections while receiving healthcare, 8000+ die as a result³.
- Mortality rates attributable to *Clostridium difficile* infection have more than tripled in Canada since 1997³.
- The healthcare-associated methicillin-resistant *Staphylococcus aureus* infection rate increased more than 1,000% from 1995 to 2009³.
- About 80% of common infections are spread by healthcare workers, patients and visitors. According to a 2004 survey of Canadian hospitals, each MRSA infection costs between \$16,836 and \$35,000³.
- Twenty years ago HAIs were the eleventh leading cause of death in Canada, now they are the fourth³.
- **When compared to 11 other well-developed countries in 2008, the World Health Organization identified Canada as having the highest national prevalence of hospital-acquired infections at 11.6%. The U.S. rate was 4.5%.⁴**

3. <http://www.phac-aspc.gc.ca/cphorsphc-respcacsp/2013/infections-eng.php>

4. http://www.who.int/gpsc/country_work/summary_20100430_en.pdf

HAI's are preventable.

According to Dr. Michael Gardam, a renowned infections expert and director of infection prevention and control at the University Health Network, "two thirds of HAI's could be prevented"⁵.

Removing bacterial colonies that live on high touch surfaces in healthcare settings is critical in reducing the spread of infection. **However, budget cuts are reducing cleaning efficacy in the fight against HAI's.** Room disinfection and high touch surface cleaning is inarguably crucial to infection control and prevention. However, "cleaning budgets across Canada have been cut, and cleaning services in many facilities have been contracted out"⁶.

5. <http://www.cbc.ca/news/health/dirty-hospital-rooms-a-top-concern-for-canadians-1.1321668>

6. <http://cupe.ca/updir/healthcare-associated-infections-cupe-background.pdf>.

What if the high touch surfaces themselves could persistently kill pathogens? Copper is a naturally antimicrobial super material that persistently kills superbugs.

- In 2008, the EPA certified copper and a number of copper alloys as antimicrobial agents. According to EPA-certified claims, copper kills 99.9 per cent of bacteria in less than two hours of exposure⁷.
- Copper surfaces have been shown to reduce healthcare-associated infections in intensive care units by 58 per cent⁸.
- The number of publications on copper/copper alloys' antimicrobial efficacy, and interactions with micro-organisms has increased significantly over the past ten years, reflecting the recognition of copper as an antimicrobial and substantial increased research investments.
- "Copper is the only antimicrobial surface that we know that reduces bacterial counts in patient environments," says Dr. Allison McGeer, infectious disease consultant and microbiologist, Mount Sinai Hospital⁹.
- Early adopter hospitals across Europe, the U.S and South America are switching their high touch surfaces to copper:

The Centre Hospitalier de Rambouillet located near Paris is the first hospital in France to install antimicrobial copper touch surfaces to lower the risk of healthcare-associated infections. Bed rails, trolleys, taps, handrails, door handles, soap dispensers, light switches and push plates made of copper, or copper alloys like brass and bronze, were fitted throughout the hospital's intensive care and paediatric units;

Rambouillet's Director, Jean-Pierre Richard, said it was the scientific evidence that had convinced him to mandate antimicrobial copper surfaces "We decided to affect a proactive risk prevention policy by using innovative materials that will have no impact on the way the medical staff work while protecting patients¹⁰". A health economic study published by the University of York indicates that implementing copper fixtures can save a hospital \$2.6 million in infection-aversion over a five-year period. This study was based on a conservative 20 per cent overall hospital-acquired infection reduction, even though copper has been shown to reduce infection rates by nearly 60 per cent.

7. <http://www.epa.gov/opp00001/factsheets/copper-alloy-products.htm>

8. Source: (C. Salgado, et al. "Copper surfaces reduce the rate of healthcare-acquired infections in the intensive care unit." *Infection Control and Hospital Epidemiology*, 35:5 (May, 2013). 479-486. Web. <http://www.jstor.org/stable/10.1086/670207>).

9. M. Gardam, A. McGeer, R. Peters, T. Portman, et al. "Antimicrobial Efficacy of a Thermal Spray Copper Alloy Coating in a Hospital Setting." ICAAC. 2013. Web. <http://www.abstractsonline.com/Plan/ViewAbstract.aspx?sKey=3018caed-1c01-4461-b602-d51f82fc1428&cKey=97c95d5b-e4bc-453d-b404-43009bdaa27b&mKey=%7b7DD36E88-52C3-4FF1-A5DF-1D00766558B8%7d>.

10. The Australian Hospital Healthcare Bulletin, October 9, 2012 <http://www.hospitalhealth.com.au/news/french-hospital-mandates-copper-surfaces>)

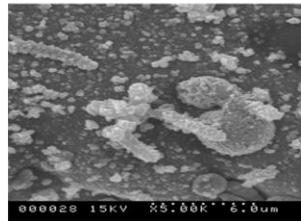
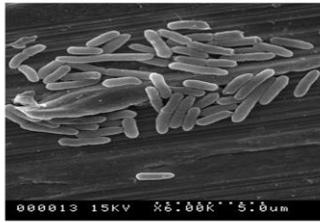
Copper is the most effective antimicrobial surface, but it is impractical for everyday use.

- Solid copper is expensive
- Plated copper alloys tarnish and dent
- Neither are durable
- It just doesn't stand up to everyday use
- Difficult to manufacture

Canadian company (Aereus Technologies) discovers and patents a process that preserves copper's power without any of its drawbacks: Aereus Shield®

- Aereus Shield® is a patented thin copper alloy coating that can coat nearly all solid surfaces, including: metals, polymers, plastics, and wood composites. It is applied using a patented thermal spray process and was developed at the University of Toronto.
- Aereus Shield® has been clinically shown to persistently kill bacteria. The effectiveness of Aereus Shield® as an antimicrobial agent has been proven in the lab and in real patient environments. For example, to verify the effectiveness of Aereus Shield® a study was undertaken at the Toronto General Hospital. A waiting room was outfitted with 32 new chairs: 16 had standard plastic arms and 16 had the Aereus Shield® coating applied to the arms. On four occasions, all 32 chair arm surfaces were sampled. Colony counts from swabs showed that there was a 68% reduction of overall median colony count on the Aereus Shield® protected chair arms vs. the standard plastic arm control group. The real world result was significant⁹.

"Our study at Toronto General Hospital showed that copper alloy coatings have persistent antimicrobial activity," commented McGeer. "Covering commonly-touched surfaces with these coatings could be highly valuable in healthcare settings"⁹.



The picture on the left shows healthy bacteria living on stainless steel. The picture on the right shows Bacteria at various stages of destruction on an Aereus Shield surface.

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- Dr. McGeer presented Aereus Shield's trial results at an international infection control conference, the Interscience Conference on Antimicrobial Agents and Chemotherapy (ICAAC).
- Although Aereus Shield® is 70 per cent copper, the silver-coloured coating looks and feels nothing like a copper penny. Its proprietary combination of alloys makes it non-tarnishing, wear-resistant and durable.
- **Remarkably, clinical studies have shown that Aereus Shield® coated surfaces kill bacteria faster than EPA-certified solid copper. Aereus Shield® is able to accomplish this because of its microscopic surface texture which quickly perforates bacterial membranes, starving them of oxygen and nutrients**¹¹.

11. T. Portman, M. Ringuette, et al. "Evaluation of biocidal efficacy of copper alloy coatings in comparison to solid metal surfaces: generation of organic copper phosphate nanoflowers." *WILEY Journal of Applied Microbiology*. 114:3 (Jan. 2013). Web. <http://onlinelibrary.wiley.com/doi/10.1111/jam.12094/abstract>

Aereus Shield® is acquiring official status as a certified antimicrobial agent

- Class 1 and Class 2 medical designation in Canada has been obtained
- Canadian PRMA registration is underway
- US EPA registration process is underway
- Trade marking has been secured for Aereus Shield
- Worldwide Patent has been registered
- Country specific patents are being registered

Aereus Shield® is starting to be implemented in the marketplace

- Aereus Shield® is actively working with early adopter Canadian manufacturing partners:
 - Techlem is manufacturing Stretchers and IV stands that are coated in Aereus Shield®
 - Working with other manufactures for other commonly touched products in institutions

Seeing is believing – demonstrations at the IPAC conference

Numerous clinical trials (link below) demonstrate Aereus effectiveness in its ability to persistently kill pathogens, but seeing is believing. Aereus Technologies Medical Director Dr. Karim Keshavjee and Tom Portman will be attending and giving a poster presentation on a systematic review on copper at the IPAC Conference from May 24th – 28th at the Halifax World Trade and Convention Centre. Throughout the day each day they will be giving live demonstrations of bacterial load testing on Aereus Shield coated surfaces and non-coated surfaces at both Techlem Medical and Class1 Inc.'s booths at the conference.

Promising hope in the battle against HAI`s – Aereus Shield®

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