



PR772 issued: 11<sup>th</sup> January 2010

## **Irish Hospital First to Harness Copper Technology to Fight Infections**

An Irish hospital is the first in the world to embrace the latest science by specifying hygienic copper door handles throughout in a bid to reduce healthcare associated infections such as MRSA, providing the best possible solid protection to its patients.

St Francis Private Hospital, a 140-bed facility located in Mullingar, County Westmeath, and its associated nursing home, St Clair's, made the decision after examining the compelling evidence from the clinical trial at Selly Oak Hospital, Birmingham, which showed that copper surfaces such as taps, toilet seats and door pushplates can reduce microbial contamination by 90-100%.

The General Manager and Director of Nursing, Noeleen Sheridan, explains the landmark decision: 'All healthcare facilities are acutely aware of the risks from the spread of germs and the high costs of negating them. As it is estimated that 80% of infections are spread by touch, keeping surfaces like door handles as germ free as possible will impact on the spread of infection. Our decision to specify antimicrobial copper products is based on this conviction, and the compelling evidence from the Selly Oak clinical trial.'

Professor Tom Elliott, University Hospital Birmingham NHS Foundation Trust's Deputy Medical Director and leader of the Selly Oak copper clinical trial, believes copper could play a key role in helping to contain healthcare associated infections.

'Laboratory research has shown that MRSA and *Clostridium difficile* microbes die much more quickly when they come into contact with copper-based surfaces than on the usual surfaces you find in a hospital. It is an exciting development and could provide NHS Trusts with yet another means of tackling the spread of healthcare associated infections.'

The use of copper as a preventative health measure is becoming increasingly well recognised. Copper is the first solid surface material to be registered with the US Environmental Protection Agency as having proven public health benefits, helping to reduce contamination between cleans. Antimicrobial copper surfaces have been shown to kill more than 99.9% of specific bacteria (including the MRSA superbug) within two hours, and to continue to kill more than 99% of these bacteria even after repeated contamination.

Noeleen Sheridan explains the relevance of this to those responsible for infection prevention and control: ‘Copper touch surfaces serve as an extra line of defence in addition to the hospital’s accredited hygiene measures. This initiative is part of our commitment to improving the quality of patient safety and care through effective risk management and infection control.’

Whilst St Francis is leading the way, it seems other healthcare facilities will not be left behind. Healthcare architects in the UK have begun specifying antimicrobial copper, and many refurbishment projects are anticipated across NHS Trusts throughout 2010.

	
<p>Antimicrobial copper door handle</p>	<p>Hand washing using antimicrobial copper tap</p>
	
<p>The exterior of St Francis Hospital</p>	

**See overleaf for Notes for Editors.**

## Notes for Editors

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### Healthcare Associated Infections: The Scale of the Problem

In the UK each year, around 300,000 patients contract a nosocomial infection and at least 5,000 die of complications from infections they contracted in hospital. This adds up to an annual cost to the National Health Service of around £1 billion.<sup>1</sup>

In Ireland, there are around 25,000 HCAs recorded a year, with 1 in 20 inpatients contracting at least one infection solely as a consequence of being a hospital patient.<sup>2</sup>

In the European Union, mortality directly attributable to nosocomial infections is estimated to be around 37,000 per year, while they contribute to an estimated 110,000 further deaths. The total annual healthcare costs of such infections for the EU was estimated at around €7 billion in 2008.<sup>3</sup>

<sup>1</sup> [\*Improving patient care by reducing the risk of hospital acquired infection: A progress report. London: National Audit Office, 2004.\*](#)

<sup>2</sup> [\*Say No to Infection – Infection Control Action Plan. Health Service Executive, March 2007.\*](#)

<sup>3</sup> [\*Healthcare-associated infections: the view from European Academies Science Advisory Council. April 2009.\*](#)

### Selly Oak Study Published in the Journal of Hospital Infection

The first results of the Selly Oak hospital trial are currently in press<sup>4</sup>, along with two other papers exploring the potential of antimicrobial copper.

In the second phase of the ongoing trial, the following products have been introduced in antimicrobial copper: cistern flush levers, dressing trolleys, commodes, sink traps and wastes, door handles and push plates, thumb turns, cubicle locks, grab rails, hot and cold taps, toilet seats, light switches, power sockets and bed table tops.

<sup>4</sup> *Role of copper in reducing hospital environment contamination, A.L. Casey, D. Adams, T.J. Karpanen, P.A. Lambert, B.D. Cookson, P. Nightingale, L. Miruszenko, R. Shillam, P. Christian and T.S.J. Elliott, J Hosp Infect (2009). Available online at <http://dx.doi.org/10.1016/j.jhin.2009.08.018>.*

### **St Francis Private Hospital**

St Francis is a private hospital in Mullingar, Ireland. Its acute care activities are based on surgical specialities through four theatres and scope rooms. Incorporated into the hospital is St Clair's Nursing Home, which is currently registered with 43 beds, and has a strong reputation locally for the quality of care offered to residents.

A full upgrade of all door furniture (250 doorsets, incorporating handles, push plates and privacy locks) to antimicrobial copper in the hospital and nursing home is due to commence January 2010.

<http://www.saintfrancishospital.ie>

### **Copper Development Association**

Copper Development Association (CDA) is a non-profit making trade association which aims to develop, promote and support the correct and efficient use of copper and copper alloys through the provision of information, technical support and training. CDA does not sell or endorse products. CDA is one of many centres around the world engaged in a Public Health Initiative to disseminate information on copper's natural antimicrobial properties for applications such as healthcare, food processing and HVAC to help protect public health.

<http://www.copperinfo.co.uk/antimicrobial>

### **Antimicrobial Copper Contractor**

Cupright International, Mullingar, County Westmeath, suppliers and fitters of a range of antimicrobial copper touch surface products.

<http://www.cuprightinternational.com/>

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## Questions and Answers on Antimicrobial Copper

### What is meant by 'antimicrobial?'

'Antimicrobial' is the ability of a substance to kill or inactivate microbes, such as bacteria, fungi (including moulds) and viruses.

### Which microbes are killed by copper?

In recent years, antimicrobial efficacy studies on various contact surfaces have clearly demonstrated that copper and copper alloys kill several of the most potent types of microbes, including Methicillin-Resistant *Staphylococcus aureus* (MRSA), *Clostridium difficile*, Influenza A and *Escherichia coli* O157:H7.

The scientific literature also cites the efficacy of copper against: *Actinomucor elegans*, *Aspergillus niger*, *Bacterium linens*, *Bacillus megaterium*, *Bacillus subtilis*, *Brevibacterium erythrogenes*, *Candida utilis*, *Candida albicans*, *Penicillium chrysogenum*, *Rhizopus niveus*, *Saccharomyces mandshuricus*, *Saccharomyces cerevisiae*, *Torulopsis utilis*, *Tubercle bacillus*, *Achromobacter fischeri*, *Photobacterium phosphoreum*, *Paramecium caudatum*, *Poliovirus*, *Proteus*, *Escherichia coli*, *Streptococcus* group D, and *Pseudomonas aeruginosa*.

### Has any official body verified copper's antimicrobial efficacy?

Yes. On February 29, 2008, the US Environmental Protection Agency (EPA) registered 275 copper alloys with public health claims. Seven additional alloys have since been registered which brings the total number of registered alloys to 282.

### What does the EPA registration mean?

Registration of copper and certain copper alloys such as brass and bronze means that the EPA recognises these solid materials' antimicrobial properties. Products made from any of the 282 registered alloys are legally permitted to make public health claims in the United States.

### Has copper been tested in clinical trials?

Yes, clinical trials are currently under way at hospitals around the world where the impact of copper touch surfaces on the amount of microbes in the hospital environment is being assessed. In the UK, Selly Oak Hospital, Birmingham, part of University Hospitals Birmingham NHS Trust, was selected to be the test centre for this new approach to infection prevention. The first results from the trial, published in the Journal of Hospital Infection (January 2010), showed conclusively that copper is antimicrobial in a real ward situation and

that copper-containing surfaces had 90-100% less bacterial contamination than controls made from conventional materials. Other trials are under way in Germany, Chile, Japan and the US, where the Department of Defense is funding a three-centre trial.

### **How is copper currently used as an antimicrobial agent?**

Copper is already an active ingredient in many different types of antimicrobial products, in agriculture, in marine environments, in healthcare environments and in the home. Copper is an active ingredient in anti-plaque mouthwashes, toothpastes and medicines. Copper sink strainers and scourers for pots and pans can help prevent cross-contamination in the kitchen.

### **How is copper superior to other antimicrobial surfaces?**

Copper and copper alloy products are antimicrobial through and through. Even when surfaces made of these materials are scratched, their antibacterial efficacy continues to work – they won't wear away like coatings or other treatments can. Copper alloys are the only solid surfaces with an EPA public health product registration.

### **How can copper help prevent the spread of infection?**

Pathogens can remain alive and infectious on surfaces for hours, days, even months, providing a reservoir of infection which can be transferred by touch. Pathogens simply cannot survive on copper surfaces. Copper can thus break the chain of infection and act as a supplement to regular cleaning to improve hygiene.

### **Where can antimicrobial copper be further used?**

Antimicrobial copper can be used for frequently-touched surfaces in hospitals, care homes, schools, gyms, public buildings and on public transport.

### **Is it just pure copper that has an antimicrobial effect?**

No, copper alloys do too. Tests have been performed on pure copper, high coppers, brasses, bronzes, copper-nickels and copper-nickel-zincs. The latter are sometimes referred to as nickel silvers because of their shiny white colour, even though they contain no silver. The EPA has registered 282 antimicrobial copper alloys with nominal copper content down to 50%. Alloys with higher copper content kill organisms faster. When choosing a copper alloy for a product it is important to balance the requirements for mechanical properties, manufacturing process and, of course, colour. Copper alloys provide a palette of attractive colours from the yellow of brasses to the dark browns of bronzes.

**By what means does copper kill pathogens?**

Copper is an essential nutrient for humans as well as bacteria, but in high doses, copper ions can cause a series of negative events in bacterial cells. The exact mechanism by which copper kills bacteria is still unknown, however several theories exist and are being studied. They include:

- Cause leakage of potassium or glutamate through the outer membrane of bacteria
- Disturb osmotic balance
- Bind to proteins that do not require copper
- Cause oxidative stress by generating hydrogen peroxide.

**If copper reduces microbes, is it safe?**

Yes, copper, brass and bronze surfaces are safe and long lasting. In fact copper is an essential micronutrient in the human diet, along with zinc and iron. An adult needs 1mg of copper every day. Foods rich in copper include chocolate, nuts and seeds. A balanced diet should provide enough copper to avoid a copper deficiency.