Antimicrobial Copper

Economics and case studies

Medica, Dusseldorf

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Antimicrobial Copper Cu+™

Content

01.00 Introduction & context

Europe – some headline numbers

HCAIs… infections resulting from healthcare interventions

- 7.1% overall prevalence rate – over 4.1 million patients affected
- Up to 51% prevalence in Intensive Care Units (ICUs)
- 16 million extra days in hospital
- Direct costs: €7 billion
- 37,000 deaths directly caused by HCAIs
- Additional 110,000 deaths where HCAIs contributory factor

Source: WHO - The Burden of Health Care-Associated Infection Worldwide – A Summary. 2011
WHO - European Health for All Database (HFA-DB)

02.00 Clinical evidence and case studies

Independent clinical trials have been conducted at multiple locations around the world

Fighting infections is a multifaceted challenge

- Antimicrobial Copper needs to be seen as a **supplement** to, not a substitute for, standard infection control practices.
- One must continue to follow all current practices, including those related to cleaning and disinfection of environmental surfaces.
- Antimicrobial Copper is compatible with hospital cleaning agents.
- Antimicrobial Copper alloy surfaces must not be waxed, painted, lacquered, varnished, or otherwise coated. The alloys oxidize to varying degrees, which does not impair their antimicrobial efficacy.

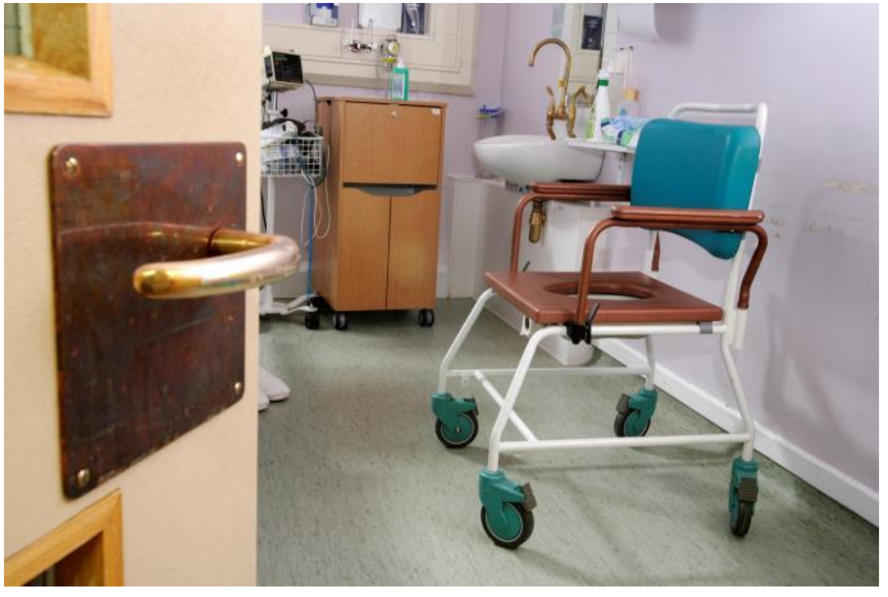
University Hospitals Birmingham, NHS Foundation Trust

Selly Oak clinical trial - UK

University Hospitals Birmingham NHS
NHS Foundation Trust

UHB, NHS Foundation Trust

Selly Oak clinical trial - UK



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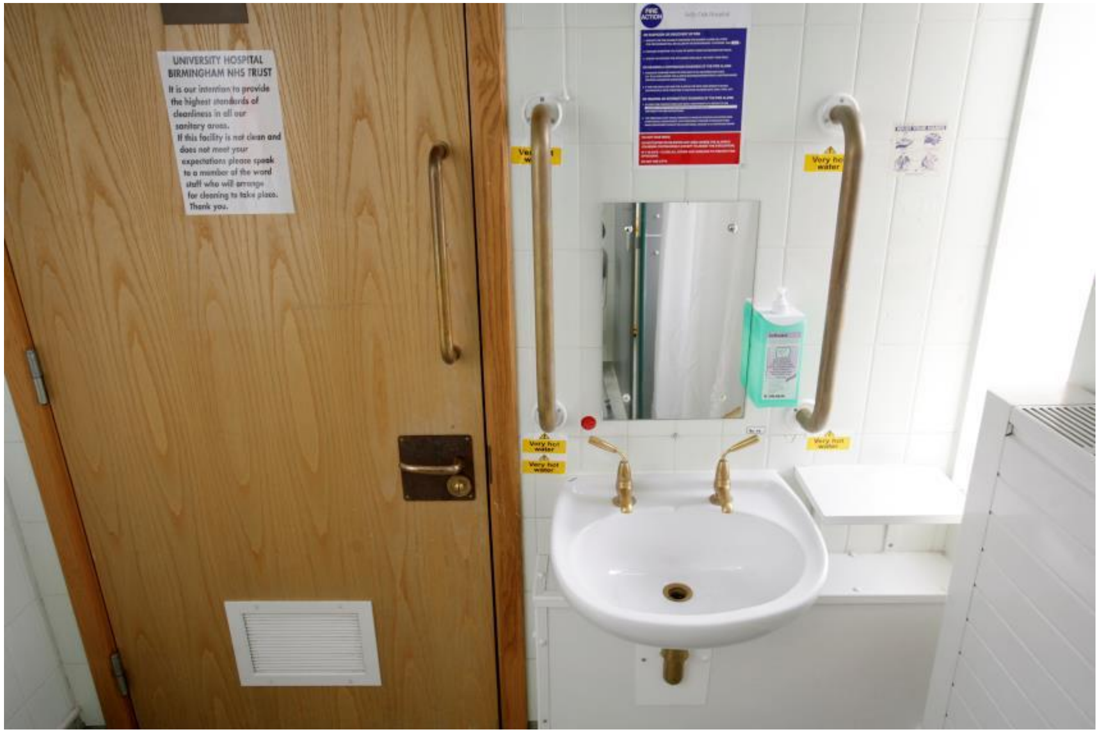

University Hospitals Birmingham NHS
NHS Foundation Trust

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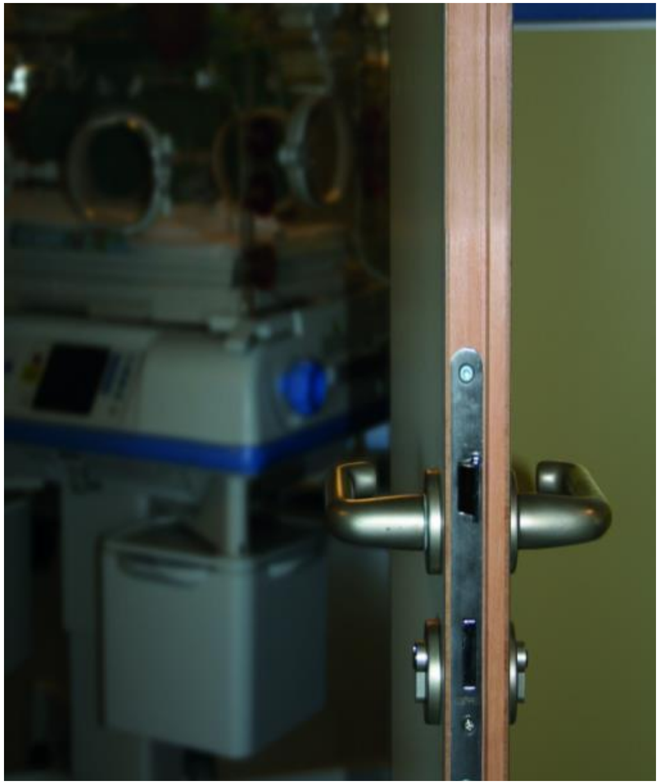
AKH Hagen, Germany – children's ICU



Images courtesy of Deutsches Kupferinstitut and N. Passoth

AKH Hagen, Germany – children's ICU

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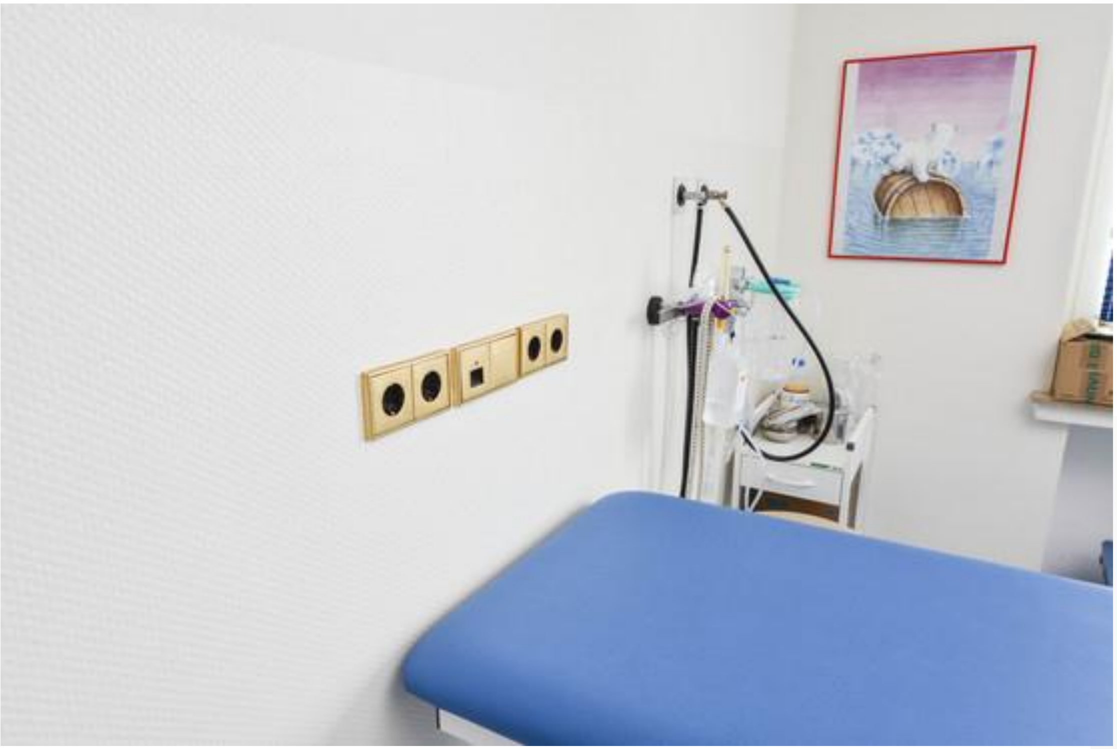
AKH Hagen, Germany – children's ICU



Allgemeines Krankenhaus Hagen
Medizinische Kompetenz
AKH
Mittelpunkt Mensch
Diakonie

AKH Hagen, Germany – children's ICU

Reinhard Tennert, Director of AKH:

"It is important for us to get ahead with investing in supplementary hygiene measures, and to therefore be able to offer our youngest patients the best possible protection against infections carried by germs.

Cases of illness resulting from a lack of hygiene are **unethical**, **extremely expensive** due to treatment costs of up to a quarter of a million Euros per case of treatment, and furthermore have a negative effect on the **image** of the whole organisation."

Craigavon Area Hospital, N. Ireland

- Maternity and Surgery

Southern Health
and Social Care Trust

Craigavon Area Hospital, N. Ireland

- Maternity and Surgery

HSC Southern Health and Social Care Trust

Homerton University Hospital, London, UK

Homerton University Hospital NHS
NHS Foundation Trust

Homerton University Hospital, London, UK

Homerton University Hospital NHS
NHS Foundation Trust

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Roberto del Rio Children's Hospital, Chile

- Paediatric Hospital

Roberto del Rio Children's Hospital, Chile

- Paediatric Hospital

Roberto del Rio Children's Hospital, Chile

Dr Ignacio Hernandez, Director of Roberto del Rio:

“This initiative will benefit children who are hospitalised in critical conditions as they will be in a healthier environment.”

03.00 What about cost?

An Economic Evaluation of the use of Copper in Reducing the Rate of Healthcare Associated Infections in the UK

Presented at:

- WHO International Infection Control Conference, Geneva (ICPIC 2013)
- The International Society for Pharmacoeconomics and Outcomes Research, Dublin (ISPOR 2013)

Providing Consultancy &
Research in Health Economics

The University of York

Investors in People

YHEC
York Health Economics Consortium

The Business Case for Copper

- YEHC - Global leader in healthcare associated modelling
- Model developed to calculate payback for upgrading to copper
- Allows input of local HCAI rates and costs
- Works in £, € or $
- Fully referenced model

YHEC
York Health Economics Consortium

Example: 20-bed ICU, new build, UK

York Health Economics Consortium

- Title Sheet
- Inputs
- Calculations
- Results

Model Inputs

Set-Up | Effectiveness | Cost | Resource Use | References

The purpose of this sheet is to set up the model for the appropriate hospital setting. The typical number of pati
entered in the cells shaded in green. Whether or not copper items will be introduced to general wards, ICU or s
pathogen in the model can be entered in the appropriate green shaded cell .

Number of beds in unit	20
Average length of stay in ICU (days)	5.7
Average length of stay ward/single room (days)	3.0
Calculated number of patients per year (Cohort)	1,200
Yearly change in number of patients	0%

Setting	ICU

Infection to be included in the model:	All Healthcare Associated Infections

Currency:	Euro (I)

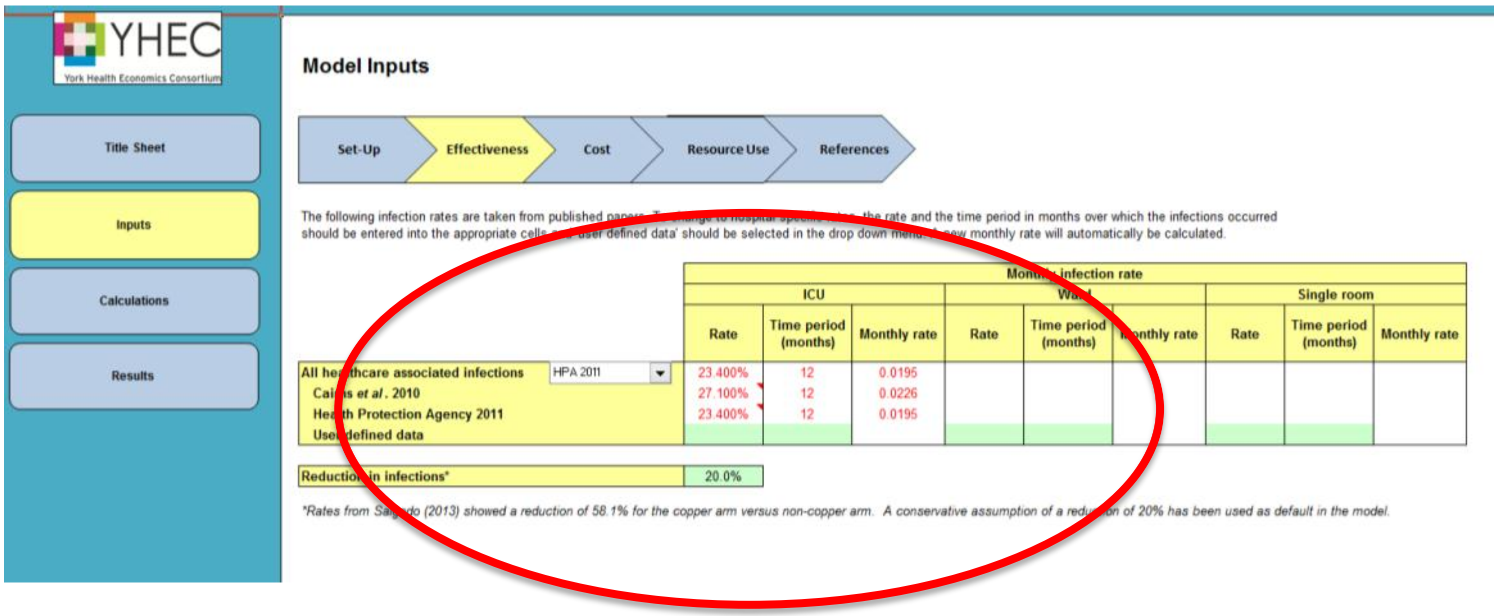
Example: 20-bed ICU, new build, UK

Outcome and length of stay in different European and North American ICUs. Results from the European/North American scoring multicenter study in 137 ICUs with 13,152 intensive care patients (51)

Country	ICU Patients (n)	Mortality Rate (%)	Length of ICU Stay (days)	Length of Hospital Stay (days)***	Mean Score SAPS II	Mortality Observed/Expected
Belgium	1,091	21.7	6.2	21.5	0.9	1.12
Finland	720	17.6	4.1	14.0	31.0	0.88
France	1,393	28.9	9.7	18.9	40.5	0.92
Germany*	1,807	15.7	6.0	21.0**	30.3	0.9
Italy	1,297	31.3	7.2	20.5	38.6	1.07
Spain	1,270	27.1	9.5	22.8	32.2	1.31
Switzerland	756	13.8	4.9	17.6	30.7	0.74
The Netherlands	950	20.0	5.5	19.3	31.3	1.02
United Kingdom	136	32.4	5.7	14.8	42.1	0.96
U.S./Canada	3,732	19.7	5.9	17.1	32.1	0.96
Total	13,152	21.8	6.6	19.1	33.2	0.99

* Including one ICU from Austria
** The average length of stay in German hospitals is about 14 days
*** No. of days in hospital from beginning of ICU stay

Example: 20-bed ICU, new build, UK



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The following infection rates are taken from published papers. To change to hospital specific rates, the rate and the time period in should be entered into the appropriate cells and 'user defined data' should be selected in the drop down menu. A new monthly rate

	Montl				
	ICU				
	Rate	Time period (months)	Monthly rate	Rate	T
All healthcare associated infections (User defined data)	15.000%	12	0.0125		
Cairns *et al*. 2010	27.100%	12	0.0226		
Health Protection Agency 2011	23.400%	12	0.0195		
User defined data	15.000%	12	0.0125		

Reduction in infections*	20.0%

**Rates from Salgado (2013) showed a reduction of 58.1% for the copper arm versus non-copper arm. A conservative assumption*

Example: 20-bed ICU, new build, UK

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- Title Sheet
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Model Inputs

Set-Up > Effectiveness > Cost > Resource Use > References

This sheet is used to calculate the cost of an infection and the copper intervention. Costs included are the unit cost for one additional day the pat
GP and outpatient costs after leaving hospital. (The number of excess hospital days, GP visits and outpatient visits that a patient may need are e
equipment are for those used in the Salgado study. Optional copper items can also be added but it should be noted that this only adds to the cos
account any additional benefit given the clinical evidence currently available.

	Unit cost
Cost of an additional day in hospital due to infection	€ 1,000
Visit to general practitioner	€ 0
Outpatient	€ 0

Cost of equipment

	Unit Cost		Number required	Total cost	
	Copper	Baseline		Copper	Baseline
Bed rails sets	€ 5,360	€ 4,020	20	€ 107,200	€ 80,400
Overbed tray table	€ 402	€ 201	20	€ 8,040	€ 4,020
Chair	€ 469	€ 335	20	€ 9,380	€ 6,700
Call button	€ 67	€ 27	20	€ 1,340	€ 540
Data device	€ 335	€ 134	20	€ 6,700	€ 2,680
IV pole	€ 402	€ 268	20	€ 8,040	€ 5,360
Optional copper items					
Grab rails ☐					
Lever handle set ☐					
Push plates set ☐					
Cistern handle ☐					
Tap set ☐					
Other 1 ☐					
Other 2 ☐					
Other 3 ☐					
Other 4 ☐					
Other 5 ☐					
Other 6 ☐					

Example: 20-bed ICU, new build, UK

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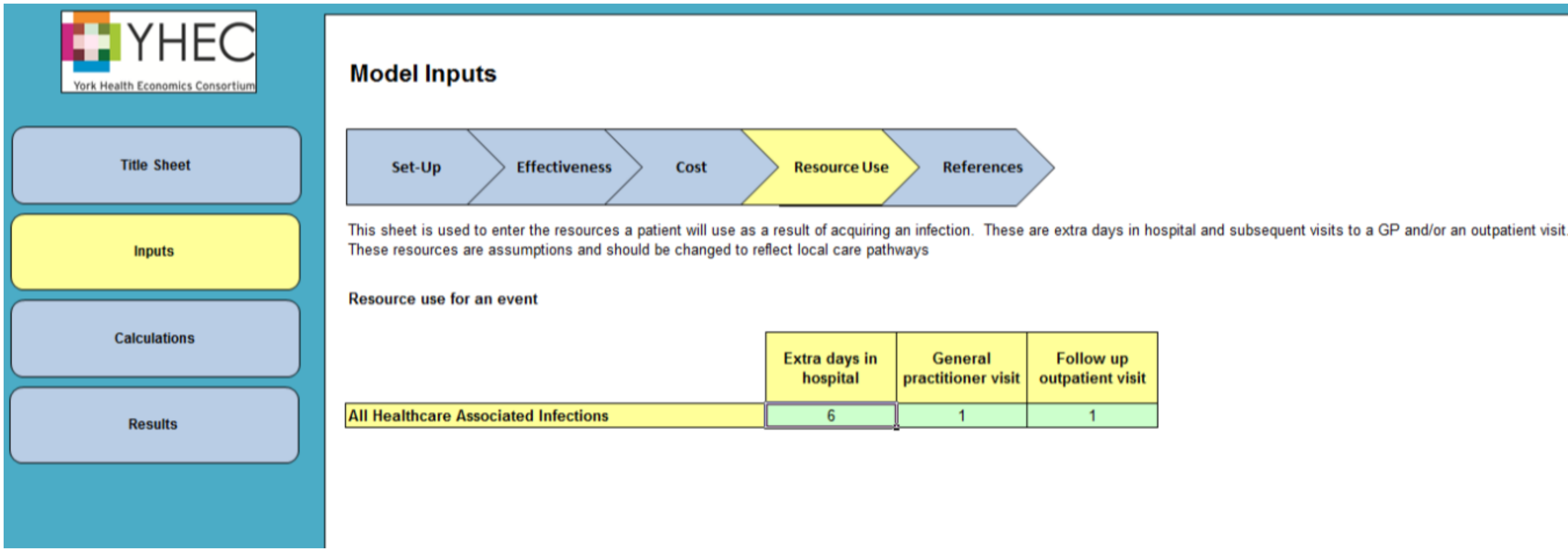

Example: 20-bed ICU, new build, UK

Title Sheet

Inputs

Calculations

Results

Summary | Number of Infections | Cost Chart | Sensitivity Chart | Print results

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An Economic Evaluation of the Use of Copper in Reducing the Rate of Healthcare Associated Infections in the UK.
The purpose of this model is to calculate the number and associated costs of Healthcare Associated Infections in different clinical settings and to evaluate the benefits of a copper intervention on key touch surfaces compared to non-copper items. It then calculates the Return on Investment (ROI) and indicates other tangible benefits.

5 year results

	Copper	Baseline	Incremental
Total cost (excluding cost of infections)*	€ 140,700	€ 99,700	€ 41,000
Number of infections	720	900	180
Cost per infection averted (excluding cost of infections)			€ 227.78
Total QALYS gained			64.44
Cost per QALY			€ 636.25
Cost of infections*	€ 4,320,000.00	€ 5,400,000.00	-€ 1,080,000.00
Total cost of intervention*	€ 4,460,700.00	€ 5,499,700.00	-€ 1,039,000.00
Cost per infection averted			Dominant

*These are direct costs to the hospital (no GP costs or societal costs have been included in the model)

Number of bed days saved per year	216
Cost per bed day day saved per year	€ 189.81

The number of bed days saved per year is 216, this would allow an increased capacity in the ICU by 38 beds with a typical length of stay of 5.7 days.

Return on investment	< 3 months

The cost of the copper upgrade is €140,700 compared to €99,700 for installation of non-copper items. There were 720 infections in the copper group over the period and 900 in the baseline. This results in a cost per infection averted of €227.78.

These results are based on the following scenario:

Number of beds per unit	20
Number of patients per year	1,200
Setting	ICU
Percentage reduction in infections	20.0%
Type of infection	All Healthcare Associated Infections

Example: 20-bed ICU, new build, UK

5 year results

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Example: 20-bed ICU, new build, UK

factor	reference	example
HCAI rate in ICUs	25%	**15%**
reduction in HCAIs	58%	**20%**
pay back time		**< 3 months**
no of bed days saved per year		**216**
cost per bed day saved per year		**€189.90**

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Example: 20-bed ICU, new build, UK

factor	reference	example 1	example 2
HCAI rate in ICUs	25%	15%	**25%**
reduction in HCAIs	58%	20%	**20%**
pay back time		< 3 months	**< 1 month**
no of bed days saved per year		216	**360**
cost per bed day saved per year		€189.90	**€113.90**

Example: 20-bed ICU, new build, UK

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Title Sheet

Inputs

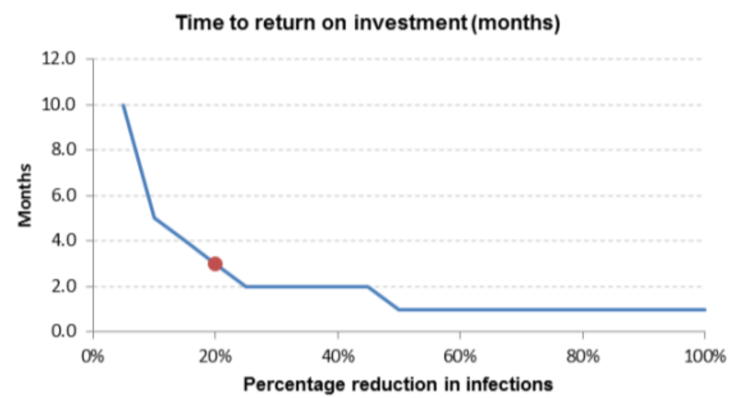
Calculations

Results

Results

Summary → Number of Infections → Cost Chart → Sensitivity Chart

- Cost per infection
- **Return on investment**



This chart shows the change in the cost per infection averted (the blue line) as the reduction in infections due to copper increases. The red circle denotes the baseline result.

04.00 Conclusion & next steps

5 reasons to install Antimicrobial Copper touch surfaces

1. A supplement to standard hygiene practices
2. Continuous and significant bioburden reduction
3. Improved patient outcomes
4. A simple, cost-effective intervention
5. Payback in less than one year

The mark of the most effective antimicrobial touch surfaces

The mark is licensed under a stewardship program run by the International Copper Association and its copper centres around the world. It is used by leading product manufacturers and copper fabricators to indicate that their products are made from Antimicrobial Copper.

"Nearly 300,000 people acquire Healthcare Associated Infections in the UK each year."

Taylor L, Plowman R and Roberts J A, A challenge of hospital-acquired infection, National Audit Office 2001

The Science behind Antimicrobial Copper

Science suggests that Antimicrobial Copper kills bacteria with a multifaceted attack.

The mechanism by which Antimicrobial Copper kills bacteria is complex by nature, but the effect is simple. The questions and answers below summarise active and ongoing research seeking to explain how Antimicrobial Copper is the most effective touch surface.

How does copper affect bacteria?

Science suggests that copper surfaces affect bacteria in two sequential steps: the first step is a direct interaction between the surface and the bacterial outer membrane, causing the membrane to rupture. The second is related to the holes in the outer membrane, through which the cell loses vital nutrients and water, causing a general weakening of the cell.

How can copper punch holes in a bacterium?

Every cell's outer membrane, including that of a single cell organism like a bacterium, is characterised by a stable electrical micro-current. This is often called 'transmembrane potential', and is, literally, a voltage difference between the inside and the outside of a cell. It is strongly suspected that when a bacterium comes in contact with a copper surface, a short circuiting of the current in the cell membrane can occur. This weakens the membrane and creates holes.

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The Official Brand of the World's Most Effective Antimicrobial Touch Surface Material

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Home > Antimicrobial Copper

The Science b

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What you can do

- take the message home: tell your executives & decision makers
- (tell the sales team)
- consider copper as a new opportunity during hospital new builds, ward or unit refurbishments
- visit anticrobialcopper.org for products and science

Keep in touch

- visit www.antimicrobialcopper.org
- sign up for newsletters (about 4 per year)
- visit us on stand **B03 in Hall 14**
- any feedback or questions can be sent to:

info@copperalliance.org.uk

Antimicrobial Copper

visit us on **stand B03 in Hall 14**

Thank you

Any questions?

Mark Tur, Technical Consultant, CDA

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