

# WELCOME TO



## INFECTION PREVENTION AND CONTROL 2018 LONDON

Sharing Knowledge, Improving Care

Wednesday 21st February, The Brewery, London

Produced In Collaboration With



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## Potential Risks and Compliance Issues with Domestic Laundering of Healthcare Uniforms



Clinical Fabric  
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***“Does laundering present a risk?”***

**Infection Prevention & Control  
Conference, London 2018**

**Ian Hargreaves  
National Chairman  
Society of Hospital Linen services & Laundry Managers**

# How important is laundering in Healthcare?

# Media Attention

The screenshot shows the BBC News website in a Windows Internet Explorer browser window. The article is dated 7 December 2012 and is written by Emma Forde. The main headline is "Hospitals' disabled parking charges may be 'unlawful'". Below the headline is a photograph of a disabled parking space with a yellow wheelchair symbol. The article text discusses how 37 NHS trusts charge disabled drivers to park, which some believe is in breach of the law. A sub-headline reads "Hospitals charging disabled drivers to park could be in breach of the law, a leading lawyer says." The page also features a "Top Stories" section with a link to "Kate hoaxers 'gutted' over death" and a "Features & Analysis" section with links to "Sound of 2013", "Odds checker", "Staying together", and "Kim Jong-online".

The screenshot shows the MailOnline website. The article is dated Wednesday, Oct 17 2012 12PM and is written by Sophie Borland. The main headline is "Hospital spends just 73p a meal on patients - less than is put aside to feed prisoners". Below the headline is a photograph of a woman sitting at a table eating a meal. The article text states that Newham University Hospital Trust in East London allows only £2.19 for breakfast, lunch and dinner, while another 16 hospital trusts spend £5 a day or less on feeding each patient. A sub-headline reads "Hospital spends just 73p a meal on patients, less than is put aside to feed prisoners, officials have admitted." The page also features a "FEMAL TODAY" section with links to "Three pages of A4, five sheets of gold leaf and 'perfect' lemon meringues: The show stopping confection that saw John Whittle win Great British Bake Off", "Pernickety perfect: Popping, caramelized cobwebs and unseasoned fondants - but in the end the best cake won", "The terrible twosome: Ryan Clark and Lucy Spraggan evicted from the X Factor hotel after 'shameless drunken bender'", and "Stop talking about me to get yourself press: Mark Wright hits out at ex Lauren Goddard as she claims they were still seeing each other".

# Dirty Hospitals

710,000 patients a year infected on dirty NHS wards by BEEZY MARSH, Daily Mail

One in ten patients in NHS hospitals picks up a potentially deadly infection during their stay, a damning survey reveals today.

A staggering 710,000 patients a year develop symptoms during their stay or shortly afterwards. Much of the spread can be put down to staff failing to wash their hands enough, while grubby wards, bathrooms and waiting areas increase the risk.

Other factors are a lack of staff training in basic hygiene and shortages of washbasins in old hospital buildings.

Many of the victims are infected by MRSA, the drugresistant so-called superbug which causes the deaths of up to 5,000 people a year. Elderly and vulnerable patients, such as cancer sufferers, are most at risk.

## Nothing about Linen!

## 1995 Truro Public Health Laboratory, Treliske, Truro, Cornwall

On each occasion, extensive environmental and epidemiological investigations were carried out, which indicated that babies were being infected very shortly after birth and perhaps in the delivery suite. A great deal of effort was spent in swabbing staff (reluctantly on our part and in the event without useful positive results), which was done only after other avenues had been exhausted and no obvious source for the outbreak had been established. The nursing techniques being implemented within the department seemed of a high standard. Finally, the control of infection team decided to look at the laundering of the vests usually given to newborn children. To our surprise, we found that these were washed in the local hospital mini-laundry and not under the normal laundry contract. Investigation of the mini-laundry, and in particular the hot air dryers, revealed extensive contamination with the MT type of *Streptococcus pyogenes* involved in the outbreak. Since then, all babies' vests have been autoclaved and the outbreaks have ceased.

# Linens implicated in the death of patients

- \* It was confirmed in 2014 that five children who died at the New Orleans' Children's Hospital USA, were killed by a fungus from their bed sheets. The first victim was a premature boy in intensive care, the last patient to die was a 10-year-old girl, the children died between August 2008 and July 2009 during an outbreak of a flesh-eating fungal infection, mucormycosis.
- \* Workers unloaded clean linen on the same loading bay where medical waste was removed.
- \* They moved clean and soiled linen on the same trolleys.

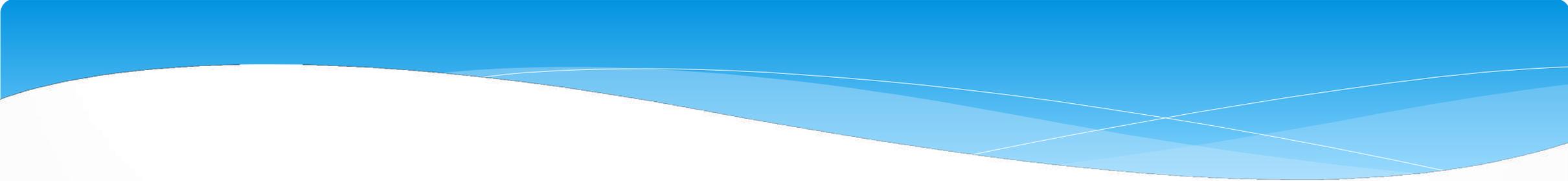
# Linen “Kills” again

In 2015 the same issue has been reported following a recent fungal outbreak reported in Queen Mary Hospital, Hong Kong. Five immunocompromised patients aged 42 to 74 suffered a mucormycosis infection from the same organism with two passing away on the 24<sup>th</sup> June and 14<sup>th</sup> July 2015

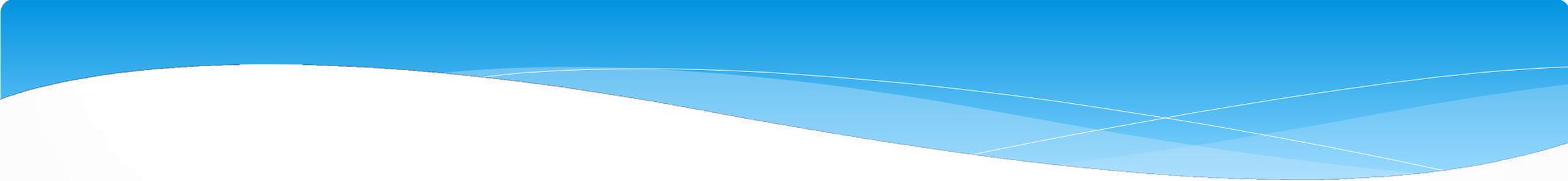
The linen was washed in Shum Wan laundry operated by contractor ISS Mediclean (HK) Ltd, which washes bedding and patient clothes for another 14 hospitals and institutions.

To trace the source of infection, the authority checked for contamination of items that came into skin contact with patients. It found 31% of linen in use and 18% of clean linen had the fungus. A follow-up test showed on linen that arrived at Queen Mary from the Shum Wan laundry, 50% was contaminated.

# Do textiles used in healthcare present a risk?



Professor Sally Bloomfield, of the London School of Hygiene and Tropical Medicine, wants a campaign to educate consumers in laundry hygiene. ‘We need to launder clothing in a way that renders them not just visually clean, but hygienically clean — the two are not the same,’ she says.



Dr Lisa Ackerley, a consultant in environmental hygiene.

‘If you work with food and put your uniform in with the rest of the family’s dirty laundry, including dirty underwear, it could become infected with e.coli or salmonella — or whatever else is on those clothes,’

# The facts

- \* 94% of Healthcare linen is processed by the private sector
- \* 91% of this is processed by 2 companies
- \* Linen used today in London may be on a bed in Oxford tomorrow!

# The facts

* Pieces laundered	521,350,235
* Total spend	£177,457,951

# Laundering

- \* The oldest profession in the world – possibly?
- \* Simple – only becomes complicated when a business
- \* Uses basic technology – unchanged for 000's years
  - \* Mechanical action – shake it, rub it, wipe it
  - \* Water – Holds the soiling, carry's it away
  - \* Soap (Detergent) – Helps mechanical action, suspends soiling
  - \* Heat – A catalyst, kills bacteria
  - \* Time – Sufficient

# What's changed?

- \* Most linen is processed to an high standard
- \* HTM 01-04 .....replaced Hsg(95)18
  - \* 12pages – 161pages
- \* EN14065 (Bio-contamination control system for laundered textiles)
  
- \* Excludes: Mops
- \* Excludes: Uniforms which can be washed at home

# Is there a risk?

- \* 2007 (DoH) A review of the microbiological significance of uniforms and uniform policy in the prevention and control of healthcare-associated infections
- \* Guidance document produced on washing at home
- \* “There is little effective difference between domestic and commercial laundering in terms of removing micro-organisms from uniforms and workwear; ”

# Is there a risk?

- \* All beds are remade with fresh linen after a patient is discharged
- \* Curtains are only changed
  - \* When soiled
  - \* 6 monthly intervals
- \* Uniforms – washed at home
  - \* Are not considered a risk????



# Is there cause for concern?



Email: [Ian@Laundry-solutions.co.uk](mailto:Ian@Laundry-solutions.co.uk)

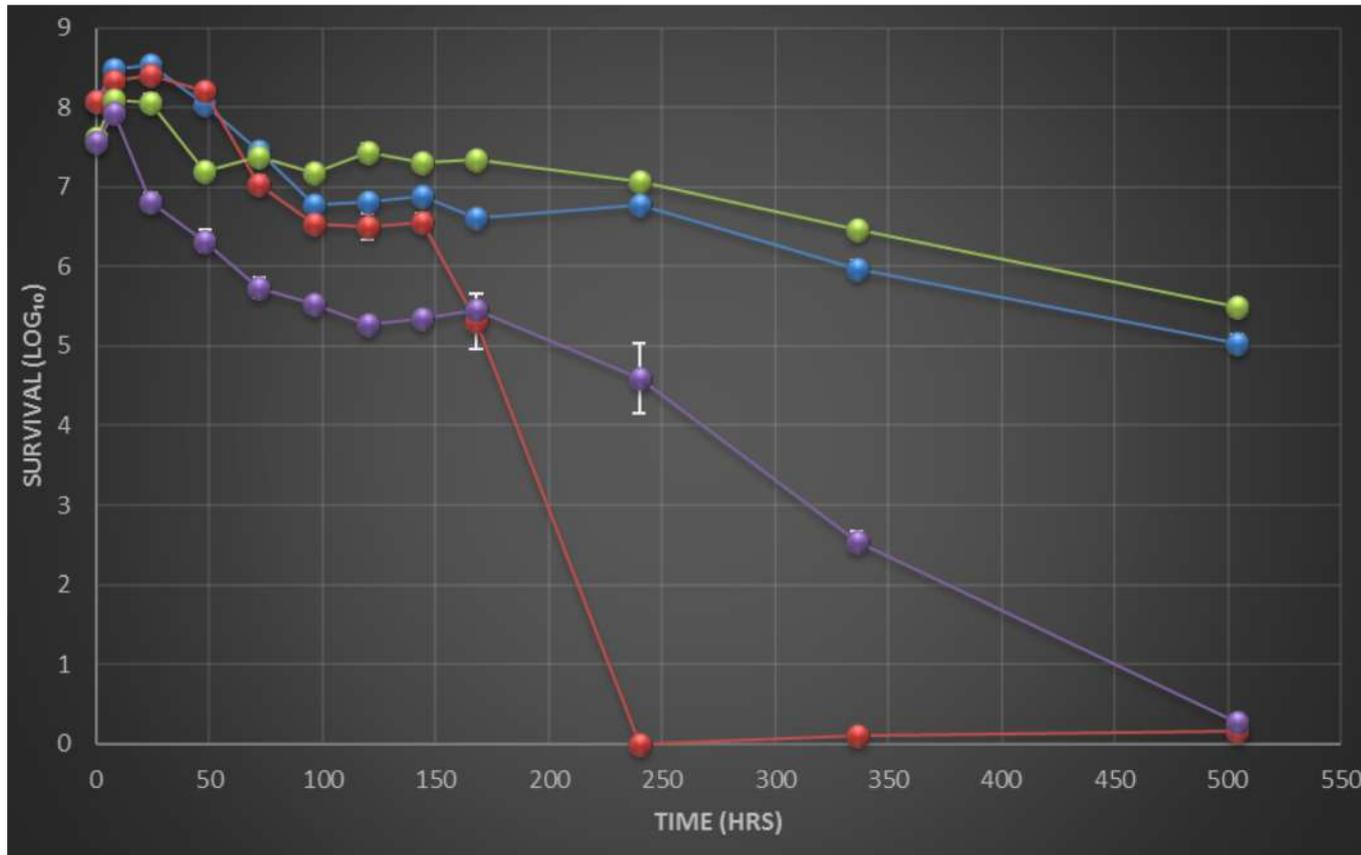
# Potential Risks and Compliance Issues with Domestic Laundering of Healthcare Uniforms

**Dr Katie Laird – [klaird@dmu.ac.uk](mailto:klaird@dmu.ac.uk)**

- Survival of microorganisms on textiles
- NHS domestic laundering policies are they adhered to?
- What is the effect of low temperature laundering?
- What are the risks?

# Survival of Microorganisms on Textiles

Survival of *Escherichia coli* and *Staphylococcus aureus* on polyester and cotton fibres



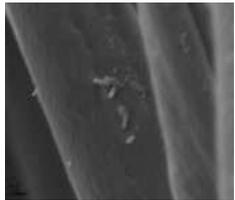
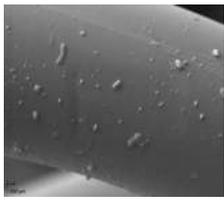
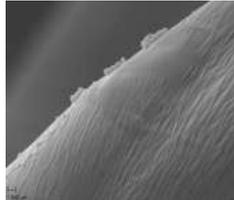
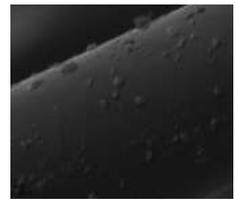
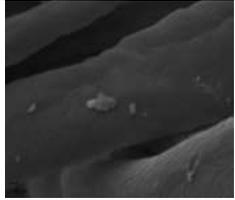
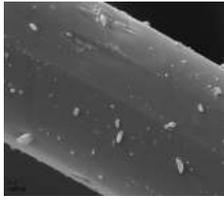
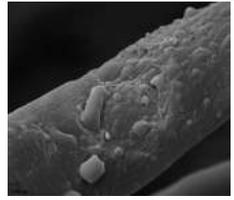
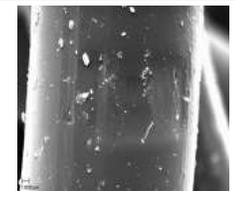
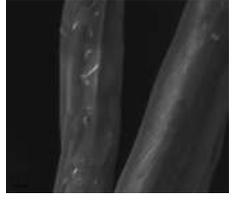
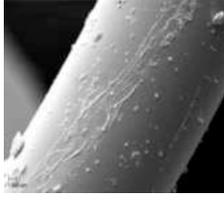
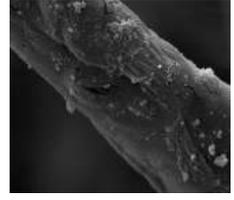
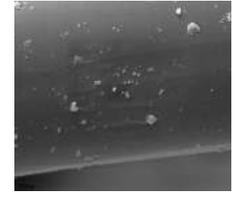
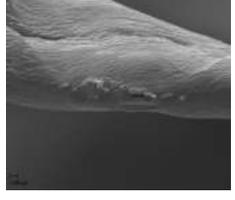
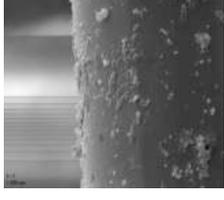
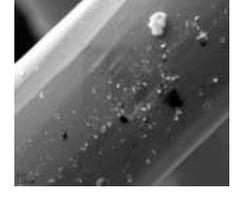
Green -  
*S. aureus* cotton

Blue -  
*E. coli* cotton

Red -  
*E. coli* polyester

Purple -  
*S. aureus* polyester

# Survival of Microorganisms on Textiles

	Cotton ( <i>E. coli</i> )	Polyester ( <i>E. coli</i> )	Cotton ( <i>S. aureus</i> )	Polyester ( <i>S. aureus</i> )
8 hrs				
24 hrs				
168 hrs				
504 hrs				

- 1. Laundry not washed immediately – bacteria remains viable**
- 2. Cross contamination to contact sites in the home – other laundry, wash basket, surfaces and individuals**

# Are domestic laundering policies adhered to?

DoH Policy States:

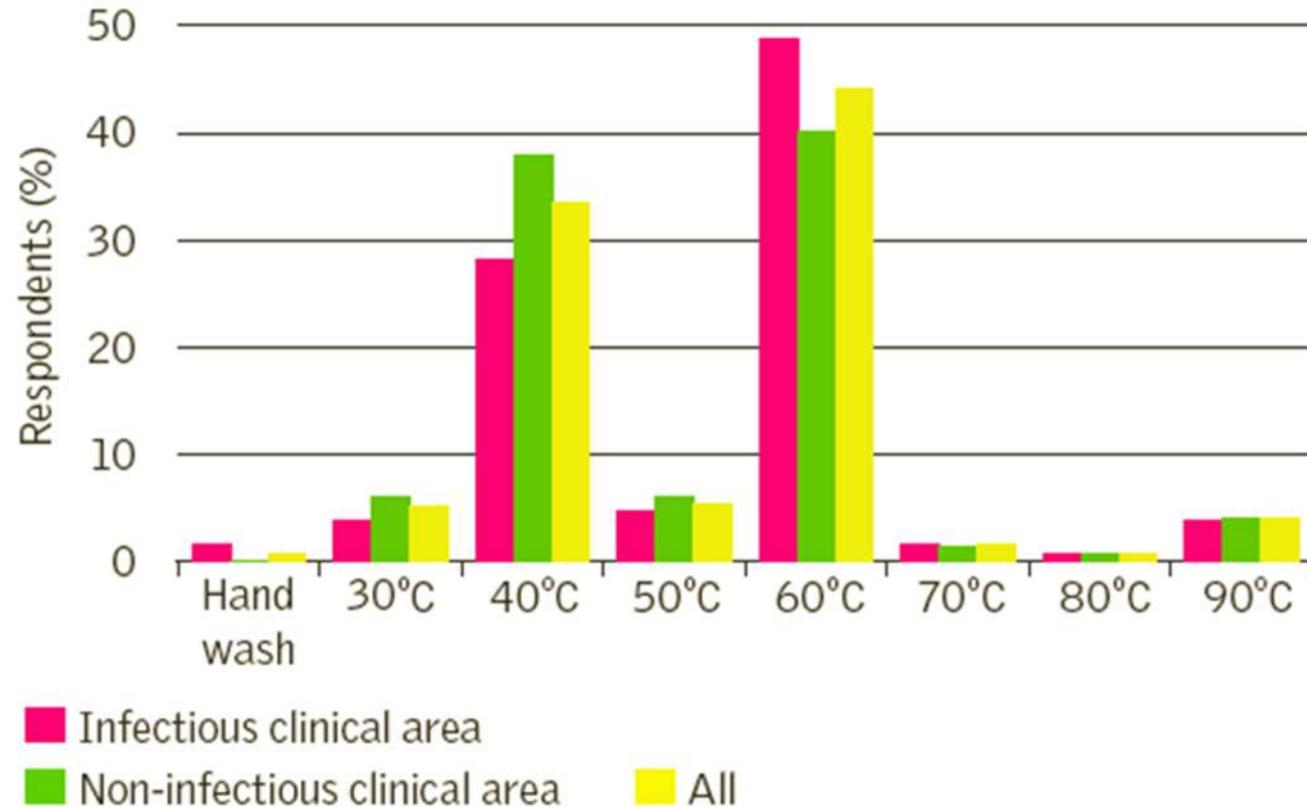
- *Wash at 60°C for 10 mins – removes almost all microorganisms*
- *Washing at lower temperatures using detergent eliminates MRSA and most other Microorganisms*

What Trusts State:

- 3 out of 4 reviewed state no requirement for detergent
- 1 out of 4 state a minimum temperature of 50°C

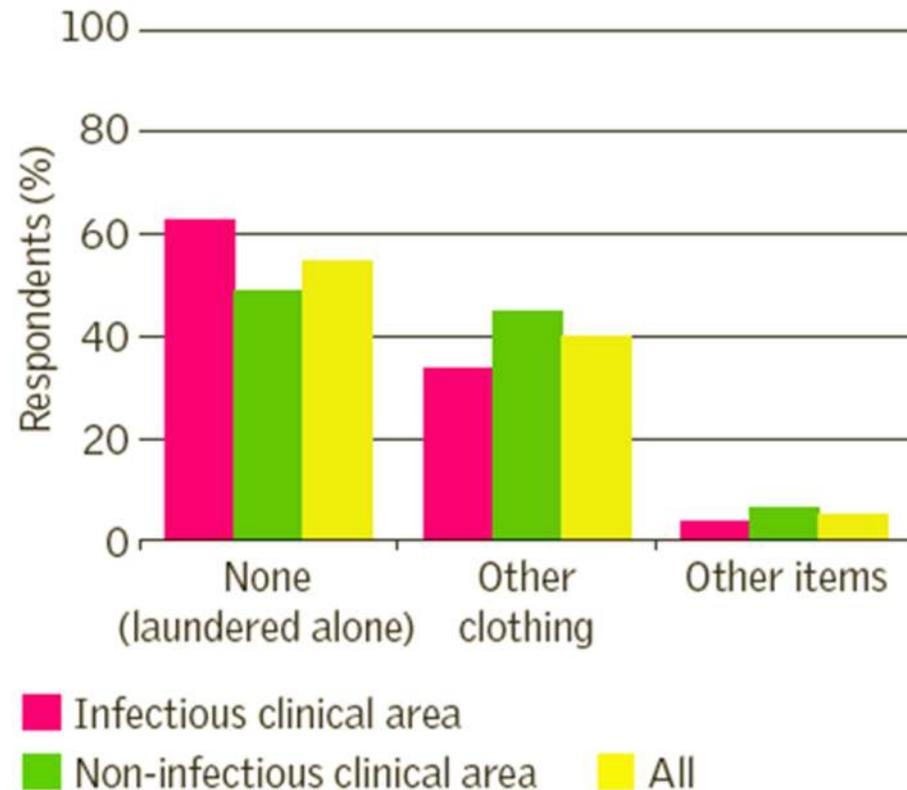
# Are domestic laundering policies adhered to?

Temperatures used for uniform laundering at home ( $n = 265$ )

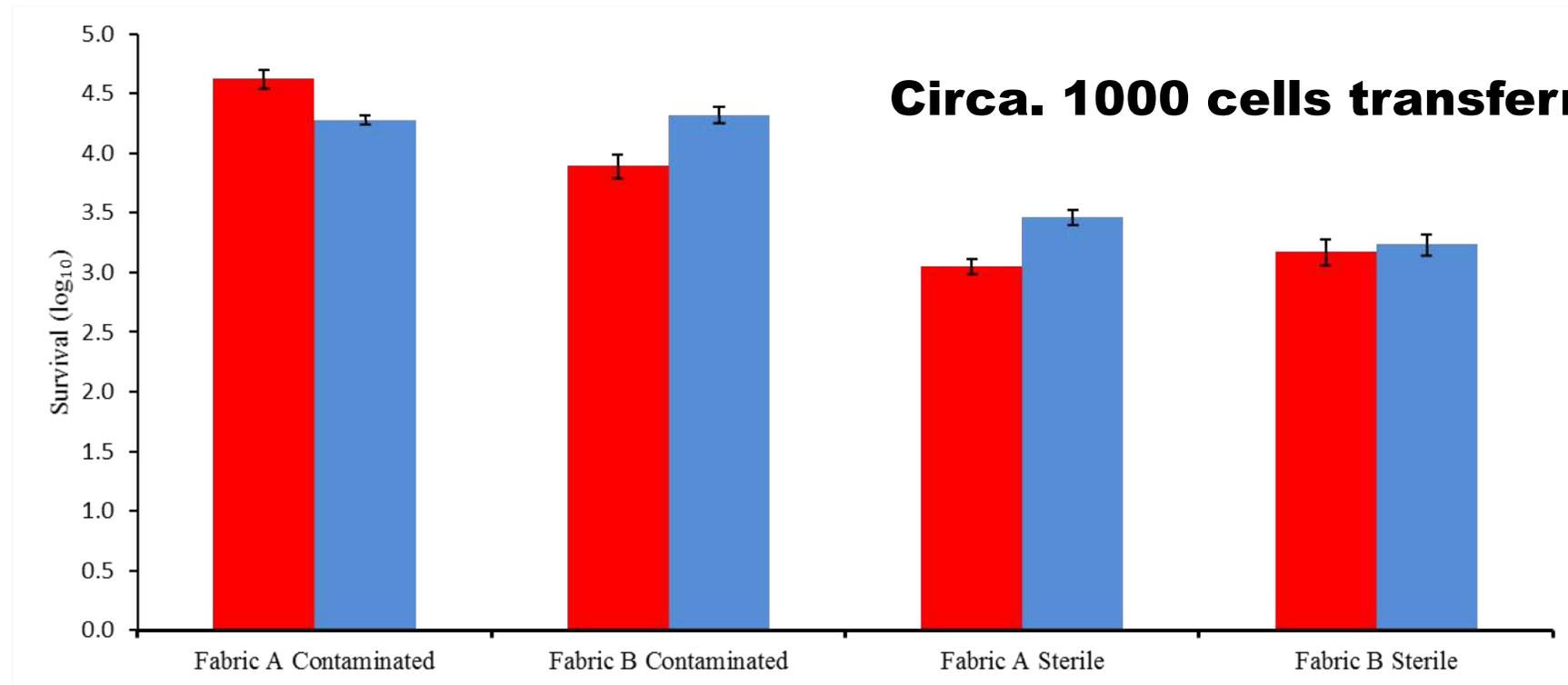


# Are domestic laundering policies adhered to?

Items with which uniforms are most commonly  
laundered ( $n = 265$ )



## Reductions 99.9% - 99.99%



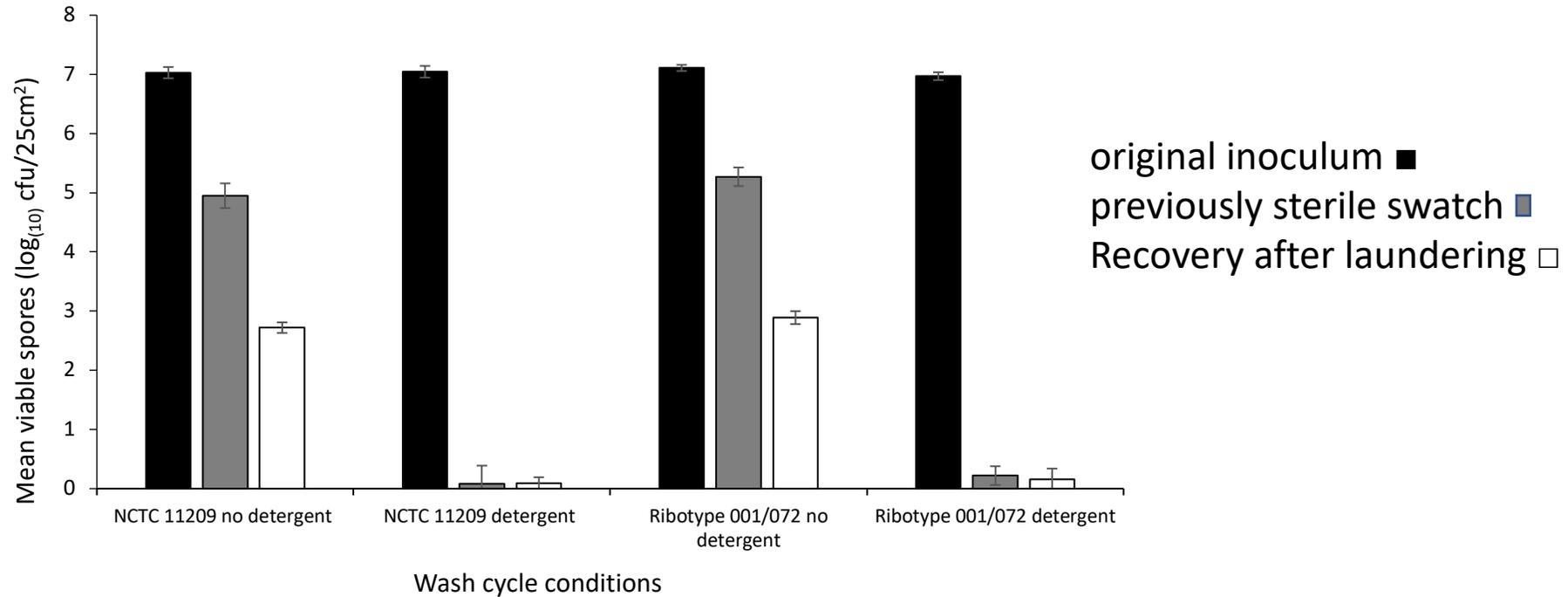
Survival of *E. coli* ■ and *S. aureus* ■ after laundering at 40°C on contaminated and sterile samples of fabric A (65% polyester/35% cotton) and fabric B (100% polyester)

## EFFECT OF LAUNDERING 60°C

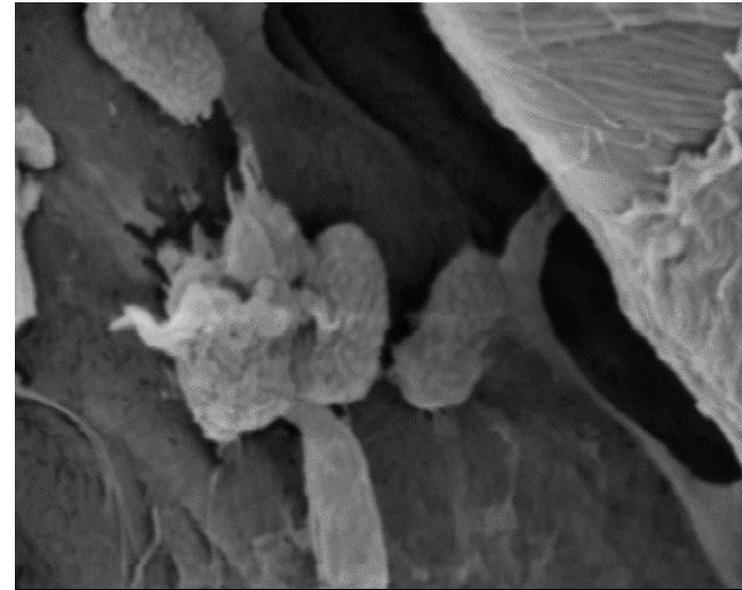
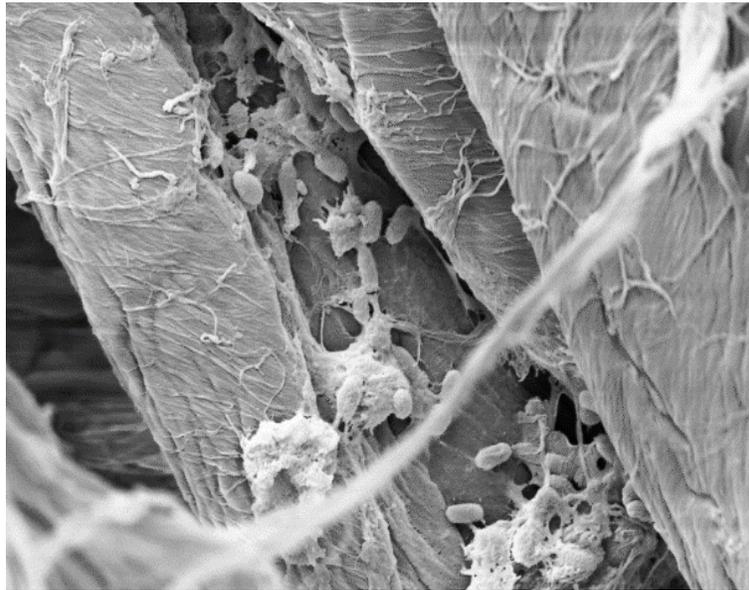
When *E. coli* and *S. aureus* samples were washed at 60°C **ALL** bacteria was removed and **NO** cross contamination occurred

# *C. difficile* spores survival through high temperature washing

Simulated Wash 71°C



# *C. difficile* spores survival through high temperature washing



# The Risks

- 1. No monitoring or adherence to policies in the domestic setting**
- 2. Most used temperatures for domestic laundering do not remove high loads of bacteria or spores**
- 3. Other textiles in the wash can become contaminated with microorganisms**

ORIGINAL ARTICLE

## The effect of low-temperature laundering and detergents on the survival of *Escherichia coli* and *Staphylococcus aureus* on textiles used in healthcare uniforms

K. Riley<sup>1,2</sup>, J. Williams<sup>2</sup>, L. Owen<sup>1</sup>, J. Shen<sup>2</sup>, A. Davies<sup>2</sup> and K. Laird<sup>1</sup>

Clinical Practice  
**Discussion**  
**Uniforms**

**Keywords** Uniforms/Home laundering/  
HCAs/Contamination/Temperature

This article has been  
double-blind peer reviewed

### In this article...

- Outcomes of research into the risks of home laundering of uniforms
- National guidance on the home laundering of uniforms
- Recommended changes to reduce the risk of bacterial contamination from uniforms

## Domestic laundering of nurses' uniforms: what are the risks?

## Art & science

If you would like to contribute to the Art & science section, email [gwen.clarke@rcnpublishing.co.uk](mailto:gwen.clarke@rcnpublishing.co.uk) or [@NSclinicalEd](https://twitter.com/NSclinicalEd)

*The synthesis of art and science is lived by the nurse in the nursing act*  
JOSEPHINE G PATERSON

## Washing uniforms at home: adherence to hospital policy

Riley K *et al* (2015) Washing uniforms at home: adherence to hospital policy. *Nursing Standard*. 29, 25, 37-43. Date of submission: June 26 2014; date of acceptance: November 25 2014.



Nursing Times  
Journal Club

## Collaborators:

- All participating hospitals
- Healthcare staff involved in the survey

## PhD Students:

- Kate Riley
- Joanna Tarrant
- Lucy Owen

## Funders:

- Society of Applied Microbiology



# Infection Prevention

Val Edwards-Jones  
Professor of Medical Microbiology  
Institute of Skin Integrity and Infection Prevention  
University of Huddersfield

# Summary of the Problem

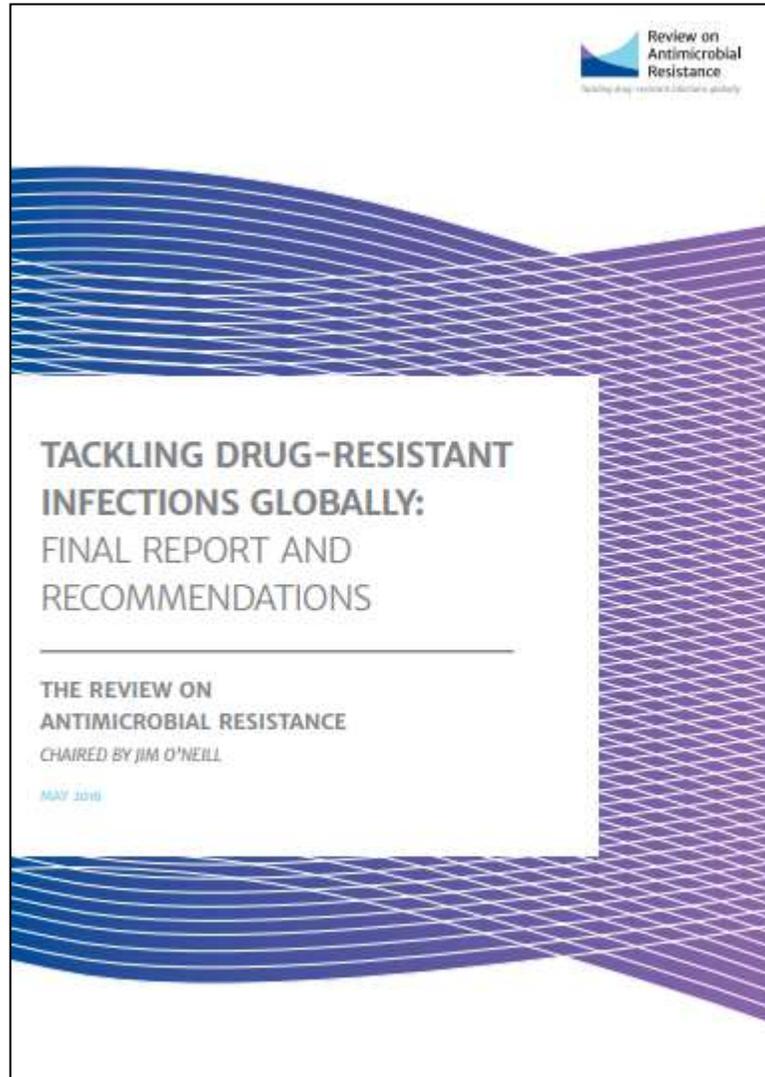
- ▶ Healthcare associated infection
  - ▶ Growing concern of antimicrobial resistance
  - ▶ O'Neill report
  - ▶ Role of the environment in infection prevention
  - ▶ prevention of infection through textile contamination
  - ▶ incorporation of biocides including silver into textiles and plastics.
- 

## Dr Margaret Chan, Director General of WHO, 2011



- ▶ *Things as common as strep throat or a child's scratched knee could once again kill.*
- ▶ *For patients infected with some drug-resistant pathogens, mortality has been shown to increase by around 50 per cent.*
- ▶ *A post-antibiotic era means, in effect, an end to modern medicine as we know it.*

**It has been estimated that current antibiotics may become useless within the next two decades**



Jim O'Neill report  
May 16<sup>th</sup> 2016

Commissioned by  
David Cameron in  
2014

*“We have reached a  
critical point and  
must act now on a  
global scale to slow  
down antimicrobial  
resistance”*

Professor Dame Sally  
Davies, UK Chief  
Medical Officer

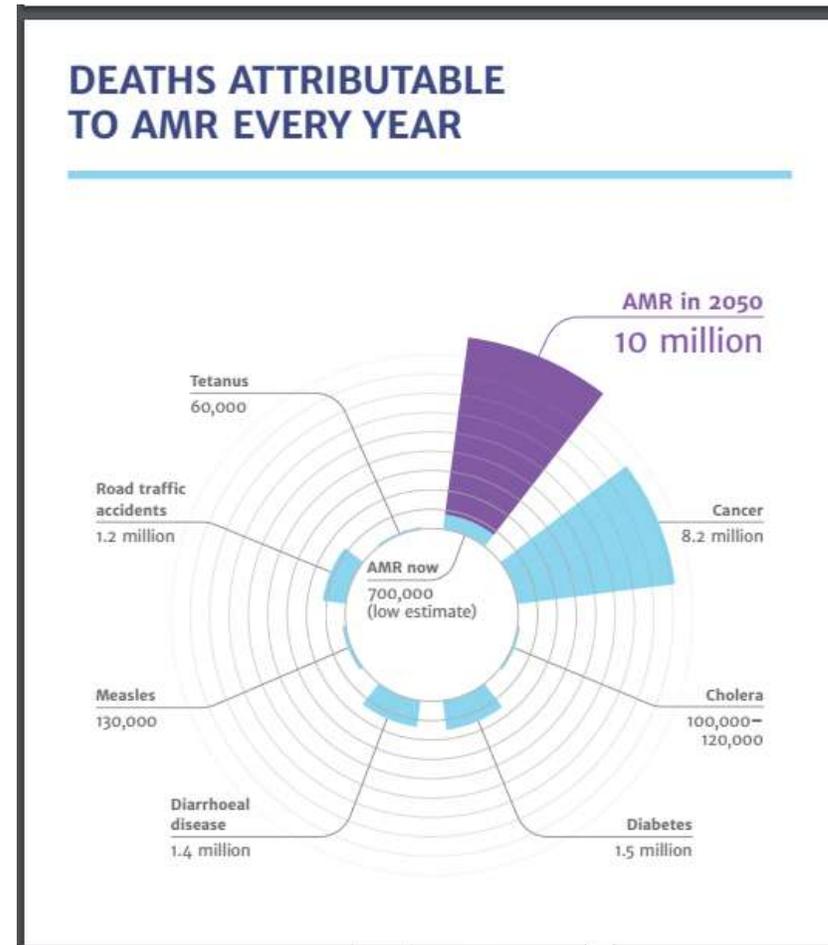
# 10 key areas

1. A massive global public awareness campaign
2. Improve hygiene and prevent the spread of infection
3. Reduce unnecessary use of antimicrobials in agriculture and their dissemination into the environment
4. Improve global surveillance of drug resistance and antimicrobial consumption in humans and animals
5. Promote new, rapid diagnostics to cut unnecessary use of antibiotics
6. Promote development and use of vaccines and alternatives
7. Improve the numbers, pay and recognition of people working in infectious disease
8. Establish a Global Innovation Fund for early-stage and non-commercial research
9. Better incentives to promote investment for new drugs and improving existing ones
10. Build a global coalition for real action – via the G20 and the UN

# 10 key areas

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# Shocking statistics if we don't change



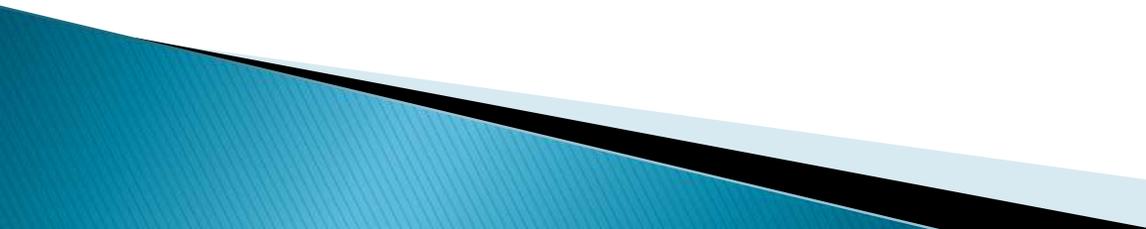
# Role of the Environment

- ▶ Microorganisms are shed into the environment with a high frequency through aerosols and touch.
  - ▶ Linen /uniforms can become contaminated in healthcare environments and can cause subsequent cross infection if not removed during laundry.
  - ▶ However, linen not often seen as the focus of cross infection.
- 

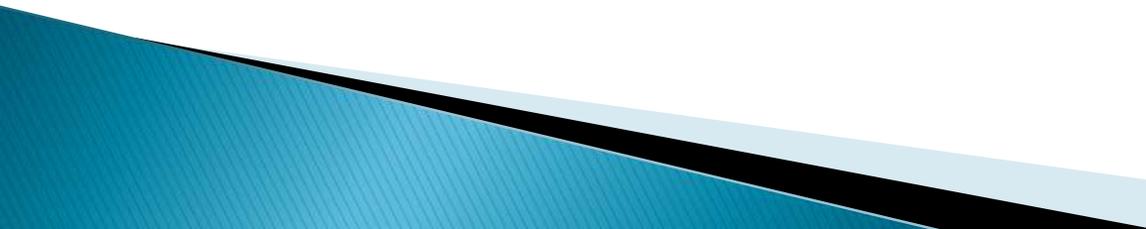
# Incorporation of biocides including silver into textiles and plastics.

- ▶ Biocides can be incorporated into a variety of medical devices to reduce infection and potentially prevent the need for antibiotics.
  - Nascent study – silver impregnated ET tubes
  - Reduction of ventilated associated pneumonia
- ▶ Silver impregnated dressings
  - Helps reduce wound infection (burns) and also used to treat infection
- ▶ Silver impregnated textiles
  - ?Help to reduce infections associated with linen

# Silver in fabrics

- ▶ Silver is a broad spectrum biocide acting on a variety of microbes and target sites within the cells
  - ▶ Silver ions can be incorporated into polyester and added to cotton (poly-cotton). (Silver metal non-antimicrobial).
  - ▶ Silver ions – highly antimicrobial at 12-50ppm
  - ▶ Quantity of silver ions in the textile can be varied depending upon amount of polyester component added.
- 

# Silver in fabrics

- ▶ Studies have shown that silver ions incorporated into a variety of fabrics (towels, sheeting, pillowcases, uniform fabrics) can reduce bacterial load by greater than 3 log (acceptable for international standards) (data on file).
  - ▶ The antibacterial action has been demonstrated even after a hundred washes.
  - ▶ **Silver in textiles could help reduce cross infection in healthcare environments by reducing the bacterial load.**
- 



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## Lunch

Exhibition and Food Halls - King George III and Queen Charlotte



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