

# Pathogenic Colonisation of hospital badges and neck lanyards in the theatre environment

## Background

- Healthcare associated infections (HCAI) cause considerable morbidity and mortality<sup>(3)</sup>
- Mandatory identification badges and neck lanyards (B&L) are handled numerous times a day and are rarely cleaned
- Contact between B&L, hands and patients poses a potential HCAI transmission risk<sup>(2,3)</sup>
- Two studies have examined colonisation of B&L in healthcare workers but none within the theatre environment.
- Pathogens were identified in 14-25% of badges and 14-38% lanyards<sup>(4,5)</sup>

### Evaluation aims:

- To quantify pathogenic colonisation of B&L within the theatre environment and determine whether B&L pose an infection risk to surgical patients<sup>(Box A)</sup>
- To evaluate the efficacy of a simple cleaning intervention using Clinell Universal Wipes™ on B&L colonisation

## Methods

- Point prevalence surveillance of B&L was performed on healthcare staff working in theatres, Freeman Hospital Newcastle upon Tyne NHS Trust, UK. May 2011.
- Ethical approval was not required as National Research Ethics Service (NRES) deemed the study a 'service evaluation'

### Phase 1:

- All samples were collected by the same operative
- Gloves were changed between each B&L
- The entire surface of the B&L was swabbed using a Polywipe (Medical Wire & Equipment) and placed immediately into a sterile bag labelled with the source of origin
- Each polywipe was then inoculated onto a standard set of media and any resultant growth identified by MALDI-TOF spectroscopy.

### Phase 2:

- Any B&L colonised with HCAI organisms were recalled and resampled
- Swabs were taken prior to cleaning intervention
- Each B&L was cleaned with a Clinell Universal Sanitising Wipe (Gama Healthcare) for 30-60 seconds<sup>(7)</sup>
- Swabs were then taken after the B&L had dried and re-analysed to assess decontamination efficacy

## Results

### Phase 1:

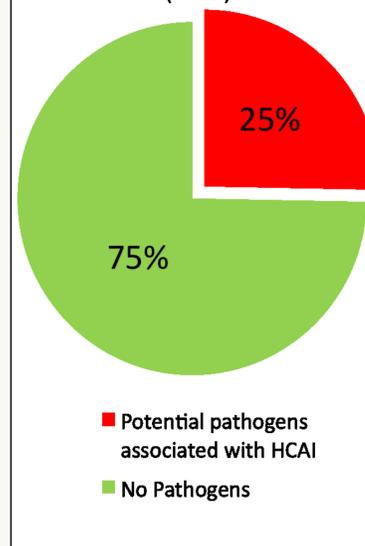
- 25.3% (21/83) B&L were colonised with pathogens associated with HCAI. (Figure 1/Table 1)
- 93% of B&L grew normal skin flora, 8% were no growth
- 75% of control B&L contained normal flora. No pathogens were identified on controls. (Box B)
- Potential pathogens were identified from 25% B&L combined samples compared to 8.3% of badges sampled alone.

**Table 1: Potential pathogens identified on B&L associated with HCAI**

Organism:	Nos:
Methicillin Resistant Staphylococcus Aureus (MRSA)	1
Acinetobacter species	8
Non-lactose fermenting coliform	1
Pseudomonas species	5
Alpha-haemolytic streptococcus	1
Pseudomonas species & Non-lactose Fermenting-coliform	1
Pseudomonas species & Aspergillus fumigatus	1
Methicillin Sensitive Staphylococcus Aureus (MSSA)	1
Roseomonas species	1
Pantoea species	1
Total:	21

Other: Klebsiella was identified during phase 2

**Figure 1: Bacterial colonisation of B&L in theatre environment (n=83)**



### Phase 2:

- 11/21 B&L colonised with potential pathogens were followed up 1 month later. No B&L on pre-swab cultures contained the same organism as originally identified in phase 1. Three B&L grew different pathogens and 8 had no organisms
- All pathogens on B&L including control samples (MSSA, Acinetobacter, Klebsiella) were destroyed following Clinell intervention, with an average reduction of 72% in colony forming units (cfu)<sup>(Figure 2 and 3)</sup>

(Additional note: pseudomonas was destroyed by Clinell Universal wipes in a separate analysis of keyboards conducted by our team, not presented here).

**Box A: All micro-organisms** have the potential to cause infection. To differentiate between microbes found in normal flora and potential pathogens associated with HCAI 'pathogens' defined as:

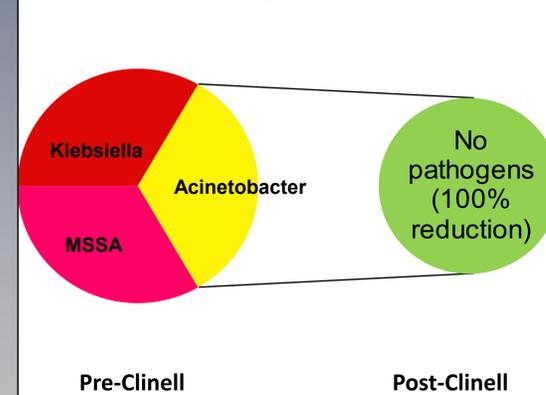
MSSA, MRSA, C.difficile, Acinetobacter, Klebsiella, Pseudomonas, E.coli, Proteus, Enterococcus and Candida

**Box B: Controls:**

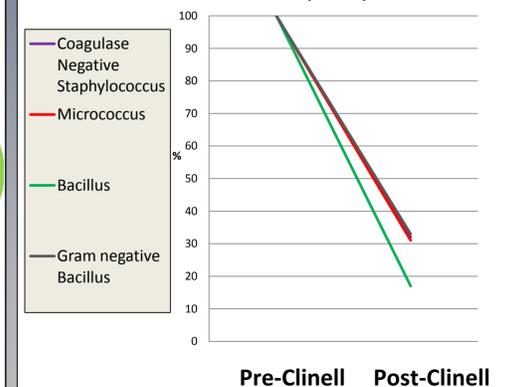
**Phase 1:** 2x unused Badges and 2x unused Lanyards swabbed for background contamination.  
**Phase 2:** 2x unused B&L were inoculated with S.aureus (NCTC 8530). B&L was swabbed and then cleaned with Clinell to assess effectiveness.

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**Figure 2: Percentage reduction in pathogens (cfu) on B&L following Clinell intervention (n=3)**



**Figure 3: Percentage reduction in normal flora (cfu) on B&L following Clinell intervention (n=11)**



With thanks to Gama Healthcare for sponsoring this poster

## Discussion

- 25% of B&L worn by staff in theatres were colonised with potentially pathogenic organisms
- Several species that can cause HCAI were identified: MRSA, Klebsiella Acinetobacter, Pseudomonas
- All pose a transmission risk to surgical patients
- B&L were found to contain 3x more pathogens than badges alone
- Like hands, B&L are a potential reservoir for pathogens and are an important 'touch site'.<sup>(6)</sup>
- Pathogens found on B&L can live on plastic and fabric for a number of months and remain a continuous source of transmission if no regular surface disinfection is undertaken<sup>(1,2,9)</sup>
- Plastic adherent organisms are more resistant to ethanol based cleaning methods<sup>(10)</sup>
- None of the B&L which had previously contained pathogens in phase one, contained the same organisms in phase 2
- B&L like hands, may be subject to a transient ever-changing colonisation dependent on contact
- Following Clinell use: all pathogens re-identified in phase 2 were destroyed with an average 72% reduction in CFU. Our findings support the data produced by GAMA healthcare that Clinell Universal Wipes are an effective killing intervention against pathogens associated with HCAI and in reducing overall microbiological burden<sup>(7)</sup>

### Recommendations

- Continued good hand hygiene practice and daily cleaning of B&L with Clinell Universal wipes
- B&L should be removed when undertaking any clinical examination/procedure/transfer to avoid patient contact

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