Infection control in intensive care

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Risks to the patient of health care acquired infection (HCAI)

Patient admitted to hospital

Risk of HCAI

Vascular access device
- HCAI +
  - Site infection
  - Bacteraemia

Surgical procedure
- HCAI ++
  - Surgical wound infection

Admit to Intensive Care Unit
- HCAI +++
  - Ventilator associated pneumonia

Antibiotics
- Clostridium Difficile
- Antibiotic resistance
- MRSA

Increased length of stay
- Increased morbidity and mortality
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In 2001, estimated to be 9% of patients admitted to NHS hospitals in England. 8.2% in 2006, 6.4% in 2011.
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World Health Organisation

50% HCAI deaths attributable to poor hand hygiene
Lessons from the past

*Link between hand hygiene and infection*

Established in 1860
Lessons from the past

1847
Ignaz Semmelweiss
Father of hand hygiene
Link between hand washing & spread of disease

1854
Florence Nightingale
Pioneer of evidence based practice with hand washing at its core

1860-1870
Pasteur and Lister
Scientific proof of link

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2000
Didier Pittier
Improved hand hygiene compliance with alcohol handrub

2002
Healthcare Infection Control Practices Advisory Committee
Alcohol handrub standard of care
Hand washing reserved for particular situations

2005
World Health Organisation (WHO)
First global hand hygiene improvement strategy

Embedded in religious and cultural habits as measure of personal hygiene for centuries
Lessons from the past

- **1847**  
  Ignaz Semmelweiss  
  *Father of hand hygiene*  
  *Link between hand washing & spread of disease*

  - *Asepsis theory rejected by the medical community during his lifetime*  
  - *Later proven by the work of Pasteur and others*

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‘Every nurse ought to be careful to wash her hands frequently during the day’

‘She must ever be on guard against want of cleanliness …’
Lessons from the past

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Hand hygiene compliance improved with alcohol hand rub

This should be the standard of care with hand washing reserved for particular situations

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Present day issues

2012
Present day issues

• Hand hygiene compliance
  – MRSA
  – Clostridium Difficile

• Surgical site infection

• Intravenous line infection

• Ventilator-associated pneumonia

• Antibiotic resistance
Introduction of surveillance and targets

In the UK, reducing the risk of Healthcare Associated Infections (HCAI) has become a national priority with the introduction of surveillance and targets.

MRSA bacteraemia:
- 1.3% in 2006
- 0.1% in 2011

Clostridium Difficile:
- 2% in 2006
- 0.4% in 2011
Hand hygiene

Most basic thing we can do – but the easiest thing to get wrong!

Mandatory training
Monthly hand hygiene audits
Strict dress code

Bare below the elbow

- No jewellery
- *Plain wedding band allowed*
- No wrist watch
- No nail varnish
Quarterly MRSA bacteraemia 2001 to 2009

UCLH target

2011 = 8
2012 = 5
MRSA

Elective admissions

All patients screened in pre-admission clinic or on admission to hospital - MRSA Rapid Test (MRAP)

If MRSA positive

- Prescribed 5 day course of antiseptic skincare
  - Chlorhexidine body wash and shampoo
  - Antibiotic nasal ointment - mupirocin
  - Chlorhexidine body powder

- Planned surgery takes place on day 5

- Chlorhexidine skin prep at operation site

- Teicoplanin 800mg IV + gentamicin 1.5mg/kg intra-op
Emergency admissions with unknown MRSA status

- Take MRSA screen
  - MRSA Rapid Test (MRAP)

- Pre-op apply mupirocin to inside of nose

- Chlorhexidine skin prep at operation site

- Add Teicoplanin 400mg IV to conventional surgical prophylaxis intra-op

- Continue MRSA suppression post-op until screen reported
**Clostridium Difficile**

- Isolate only in presence of diarrhoea and until no diarrhoea for at least 48 hours
- Use soap and water for hands – not alcohol gel
- Environmental cleaning with Chlorine Dioxide

**Antibiotics**

**1st line:**
- Metronidazole 400mg PO tds for 10 - 14 days
- If poor response after one week change to Vancomycin 125mg PO qds for 10 - 14 days

**1st line in severe cases:**
- Vancomycin 125mg PO qds for 10 - 14 days

Restrict use of proton pump inhibitors
Surgical site infection

- Skin prep = Chlorhexidine with Tint
  - 2% chlorhexidine gluconate in 70% isopropyl alcohol with tint
    2-3 fold decrease in wound infection rates when compared to aqueous povidone iodine

- Intra-op
  - Surgical prophylaxis
    Single dose antibiotic adequate for most surgical procedures

- Post-op
  - Wound dressing and suture removal protocols

National Hospital rates
April – June 2012

Spinal surgery: 2%
(national average 2.1%)

Cranial surgery: 1.7% 
(national average 1.9%)
Intravenous lines

- Improved design of vascular access devices
  - Closed system
  - Needle free

- Protocols
  - Insertion
  - Duration

- Line dressings
  - Chlorhexidine impregnated
Visual Infusion Phlebitis (VIP) Score
Early detection of IV site infection

Insertion details
Who inserted the line and when

Daily observation of insertion site using VIP Score

Cannula removal details

VIP score
Valid and reliable measure for determining when to remove a peripheral intravenous line

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**Visual Infusion Phlebitis Score (VIP Score)**
(developed by Andrew Jackson, 1997)

<table>
<thead>
<tr>
<th>VIP Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No signs of phlebitis</td>
</tr>
<tr>
<td>1</td>
<td>Early stage of phlebitis</td>
</tr>
<tr>
<td>2</td>
<td>Medium stage of phlebitis</td>
</tr>
<tr>
<td>3</td>
<td>Advanced stage of phlebitis</td>
</tr>
<tr>
<td>4</td>
<td>Advanced stage of Thrombophlebitis</td>
</tr>
<tr>
<td>5</td>
<td>Advanced stage of Thrombophlebitis, Infections</td>
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**Visual Infusion Phlebitis Score Table**

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**Cannula Insertion Details**

- **Insertion by**
- **Date of insertion**
- **Insertion site** (e.g., Right / Left arm)
- **Size/colour of cannula**

**Dressing Details**

- **Review sticker in situ**

**Cannula Removal Details**

- **Date of removal**
- **Print name & designation**
<table>
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</thead>
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<tr>
<td>DAY 3</td>
<td>0</td>
<td>No signs of phlebitis</td>
<td>Observe cannula</td>
</tr>
<tr>
<td>DAY 4</td>
<td>1</td>
<td>Possible first signs of phlebitis</td>
<td>Observe cannula</td>
</tr>
<tr>
<td>DAY 5</td>
<td>2</td>
<td>Early stage of phlebitis</td>
<td>Re-site cannula</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>Medium stage of phlebitis</td>
<td>Re-site cannula, Consider treatment</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Advanced stage of phlebitis (or start of thrombophlebitis)</td>
<td>Re-site cannula, Consider treatment</td>
</tr>
<tr>
<td></td>
<td>5</td>
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<td>Initiate treatment, Re-site cannula</td>
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Ventilator-associated pneumonia

Internationally accepted evidence-based guidelines to prevent VAP

- Elevation of head of bed to 30°-45°
  - Reduce risk of VAP

- Tubing management
  - Replace when visibly soiled and according to manufacturer’s instructions
  - Prevent condensate entering airway

- Suctioning of respiratory secretions
  - Wear examination gloves and decontaminate hands before and after suction procedure

- Oral hygiene
  - Chlorhexidine mouth wash QDS

- Sedation holding
  - Reduce duration of mechanical ventilation and risk of VAP

- Gastric ulcer and DVT prophylaxis
  - Prevent complications of critical care

Respiratory infections 4th largest contributor to HCAI in UK 19% ventilation-related

Internationally accepted evidence-based guidelines to prevent VAP
Prudent antibiotic prescribing

Waiting for objective data to diagnose infection before treatment with antimicrobial drugs for suspected ITU acquired infections does not worsen mortality and might be associated with better outcomes and use of antimicrobial drugs

The Lancet Infectious Diseases October 2012
Prudent antibiotic prescribing

ICU Antimicrobial Guidelines
Clinical Guideline - DRAFT
Local use

Author(s)
Dr R Hurley (on behalf of Critical Care Delivery Group)
Prof P Wilson, Consultant Microbiologist
Dr B Macrae, Consultant Microbiologist
Dr N Shetty, Consultant Microbiologist
Dr C Curtis, Consultant Microbiologist
Dr S Morris-Jones, Consultant Microbiologist
Ms P Panesar, Lead Pharmacist, Microbiology

Owner/Sponsor
Critical Care Delivery Group

Review
1st January 2013 (or earlier if new evidence becomes available)

Responsible Director
Dr R Hurley, Chair of Critical Care Delivery Group

Monitoring Committee
Critical Care Delivery Group Antimicrobial Usage Committee

Target Audience
All medical, nursing and pharmacy staff

Related Trust Documents/Policies
Gentamicin dosing guideline – Adults
Neutropenic sepsis guideline
Clostridium difficile treatment guideline
Meningitis treatment
Endocarditis treatment

Number of Pages and Appendices
7 pages

Equalities Impact Assessment
Low

Updated antimicrobial guidelines for ITU patients
Updated antimicrobial guidelines for ward patients
ALWAYS take cultures BEFORE starting antibiotic therapy
All prescriptions must have a STOP or REVIEW date
Informing patients and their relatives

Not only the behaviour of health care professionals that determines the risk of HCAI but also the behaviour of patients and visitors to our hospitals.
Thoughts for the future

The basics will continue to be key to infection control in the ITU

Hand hygiene
General cleaning of the environment
Isolating infected patients

We know they work!
Thank you