

Preventing Infections Associated with the Use of Medical Devices

Prof. Robert Pratt and Dr. Carol Pellowe, Thames Valley University
A Webber Training Teleclass

Preventing infections associated with the use of medical devices

Using national guidelines to promote evidence-based practice in England

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Hosted by Debbie King

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Healthcare-associated Infections in England

- 9% of patients in NHS hospitals develop healthcare-associated infections, i.e., 100,000 infections each year
- These infections are associated with significantly increased morbidity and mortality
- **Although not all of these infections are preventable, many are (15-30%)**
- Many HCAI are linked to the use of medical devices

Pratt RJ, et al., 2001

Evidence-based practice

Drivers

- Evidence-based medicine (EB) movement
- Clinical governance
- Evidence-based Guidelines



Pratt RJ, et al., 2002

National EB Guidelines - England

- Systematically developed broad statements (principles) of good practice.
- Based on best available evidence of effectiveness – *not* best evidence 'possible'
- Used to inform development of detailed operational protocols (local guidelines)
- Subject to debate, review & updating

Pratt RJ, et al., 2001
Pellowe CM, et al., 2004

National EB Guidelines - England

Current Guidelines developed for:

- Department of Health (England)

Pratt RJ, et al., 2001
Pellowe CM, et al., 2004

- National Institute for Health and Clinical Excellence (NICE)

Pellowe CM, et al., 2003

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National EB Guidelines - England

Current Guidelines

- Standard Principles for Preventing HCAI (healthcare-associated infections)
- Preventing infections associated with the use of medical devices:
 - urinary catheters
 - central venous catheters
 - enteral feeding systems

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Standard Principles

- To be used in conjunction with more specific device-related guideline recommendations

5 important evidence-based infection prevention measures

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Standard Principles *hand hygiene*

1. When to decontaminate hands

- Hands must be decontaminated immediately before each and every episode of direct patient contact or care and after any activity or contact that could potentially result in hands becoming contaminated

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Standard Principles *hand hygiene*

2. What cleaning preparation to use

- Hands that are visibly soiled, or potentially grossly contaminated with dirt or organic material, must be washed with liquid soap and water
- Hands must be decontaminated, preferably with an alcohol-based hand rub, unless hands are visibly soiled, between caring for different patients or between different care activities for the same patient

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Standard Principles *personal protective equipment*

3. When to use gloves

- Gloves* must be worn for invasive procedures, contact with sterile sites and non-intact skin or mucous membranes, and all activities that have been assessed as carrying a risk of exposure to blood, body fluids, secretions or excretions, or sharp or contaminated instruments

* sterile or non-sterile gloves

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Standard Principles *personal protective equipment*

4. How to use gloves

- Gloves must be worn as single-use items. They must be put on immediately before an episode of patient contact or treatment and removed as soon as the activity is completed. Gloves must be changed between caring for different patients, and between different care or treatment activities for the same patient

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Standard Principles *Using sharps safely*

5. Using and disposing of sharps

- Sharps must not be passed directly from hand to hand, and handling should be kept to a minimum
- Needles must not be recapped, bent, broken or disassembled before use or disposal
- Used sharps must be discarded into a sharps container at the point of use by the user.

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Preventing catheter-associated urinary tract infections

Urinary Catheters

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Indwelling Urinary catheters IUC

Most common medical device used
Most common cause of HCAI

Risk of bacteriuria

5% for each day
of catheterisation

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If urinary tract infection (UTI) develops

1-4% will develop **bacteraemia**
of whom

13-20% will
die

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Use of indwelling urinary catheters – *a last resort*

- To be used in conjunction with **standard principles** for preventing HCAI

5 important evidence-based infection prevention measures

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Select the right system

- Patient assessment
- Intermittent catheterisation (lowest rates of UTI)
- Short term – consider use of silver alloy catheter
- Long term – consider suprapubic
- Smallest gauge

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Careful catheter insertion

- Aseptic technique
- Intermittent catheterisation – clean procedure
- Assess competence

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Leave the system alone

- Individual care regimen
- Maintain a sterile closed system
- Avoid unnecessary breaks of the system
- Wash urinary meatus with soap and water

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Urinary catheter bags

- Position below level of the bladder
- Avoid contact with the floor
- Empty frequently

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Indwelling urinary catheters

- Change only when clinically necessary
- Avoid bladder washouts
- Restricted use of antibiotic prophylaxis
- Monitor catheter blockage

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Preventing catheter-related bloodstream infections

Central Venous Catheters

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CVC-related bloodstream infections – CR-BSI

- Most life-threatening of all HCAI
- Associated with significant additional morbidity, mortality & medical costs

Risk of CR-BSI

- 87% of all BSI are associated with an intravascular device

Richards MJ, et al., 1999

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Primary source of evidence

- CDC HICPAC Guidelines for the prevention of intravascular catheter-related infections
- Additional systematic review evidence

CDC HICPAC, 2002
Pellowe CM, et al. 2004

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Central venous catheters

- To be used in conjunction with **standard principles** for preventing HCAI

5 important evidence-based infection prevention measures

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Use the right type of CVC

- Number of lumens
- Tunnelled catheter or an implantable vascular access device
- Antimicrobial impregnated CVC
 - Chlorhexidine & silver sulphadiazine impregnated
 - Minocycline/rifampin coated
 - Other

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Optimum aseptic technique for insertion

- Use sterile gown, sterile gloves and a **large** sterile drape
- Use **2% alcoholic chlorhexidine gluconate** sol. for cleaning the skin prior to CVC insertion

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Catheter & catheter site care

- Use aseptic technique for site care and for accessing the system
- Preferably, a sterile, transparent, semipermeable polyurethane dressing should be used to cover the site (change every 7 days or earlier when necessary)
- Use alcoholic sol. of chlorhexidine gluconate for disinfecting the catheter insertion site during dressing changes

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Catheter management

- Inline filters not needed for preventing infection
- Antibiotic lock solutions have a limited role in preventing infection
- Dedicated lumen is needed for TPN
- Use sterile 0.9% sodium chloride injection to flush and lock catheter lumens

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IV administration sets

- Admin. sets in continuous use generally do not need to be replaced more frequently than at 72 hour intervals
- Admin. sets for blood or blood components should be changed every 12 hours, or according to manufacturer's instructions
- Admin. sets for TPN should be changed every 24 hours

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Preventing infections associated with the use of

Enteral Feeding Systems

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Enteral Feeding (EF)

- Increasingly common means of artificial nutrition
- UK: >12,000 people in community on EF
- Majority: nervous system dysfunction
- Most: Living at home

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Prior to hospital discharge

Ensure the following:

- Patient/relative/carer training
- Community staff familiar with system
- Supplies organised
- Emergency advice available

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Use of enteral feeding systems

- To be used in conjunction with **standard principles** for preventing HCAI

5 important evidence-based infection prevention measures

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Selection of feeds

- Use pre-packaged ready-to-use feeds
- Feeds stored according to manufacturer's instructions

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Preparation of feeds ¹

- Hand decontamination
- Clean working area
- Use dedicated equipment
- Compliance with food hygiene legislation

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Preparation of feeds ²

- Feeds mixed with cool boiled water or freshly opened sterile water
- No-touch technique
- Feeds made up for 24 hours and refrigerated

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Feed administration

- Minimal handling of the system
- Ready-to-use feeds one session up to 24 hours
- Reconstituted feeds administered over 4 hours
- Administration sets and feed containers are single-use only

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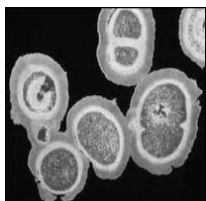
Care of insertion site and tube

- Wash stoma daily with soap and water
- Flush tube before and after feed or drug administration
- Use fresh tap water

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Summary

Preventing infections associated with the use of medical devices



Further Information/Resources

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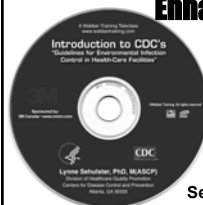
Thank you

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