INFECTION CONTROL AND THE BUILT ENVIRONMENT OF ACUTE HOSPITAL WARDS

Presentation by
Jacqui McDonald,
A research project for
Health and Care Infrastructure Research and Innovation Centre
MARU and HaCIRIC Research team

- Phil Astley, Principal Investigator and Co-Investigators
- Dr Herbert Robinson
- Rosemary Glanville
- Jacqui McDonald
- Robert Montgomery
- Karen Sorensen

HaCIRIC Reading University and Steering Group

NHS Trust Partners
Aims and Objectives

• **Aim**
  
  - To develop design guidelines to identify and implement control of infection measures in briefing, design development and construction stages and in managing the operation of hospital facilities

• **Objectives**
  
  1. To identify areas with the greatest risk of hospital acquired infection, and the patterns and sources of infection in hospital environments
  2. To explore the role of different stakeholders in facilities planning and their impact on design decisions
  3. To examine the impact of organisational drivers on key design and management factors and its influence on the transmission of infection and control measures
  4. To evaluate the impact of different design on clinical, facilities management and behavioural practices and recommend control measures
Methodology

Literature Review

Questionnaire survey to Acute Trusts

Statistical review of responses

Emerging themes exploration with focus groups

Creation of a design and management decision making tool

Content analysis of the interviews
Targeted Infection control literature review

- Storage
- Clinical practice drivers
- Heating and ventilation
- Hard FM

Management

Intervening factors

Design

Soft FM

Hand wash basins

Bed centres and single rooms

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maru
medical architecture research unit
Freedom of Information Request

- In 2006/07 the government made money available for Trusts to undertake capital projects relating to Infection control. Most Trust received £300,000.

- Our questions related to this money.
Themes of the responses

• Sites for work:
  – Wards and ward isolation facilities
    • Bathrooms and toilets
    • Sluice rooms
  – Critical care
  – Endoscopy units
  – Cleaning facilities/ Equipment
  – General
Examples of drivers for the work

- Backlog maintenance
- Changes in guidance
- Changes in thinking
- Technological innovation
- Behaviour
- Solutions to design issues
Most frequent interventions

• Replacement of commodes
• New sinks and sensor taps
• Creation of additional side rooms with en-suites
• Refurbishment of showers/bathrooms and toilets
• Centralised equipment decontamination areas and additional equipment
Divergence

• Curtains
  – Replacement curtains with anti-microbial properties
  – Replacement of curtains with disposable curtains
  – Replacement of curtains with screens

• Sluice
  – Replacement of macerators
  – Replacement of bedpan washers
  – Replacement of bedpan washers with macerators

• Choice of cleaning methods
  – Dry air systems
  – Vapour technology
  – Hydrogen peroxide
Design dilemmas

• New vs. refurbishment
• Variable age of estates/sites
• Choice with out substantiating research evidence
• Differing views of infection control teams
• Affordability vs. risk – the Trust/designers tightrope
• Preventing problems for the future i.e. radiators and other dust traps
• Incorporating new technology
  – Developments are so fast that designs can be out of date before construction is complete
  – How do you keep the design brief flexible to accommodate late changes
Analysis

• Different Trusts have done different things because they are all starting from different points

• Choice and cost are always variable factors in the solutions chosen – Trust have to weigh up the risks when making decisions

• Not all solutions are suitable for the design of building – i.e. hydrogen peroxide bombing requires bays with doors or the decant of the area

• There is a lack of evidence to assist with making choices
Focus groups

• Review of themes, drivers, frequencies, divergence, design dilemmas and analysis with steering group
• Facilitated discussion of the above with the focus groups
Emerging themes exploration with focus groups

Construction
Design
Infection control teams
FM and
Housekeeping managers
Health planners
M & E
Patients

Facilitated debates of the themes from the literature review

Capture of discussions and any additional relevant themes
<table>
<thead>
<tr>
<th>Subject for discussion</th>
<th>Reason for choice</th>
</tr>
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<tbody>
<tr>
<td>Clinical hand wash basins at ward entrances</td>
<td>Activity – no evidence in the literature</td>
</tr>
<tr>
<td>Clinical hand wash basins in Sluice/ dirty utility</td>
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</tr>
<tr>
<td>Macerators vs. bedpan washers</td>
<td>Mixed evidence and mixed activity</td>
</tr>
<tr>
<td>Sensor taps</td>
<td>Activity – no evidence in the literature</td>
</tr>
<tr>
<td>Changing facilities for ward staff</td>
<td>Mixed activity – limited evidence</td>
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<tr>
<td>Centralised ward equipment decontamination areas</td>
<td>Activity – no evidence in the literature</td>
</tr>
<tr>
<td>Flooring (vinyl in all clinical areas and coving instead of skirting)</td>
<td>Activity – little evidence</td>
</tr>
<tr>
<td>Ward storage (quantity and method)</td>
<td>Mixed activity - little evidence</td>
</tr>
<tr>
<td>Choice of cleaning method</td>
<td>Mixed activity – little evidence</td>
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</tbody>
</table>
Focus group debates: outcomes and relevance to different groups/stages of construction

- Initial key themes revisited in light of the outcomes of the research
- Discussion on themes and trends and rationale from Trusts perspectives
- Sculpting of the data to form the basis of briefing, design, construction and management guidance
Design Dilemmas Identified

- DDA v Infection Control
- Health & Safety v Sustainability
- Operational Issues v Design Guidance
A final review of the literature to ensure the inclusion of the latest relevant research and comment pertaining to the established themes and trends identified by the research prior to writing up the study and developing the design and management decision making tool.
DESIGN AND MANAGEMENT DECISION MAKING TOOL

Control of Infection
Design and Management Decisions

- New or Replacement
- Risk Assessment
- Stakeholder Engagement
- Patient’s Priorities
- Sustainability
- Wards and Single Rooms
- Evidence Base
- Cost
- New Technology
- Guidance & Compliance
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<th>Other positive considerations</th>
<th>Negative considerations</th>
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<tr>
<td>1 Centralised ward equipment decontamination areas</td>
<td>A number of Trusts have put in “bed washers” and/or created centralised equipment decontamination areas. A few have also developed non-medical equipment libraries to facilitate cleaning and reduce storage and clutter at ward level.</td>
<td>Ward furniture and equipment should be regularly, thoroughly cleaned and this should be audited.</td>
<td>Gives the opportunity to mend and replace furniture regularly, can be linked with a library type system so wards call for equipment as it is needed, this reduces clutter and storage space required on wards.</td>
<td>Few Trusts have the space to put in a centralised cleaning area, there also needs to be an increase in furniture stock to ensure availability on the wards.</td>
<td>There are logistical problems associated with this model but the outcome is worth navigating these.</td>
</tr>
<tr>
<td>2 Changing facilities for ward staff</td>
<td>Preference is for localised changing areas with hospital laundering the uniforms.</td>
<td>Clothing is low risk but all risks should be minimised.</td>
<td>Ensures uniforms are washed at the correct temperature.</td>
<td>May require staff to have more uniforms to ensure a clean one on every shift – this could be more costly.</td>
<td></td>
</tr>
<tr>
<td>3 Choice of cleaning method</td>
<td>Various methods in use – micro fibre appears to be a popular choice at the moment.</td>
<td>Method needs to leave ward areas visibly clean and should reduce microbial load without dispersing it in the air.</td>
<td>Reduces the amount of chemical products being used, reduces cost and risk of allergies.</td>
<td>Not all systems are suitable for use in every design of hospital.</td>
<td></td>
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<td>4 Curtains</td>
<td>No clear preference. Mixture of actions.</td>
<td>Curtains considered low risk. Fabric needs to be washed at high temperature, antimicrobial coatings are acceptable, as are disposables.</td>
<td>Manual handling, some Trusts feel that disposables are easier to change. However quick change systems are available for fabric curtains.</td>
<td>Sustainability – there is a large waste issue associated with disposable curtains. Designers don't like them as they are boring and bland, with fabric you can add interest and enhance interior design.</td>
<td>Any choice requires careful consideration, including risks, benefits, life cycle and financial costs.</td>
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Curtain choices
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<td>5 Flooring</td>
<td>Preference is for vinyl, Linoleum or Marmoleum and non-slip vinyl for wet areas.</td>
<td>Clinical areas require floors with smooth impervious finish that is easy to clean and maintain, with minimal corners. Edge finishing needs to be durable and cleanable.</td>
<td>‘Smart’ flooring developments are including messages and instructions inset into the flooring. Future technological developments might include for colour indicators of cleanliness.</td>
<td>Standard vinyl is slippery when wet. This need to be managed locally.</td>
<td>The life expectancy of flooring needs to be factored in.</td>
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<td>6 Hand wash basins (Clinical) at ward entrances</td>
<td>Agreement that they are a good idea to promote hand hygiene. There is a feeling that they need to be at the ward exits too, to help stop travel of infection out of the ward.</td>
<td>This is a general requirement, needs to be clearly visible but not at risk of being struck by passing beds etc.</td>
<td>Building Control may approve one basin at part M height of 740mm.</td>
<td>Ward entrances can be congested, there are often no accessible water and drainage points making it difficult to retrofit clinical hand wash basins.</td>
<td>If there were two basins, then one would be at 740mm (DDA compliant), the second at 860mm (standing height).</td>
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<td>7 Sensor taps</td>
<td>Infection control teams keen to have as much as possible on sensors to minimise contact transfer of pathogens; doors, toilet flushed, lights as well as taps.</td>
<td>Infection control enhanced with this style of tap as no possibility of recontamination of hands during the hand washing process.</td>
<td>Can reduce water consumption and wastage.</td>
<td>Can be difficult to get the temperature set correctly on some designs.</td>
<td>High visibility jackets can cause the sensors to activate – this can cause water wastage during the final stages of construction and commissioning of new and refurbished areas.</td>
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Hand wash basins at ward entrances
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<td>8</td>
<td>Sluice rooms – clinical hand wash basins and macerators vs. bedpan washers</td>
<td>HBN 04 should be amended to reflect requirement of hand wash basins in sluice rooms. Macerators are the preferred option as there is no risk of residual contamination.</td>
<td>There should be a clinical hand wash basin in the sluice.</td>
<td></td>
<td>Space in existing sluice rooms may preclude the addition of a clinical hand wash basin.</td>
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<td>9</td>
<td>Single bedrooms/patient isolation</td>
<td>Generally felt that higher proportions of single side bedrooms are required. Increased side single rooms might be created to give an element of containment. If not room for side rooms then doors to bays will give element of containment.</td>
<td>There should be adequate numbers of single/isolation rooms to provide segregation of infected and non-infected patients. Consider doors on bays with sensor activated sliding doors. Consider en-suites in larger bays.</td>
<td>Patients do not have to leave bays to use the bathroom, facilities for staff to wash hands close to bays. Patients get more sleep and rest, the issue of privacy and dignity is addressed.</td>
<td>Sometimes doors to isolation rooms left open, the use of sensor activated doors to side rooms could over come this.</td>
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<td>10</td>
<td>Ward storage</td>
<td>Ward storage solutions have been addressed in a number of Trusts. Some providing clear fronted storage to help staff locate items. Cupboards need shelving that can be cleaned.</td>
<td>There needs to be enough storage to put everything away. Nothing should be stored on the floor. There should be no dust traps.</td>
<td>Reduces clutter on the ward.</td>
<td>Can mean staff have to travel further to get items they need.</td>
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Hand wash basins in sluice rooms and need for adequate storage
Research Recommendations 1

- CoI principles need to be clearly stated at the commencement of each project.

- Consideration must be given to how the CoI principles impact on each element and area of the design.

- Areas of impact and management issues should be documented to prevent them being lost in the design process.

- Infection rates should form part of the pre and post project evaluation as a value for money measure.
Research Recommendations 2

• Patients should be involved in the design process.

• All stakeholders, in-house and external, are involved in the design process and construction process from the beginning and at regular intervals throughout the process.

• The requirement for a clinical hand wash basin in the sluice room should be added to HBN 04-01 (Department of Health, 2008)
Thank you