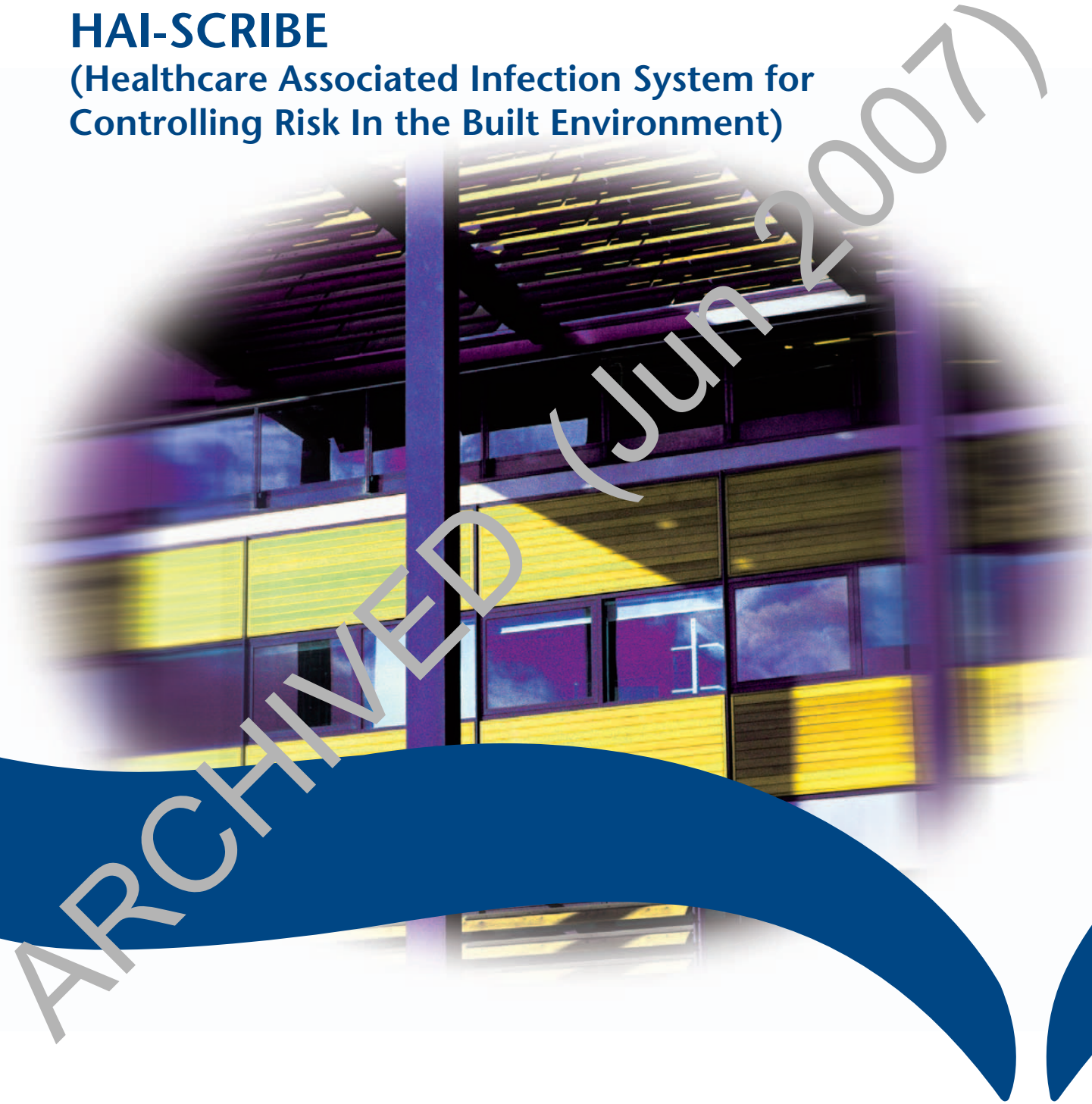


Property and Environment Forum

## HAI-SCRIBE

(Healthcare Associated Infection System for  
Controlling Risk In the Built Environment)



**HAI-SCRIBE**  
**(Healthcare Associated Infection System for**  
**Controlling Risk In the Built Environment)**





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## 1. Introduction

In recent years there has been an increase in concern about the risks to health from receiving treatment and care in healthcare facilities. The Report of a Joint Scottish Executive Health Department and NHSScotland Working Group (Carey Group 2001) states that studies have found:

- an estimated 9% of hospital patients acquire an infection during their stay;
- risks are not only present in hospitals but also in primary healthcare and social settings;
- there is a potential risk of vCJD, the human form of BSE, being spread from person to person by surgical instruments.

Furthermore, a Report by Walker (2001) states that the total cost in Scotland of HAI is approximately £186 million per annum.

Infection originating in hospitals and other healthcare facilities is now recognised as a serious and widespread problem. Although standards of hygiene in healthcare facilities and standards of personal hygiene have been identified as likely sources of infection and infection spread, it can also be said that the design, planning, construction, refurbishment and ongoing maintenance of the healthcare facility also have an important role to play in the control of infection.

NHSScotland Property and Environment Forum has developed a system which aims to assess and manage the risk of infection in the built healthcare environment; this tool is called HAI-SCRIBE.

The acronym and title of HAI-SCRIBE describes the purpose of the system which is specifically designed to focus on the built environment and Healthcare Associated Infection (HAI) risk.

HAI-SCRIBE being the acronym for Healthcare Associated Infection System for Controlling Risk In the Built Environment, has been designed as an effective tool for the identification and assessment of potential hazards in the built environment and the management of these risks. HAI-SCRIBE, when applied to the built environment facilities of NHSScotland, is intended to be:

- appropriate to the subject;
- straightforward in its application;
- manageable and practical in terms of maintenance of monitoring records;
- comprehensive in its provision of 'due diligence' defence;
- effective in minimising hazards and their impact.

HAI-SCRIBE could be applied to other operational areas of NHSScotland. The built environment includes existing buildings used for healthcare purposes and



new build projects, and the intention is to apply HAI-SCRIBE from the design and planning through to the occupation and operation of the facility.

There are three key stages involved in HAI-SCRIBE:

- identify the hazard;
- assess the risk from the identified hazard;
- manage the risk to eliminate or minimise its impact.

The application of the three key stages of HAI-SCRIBE are aided by a range of questions which are appropriate for particular development stages of the healthcare facility. The scenarios within the development and maintenance of the healthcare facility to which the question sets apply are:

- proposed site for development;
- design and planning;
- construction and refurbishment;
- ongoing maintenance.

Care needs to be taken to ensure that the System does not become a mechanical 'box-ticking' exercise, but rather a rigorous questioning and auditing of proposals and of operating facilities.

In assessing the risk from the identified hazards, and in determining how to manage the risk to eliminate or minimise its impact, the nature of exposed population is a critical consideration.

Appendix 1 lists the healthcare and associated services commonly present in NHSScotland facilities.

In most cases there will be no option but to manage the risk to eliminate or minimise its impact. Health economics will inevitably be applied by the management of the healthcare facility in circumstances where there are a number of competing bids for resources and where those with an infection risk have a number of options suggested for the management of the risk. In such cases, the assessment of risk and the measures necessary to manage the risk must be evaluated carefully as part of the health economics decision-making. The recommendations of the HAI Task Force Working Group (12) and the HAI risk methodology developed by them may be helpful in prioritising risks.

Implementation of HAI-SCRIBE should be the responsibility of a multi-disciplinary team of specialists with appropriate skills, and may include:

- an architect;
- a building services engineer;
- an infection control specialist;
- a risk manager;
- an estates/facilities manager;



- other appropriate specialists.

This team should be representative of the appropriate specialists but small enough in number to ensure effective decision-making.

Implementation of HAI-SCRIBE requires an accurate record of the process of hazard assessment and risk management which is essential 'due diligence' information.

HAI-SCRIBE must be regularly reviewed, especially after alterations to the facility or to procedures within the facility. The frequency of review will be determined partly by the nature of the healthcare provision and particularly by any alterations to the facility or to procedures within the facility.

This process will require immediate review before, during, and after the proposed alterations. The nature of the healthcare provision may require a routine review once every 1 – 2 years, bearing in mind that the outcome of the review may be to confirm that the system is working well and that no adjustments are necessary. The review should be objective and undertaken by a competent person or persons either within or outwith the healthcare organisation.

A record of the initial application of HAI-SCRIBE and all subsequent applications and reviews must be kept and be available for reference. The records of the applications of HAI-SCRIBE and the regular reviews of the System should be reported to the responsible senior manager of the healthcare facility.

In circumstances where HAI-SCRIBE is being applied to the proposed site for development, design and planning, or the construction of a new build healthcare facility, the project board needs to be advised of the outcome. In cases where it is being applied to the refurbishment or operational management of an existing healthcare facility, the organisation's risk management group or formal group which addresses risk management should be advised of the outcome of the HAI-SCRIBE applications on an annual basis.

## 2. Development Stage 1: HAI-SCRIBE applied to the proposed site for development

The first application of HAI-SCRIBE in relation to the built environment will be at the initial planning stage when the appropriateness of the proposed site for the new build or extension, or indeed major refurbishment, is being considered.

There needs to be early confirmation that the main utility services are readily available, have sufficient capacity and are of satisfactory quality to cope with the proposed development.



In considering whether the site presents a potential HAI hazard, questions to be examined will include the following:

	Yes	No
Is contaminated land an issue? (e.g. smallpox – also refer to contaminated land register.)	<input type="checkbox"/>	<input type="checkbox"/>
Are there industries or other sources in the neighbourhood which may present a risk of noise, smell, other pollution or infection e.g. animal by-products processing plant?	<input type="checkbox"/>	<input type="checkbox"/>
Are there industries or other sources in the neighbourhood which may present a risk of noise, smell, or other pollution which might affect the designed operation of the healthcare facility e.g. windows and ventilation systems in the healthcare facility being kept closed because of a sewage treatment plant?	<input type="checkbox"/>	<input type="checkbox"/>
Are there construction/demolition works programmed in the neighbourhood which may present a risk of noise, smell, other pollution or infection e.g. fungal infection?	<input type="checkbox"/>	<input type="checkbox"/>



	Yes	No
Are there cooling towers in the neighbourhood which may present a risk of legionella infection?	<input type="checkbox"/>	<input type="checkbox"/>
Does the topography of the site in relation to the surrounding area and the prevailing wind direction present any potential HAI risk e.g. from entrainment of plumes containing legionella?	<input type="checkbox"/>	<input type="checkbox"/>
Is there a locally recognised increased risk of contamination/infection e.g. cryptosporidium?	<input type="checkbox"/>	<input type="checkbox"/>
Will the proposed development impact on the surrounding area in any way which may lead to restrictions being applied to the operation of the proposed facility which may in turn present potential for HAI risk e.g. storage and collection arrangements for healthcare clinical waste leading to pressure to reduce collection frequency?	<input type="checkbox"/>	<input type="checkbox"/>
Will lack of space limit the proposed development and any future expansion of the facility?	<input type="checkbox"/>	<input type="checkbox"/>

The above questions do not necessarily comprise an exhaustive list. Having established that main utility services are available, have sufficient capacity and are of satisfactory quality to cope with the proposed development, the next challenge is to establish which, if any, of the other questions evokes the answer 'yes'.

Where a potential hazard is identified a careful assessment of that hazard must be undertaken.

Some hazards may present a risk of pollution rather than direct infection but the consequences for the healthcare facility may be to keep windows and ventilation intakes closed, and this in turn may increase the risk of HAI in the healthcare facility. It may be necessary therefore to seek further information as part of the assessment of the hazard and this may include questions about:

- the seriousness of the dust, noise, smell and other pollution;
- the hours of operation;
- the volume of traffic;
- the kind of materials being handled and processed;
- the volumes of materials being handled and processed;
- the time/frequency of deliveries and traffic movement volume;
- the deliveries being in closed or open containers;
- the transfer arrangements from delivery vehicles to storage/processing facilities;
- the exhaust flues from the processing plant;
- the prevailing wind direction;





- the areas of the healthcare development most likely to be affected;
- the measures which could be designed into the proposed healthcare development to eliminate or minimise the impact of the pollution and if these measures might increase the risk of HAI.

Other existing industries in the area of the proposed healthcare facility development may present a more obvious and direct risk of bacterial or fungal infection e.g. any cooling towers posing a potential legionella risk, and/or any demolition or construction work posing a fungal infection risk. The assessment must take account of the source of the potential risk, its relationship to the healthcare facility and particular areas of the healthcare facility, the exposed population, and the measures which are available to the healthcare facility to reduce the impact of the infection risk. Consideration should also be given to infection risks at outpatient departments within the healthcare facility and access to the facility and outpatient departments.

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### 3. Development Stage 2: HAI-SCRIBE applied to planning and design stage of development

The application of HAI-SCRIBE in the detailed planning and design of a new healthcare facility or a major redevelopment, refurbishment or extension of an existing healthcare facility is essential. It is at the planning and design stage that hazards associated with potential HAI risk should be identified and assessed and measures taken to manage the risks. It is sensible to 'design in' at the planning and design stage, measures which will eliminate or minimise the impact of identified hazards and effectively manage the risk of HAI.



HAI-SCRIBE, as applied to healthcare facility plans and designs, will involve a systematic and thorough review of the plans with a view to identifying potential hazards, assessing those hazards, and managing the risks by eliminating or minimising the impact of the hazards. This may well involve amendments to plans, bearing in mind that it is likely to be more cost effective to achieve the management of HAI risk at the planning stage rather than after completion of the facility construction.

Issues to be considered include the following:

- while the introduction of people to a healthcare facility immediately introduces challenges in terms of managing infection risk, the design and layout of the healthcare facility should not encourage the spread of infection;
- the design and layout of the healthcare facility should take account of the healthcare procedures and services to be provided and the appropriate management of risk required for the range of population groups (reference Development Stage 4).

Issues to be considered at the design and planning stage of the development will include an overall assessment of infection and infection spread risk from the design and layout of the healthcare facility and an assessment of infection risk



from detailed engineering and building features. Issues to be considered at this stage might include the following:

	Yes	No
Does the design and layout of the healthcare facility inhibit the spread of infection?	<input type="checkbox"/>	<input type="checkbox"/>
Is the ventilation system design fit for purpose, given the potential for infection spread via ventilation systems?	<input type="checkbox"/>	<input type="checkbox"/>
Has account been taken of the use of natural ventilation being affected by neighbourhood sources of environmental pollution as discussed in Development Stage 1?	<input type="checkbox"/>	<input type="checkbox"/>
Is the interior of the healthcare facility easy to clean and maintain clean? (Surfaces of floors, walls and ceilings should be appropriate to the particular room and the required management of infection risk. Thus, carpeted floors in offices may be appropriate but not appropriate in clinical areas. There should be coving at right angle junctions of walls, floors and ceilings to ease effective cleaning.)	<input type="checkbox"/>	<input type="checkbox"/>
Does each ward allow sufficient space between beds to comply with the current guidance, thus facilitating the healthcare services to the patient, which in turn may reduce HAI risk?	<input type="checkbox"/>	<input type="checkbox"/>
Are there facilities to enable high standards of hand hygiene to be maintained? For example, standards specified in: <ul style="list-style-type: none"><li>• 'Improving Clinical Care in Scotland Healthcare Associated Infection (HAI); Infection Control' (QIS 2003);</li><li>• 'Standards Healthcare Associated Infection (HAI) Infection Control' (CSBS 2001).</li></ul> (Hand-wash basins, liquid soap dispensers, paper towels and alcohol gel dispensers must be provided in sufficient numbers and be readily accessible. It should be noted that the effective use of alcohol gel first requires hands to be physically clean.)	<input type="checkbox"/>	<input type="checkbox"/>
Where curtain rails and curtains are fitted are they easy to clean and maintain clean?	<input type="checkbox"/>	<input type="checkbox"/>
Is the toilet, bath and shower accommodation conveniently sited in relation to the ward and, where possible, is this accommodation en-suite?	<input type="checkbox"/>	<input type="checkbox"/>
Is the toilet, bath and shower accommodation accessible for cleaning purposes and is the accommodation easily cleaned?	<input type="checkbox"/>	<input type="checkbox"/>



	Yes	No
Does the ventilation of the toilet, bath and shower accommodation ensure extraction of air from the room to the outside air?	<input type="checkbox"/>	<input type="checkbox"/>
Are the staff changing facilities suitably sited, have sufficient space, and readily accessible?	<input type="checkbox"/>	<input type="checkbox"/>
Are the staff showering facilities suitably sited and readily accessible for use, particularly in the event of contamination incidents?	<input type="checkbox"/>	<input type="checkbox"/>
Is there satisfactory provision of isolation facilities for infectious and potentially infectious patients?	<input type="checkbox"/>	<input type="checkbox"/>
Is there separation of dirty areas from clean areas to minimise the risk of HAI contamination?	<input type="checkbox"/>	<input type="checkbox"/>
Is there sufficient storage accommodation provided in each area of the healthcare facility for equipment which is mobile and not in continuous use?	<input type="checkbox"/>	<input type="checkbox"/>
Are there satisfactory facilities for storage of cleaning equipment e.g. Domestic Services room?	<input type="checkbox"/>	<input type="checkbox"/>
Is the service ducting for utilities etc. concealed to ease routine cleaning of surfaces?	<input type="checkbox"/>	<input type="checkbox"/>
Does the service ducting for utilities provide sufficient access for maintenance and pest control?	<input type="checkbox"/>	<input type="checkbox"/>
Are there sufficient and conveniently sited facilities provided for the cleaning of common equipment like trolleys, wheelchairs etc?	<input type="checkbox"/>	<input type="checkbox"/>
Are the food preparation areas (including ward kitchens) and distribution systems fit for purpose and complying with current food safety and hygiene standards?	<input type="checkbox"/>	<input type="checkbox"/>
Are waste management facilities and systems robust and fit for purpose? (This includes local and central storage, systems for movement of waste to central storage, systems for handling and compaction of waste, systems for separation and security of waste, especially healthcare clinical waste.)	<input type="checkbox"/>	<input type="checkbox"/>
Is the water distribution system designed to discourage bacterial growth and to ensure delivery of hot and cold water to users at the appropriate temperatures?	<input type="checkbox"/>	<input type="checkbox"/>
Is the drainage system design, especially within the healthcare facility building, fit for purpose with access points for maintenance carefully sited to minimise HAI risk?	<input type="checkbox"/>	<input type="checkbox"/>



Yes No

Are there satisfactory arrangements for effective management of laundry?

(This includes local and central storage, systems for movement of laundry to central storage, systems for handling laundry, systems for separation and security of laundry, especially contaminated laundry.)

Are there sufficient and suitably sited facilities for bed pan washing/disposal?

**The answers to the above questions should be 'yes'. Where a potential hazard is identified a careful assessment of that hazard must be undertaken.**

Reference should also be made to Development Stage 4 applied to the built healthcare facility in operation for more detail of the issues to be addressed in relation to:

- finishes and floors, walls, ceilings, doors, windows, fixtures and fittings;
- space around beds;
- isolation rooms;
- provision of hand-wash basins, liquid soap dispensers, paper towels and alcohol gel dispensers;
- provision of sinks for decontamination purposes;
- engineering services;
- storage;
- laundry and linen services.

## 4. Development Stage 3: HAI-SCRIBE applied to the construction/redevelopment phase

HAI-SCRIBE would be appropriate in redevelopment and refurbishment situations where the business of the healthcare facility continues while building and construction work is being undertaken on site. There are of course obligations on the contractors to undertake their construction operations in such a way that health and safety and other issues are adequately addressed.

Redevelopment and refurbishment of healthcare facilities in Scotland is common and the kind of work involved is varied. Kennedy (1997) described the range of redevelopment and refurbishment work commonly undertaken in healthcare facilities in the United States, and although some of the terminology may be different, her description of activities can be applied to redevelopment and refurbishment of healthcare facilities in Scotland.



In assessing the hazards of the above construction activities and the management of the potential risks, account has to be taken of the exposed population, in this case the patients, staff and visitors likely to be affected. Again, the risk assessment strategy described by Kennedy (1997) is useful.

Kennedy also highlighted a range of precautions needed to eliminate or manage the risk of infection.

In order to ensure the risk of infection is minimised during construction works consideration must be given to:

- the type of construction/refurbishment work being carried out (Table 1);
- the population group being treated (Table 2);
- the risk associated with these two factors (Table 3).



Table 1 highlights different types of construction/refurbishment activities likely to take place in the healthcare facility.

Table 2 highlights the different population groups within the healthcare facility and the risk associated with each group.

Table 3 estimates the overall risk of infection arising and indicates the level of precaution that should be implemented.

Type	Construction/Refurbishment Activity
<b>Type 1</b>	<b>Inspection and non-invasive activities.</b> Includes, but is not limited to, removal of ceiling tiles for visual inspection, painting which does not include sanding, wall covering, electrical trim work, minor plumbing and activities which do not generate dust or require cutting of walls or access to ceilings other than for visual inspection.
<b>Type 2</b>	<b>Small scale, short duration activities which create minimal dust.</b> Includes, but is not limited to, installation of telephone and computer cabling, access to chase spaces, cutting of walls or ceiling where dust migration can be controlled.
<b>Type 3</b>	<b>Any work which generates a moderate to high level of dust or requires demolition or removal of any fixed building components or assemblies.</b> Includes, but is not limited to, sanding of walls for painting or wall covering, removal of floor coverings, ceiling tiles and casework, new wall construction, minor duct work or electrical work above ceilings, major cabling activities, and any activity which cannot be completed within a single work shift.
<b>Type 4</b>	<b>Major demolition and construction projects.</b> Includes, but it not limited to, activities which require consecutive work shifts, requires heavy demolition or removal of a complete cabling system, and new construction.

**Table 1: Redevelopment and refurbishment construction activity. Adapted from Kennedy 1997.**



<b>Risk to patients of infection from construction work in healthcare premises, by clinical areas</b>	
<b>Group</b>	<b>Area</b>
<b>Group 1 Lowest risk</b>	<ol style="list-style-type: none"> <li>1. Office areas.</li> <li>2. Unoccupied wards.</li> <li>3. Public areas.</li> </ol>
<b>Group 2 Medium risk</b>	<ol style="list-style-type: none"> <li>1. All other patient care areas (unless included in Group 3 or Group 4).</li> <li>2. Outpatient clinics (unless included in Group 3 or Group 4).</li> <li>3. Admission or discharge units.</li> </ol>
<b>Group 3 High risk</b>	<ol style="list-style-type: none"> <li>1. A &amp; E (Accident and Emergency).</li> <li>2. Medical wards.</li> <li>3. Surgical wards (including Day Surgery) and Surgical outpatients.</li> <li>4. Obstetric wards and neonatal nurseries.</li> <li>5. Paediatrics.</li> <li>6. Acute and long stay care of the elderly.</li> <li>7. Patient investigation areas, including:               <ul style="list-style-type: none"> <li>• Cardiac catheterization;</li> <li>• Invasive radiology;</li> <li>• Nuclear medicine;</li> <li>• Endoscopy.</li> </ul> </li> </ol> <p>Also (indirect risk)</p> <ol style="list-style-type: none"> <li>8. Pharmacy preparation areas.</li> <li>9. Microbiology laboratories (risk of pseudo-outbreaks and unnecessary treatment).</li> </ol>
<b>Group 4 Highest Risk</b>	<ol style="list-style-type: none"> <li>1. Any area caring for immuno-compromised patients*, including:               <ul style="list-style-type: none"> <li>• Transplant units and outpatient clinics for patients who have received bone marrow or solid organ transplants;</li> <li>• Oncology Units and outpatient clinics for patients with cancer;</li> <li>• Burns Units.</li> </ul> </li> <li>2. All Intensive Care Units.</li> <li>3. All operating theatres.</li> </ol> <p>Also (indirect risk)</p> <ol style="list-style-type: none"> <li>4. CSSUs (Central Sterile Supply Units).</li> </ol>

\***Immunocompromised patients** are those patients whose immune mechanisms are deficient because of immunologic disorders (e.g. human immunodeficiency virus [HIV] infection or congenital immune deficiency syndrome), chronic diseases (e.g. diabetes, cancer, emphysema, or cardiac failure), or immunosuppressive therapy (e.g. radiation, cytotoxic chemotherapy, anti-rejection medication, or steroids). Immunocompromised patients who are identified as high-risk patients have the greatest risk of infection caused by airborne or waterborne micro-organisms. Patients in this subset include persons who are severely neutropenic for prolonged periods of time (ie an absolute neutrophil count [ANC] of  $\leq$  500 cells/mL), allogeneic HSCT patients, and those who have received the most intensive chemotherapy (e.g. childhood acute myelogenous leukaemia patients).

Immunosuppressive conditions identified as risk factors for construction-related nosocomial fungal infections include graft-versus-host disease requiring treatment; prolonged neutropenia or granulocytopenia because of cytotoxic chemotherapy; prolonged use of antibiotics; and steroid therapy. Other risk factors for the development of aspergillosis include dialysis and mechanical ventilation, smoking and patient age, the very young and very old being at greater risk. Grauhan and colleagues reported that the risk of a fungal infection increases in patients who exhibit three or more risk factors ( $p < 0.001$ ). **CDDR (2001)**

**Table 2: The different areas within the healthcare facility and the risk associated with each area.**





	<b>Construction Project Type</b>			
<b>Patient Risk Group</b>	<b>TYPE 1</b>	<b>TYPE 2</b>	<b>TYPE 3</b>	<b>TYPE 4</b>
<b>Low Risk</b>	<b>Class I</b>	<b>Class II</b>	<b>Class II</b>	<b>Class III/IV</b>
<b>Medium Risk</b>	<b>Class I</b>	<b>Class II</b>	<b>Class III</b>	<b>Class IV</b>
<b>High Risk</b>	<b>Class I</b>	<b>Class II</b>	<b>Class III/IV</b>	<b>Class IV</b>
<b>Highest Risk</b>	<b>Class II</b>	<b>Class III/IV</b>	<b>Class III/IV</b>	<b>Class IV</b>

**Table 3: Estimates the overall risk of infection arising and will indicate the class of precaution that should be implemented.**

Having highlighted the overall degree of infection risk, appropriate infection control measures can be implemented to manage or eliminate the risk of transmission. Table 4 highlights the appropriate prevention and control of infection precautions.



	<i>During construction of a project</i>	<i>Upon completion of a Project</i>
<b>Class I</b>	<ol style="list-style-type: none"> <li>1. Execute work by methods to minimise raising dust from construction operations.</li> <li>2. Immediately replace a ceiling tile displaced for visual inspection.</li> </ol>	Clean areas.
<b>Class II</b>	<ol style="list-style-type: none"> <li>1. Provide active means to prevent airborne dust from dispersing into atmosphere.</li> <li>2. Water mist work surfaces to control dust while cutting.</li> <li>3. Seal unused doors with duct tape.</li> <li>4. Block off and seal air vents.</li> <li>5. Place dust mat at entrance and exit of work area.</li> <li>6. Remove or isolate HVAC system in areas where work is being performed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Wipe work surfaces with disinfectant.</li> <li>2. Contain construction waste before transport in tightly covered containers.</li> <li>3. Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.</li> <li>4. Remove isolation of HVAC system in areas where work is being performed.</li> </ol>
<b>Class III</b>	<ol style="list-style-type: none"> <li>1. Remove or Isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>2. Complete all critical barriers ie plasterboard, plywood, plastic, to seal area from non work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins.</li> <li>3. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>4. Contain construction waste before transport in tightly covered containers.</li> <li>5. Cover transport receptacles or carts. Tape covering unless solid lid.</li> </ol>	<ol style="list-style-type: none"> <li>1. Do not remove barriers from work area until completed project is inspected by the Board's Safety Department and Infection Control Department and thoroughly cleaned by the Board's Environmental Services Department.</li> <li>2. Remove barrier materials carefully to minimise spreading of dirt and debris associated with construction.</li> <li>3. Vacuum work area with HEPA filtered vacuums.</li> <li>4. Wet mop area with disinfectant.</li> <li>5. Remove isolation of HVAC system in areas where work is being performed.</li> </ol>
<b>Class IV</b>	<ol style="list-style-type: none"> <li>1. Isolate HVAC system in area where work is being done to prevent contamination of duct system.</li> <li>2. Complete all critical barriers ie plasterboard, plywood, plastic to seal area from non work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins.</li> <li>3. Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.</li> <li>4. Seal holes, pipes, conduits, and punctures appropriately.</li> <li>5. Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave the work site.</li> <li>6. All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.</li> <li>7. Do not remove barriers from work area until completed project is inspected.</li> </ol>	<ol style="list-style-type: none"> <li>1. Remove barrier material carefully to minimise spreading of dirt and debris associated with construction.</li> <li>2. Contain construction waste before transport in tightly covered containers.</li> <li>3. Cover transport receptacles or carts. Tape covering unless solid lid.</li> <li>4. Vacuum work area with HEPA filtered vacuums.</li> <li>5. Wet mop area with detergent to remove physical soiling before disinfecting area.</li> <li>6. Remove isolation of HVAC system in areas where work is being performed.</li> </ol>

**Table 4: Describes the required Infection Control Precautions depending on class of risk. Adapted from Kennedy 1997.**



There are key issues to be considered in assessing the hazard with a view to managing the risk. Therefore, in each situation where there is to be construction and refurbishment or repair work, the multi-disciplinary team of specialists referred to in the 'Introduction' of this document should be involved and the following questions need to be addressed.

Consideration should be given to the likelihood of patient movement outwith their speciality care area and the need for appropriate measures to control infection risk.

	Yes	No
Has the type and extent of construction and refurbishment or repair work been addressed in terms of infection risk?	<input type="checkbox"/>	<input type="checkbox"/>
Has the likelihood of contaminating adjacent patient care areas, and those on levels immediately below and above been addressed?	<input type="checkbox"/>	<input type="checkbox"/>
Has the impact on traffic and supply routes been addressed in terms of infection risk?	<input type="checkbox"/>	<input type="checkbox"/>
Has the impact on sterile stock storage areas been addressed?	<input type="checkbox"/>	<input type="checkbox"/>
Has the impact of airflow patterns and ventilation systems been addressed in terms of infection risk from construction and refurbishment or repair work?	<input type="checkbox"/>	<input type="checkbox"/>
Has the extent of the dust, noise and infection risk from the construction and refurbishment or repair work been addressed?	<input type="checkbox"/>	<input type="checkbox"/>
Have the hours of operation of the construction work and the impact of this in terms of infection risk been addressed?	<input type="checkbox"/>	<input type="checkbox"/>
Have the areas of the healthcare facility most likely to be affected by the dust, noise and infection risk been identified and the infection risks addressed?	<input type="checkbox"/>	<input type="checkbox"/>
Have the population groups most susceptible to infection been identified and the risks associated with noise, dust, and infection been addressed?	<input type="checkbox"/>	<input type="checkbox"/>
Has the particular risk of fungal infection from demolition and refurbishment construction been identified and measures put in place for the infection risk to be managed effectively to minimise impact on patients and visitors?	<input type="checkbox"/>	<input type="checkbox"/>
Have measures been designed in to eliminate or minimise the impact of the dust, noise and infection risk?	<input type="checkbox"/>	<input type="checkbox"/>

**The answers to the above questions should be 'yes'. Where a potential hazard is identified a careful assessment of that hazard must be undertaken.**



Certain situations will require the use of barrier structures to contain contamination. Therefore the following question needs to be addressed for each of these situations:

	Yes	No
Has the use of barrier structures to contain contamination been addressed in the following situations? -		
Demolition of walls, plaster, ceramic tiles, ceilings and ceiling tiles?	<input type="checkbox"/>	<input type="checkbox"/>
Removal of flooring and carpeting, windows and doors?	<input type="checkbox"/>	<input type="checkbox"/>
Work with sinks or plumbing which could give rise to aerosol water droplets in high risk areas?	<input type="checkbox"/>	<input type="checkbox"/>
Exposure of ceiling spaces?	<input type="checkbox"/>	<input type="checkbox"/>
Elevator shaft demolition and construction?	<input type="checkbox"/>	<input type="checkbox"/>
Repairs to water damage?	<input type="checkbox"/>	<input type="checkbox"/>
Has the type and extent of construction and refurbishment or repair work been addressed in terms of infection risk?	<input type="checkbox"/>	<input type="checkbox"/>

**The answers to the above questions should be 'yes'. Where a potential hazard is identified a careful assessment of that hazard must be undertaken.**

Measures to minimise risk of infection should be addressed. Therefore the following question needs to be addressed.

	Yes	No
Have measures to minimise risk of infection been investigated, including the following? -		
Relocation of susceptible patients?	<input type="checkbox"/>	<input type="checkbox"/>
Prevention of weather/water entry and protection of interior?	<input type="checkbox"/>	<input type="checkbox"/>
Prevention of contamination by dust etc. with particular attention to air systems e.g. ducts, air handlers, coils, fans, grills by creation of temporary barrier structures or exhaust ventilation to isolate work areas?	<input type="checkbox"/>	<input type="checkbox"/>
Has the discharge of exhaust air been arranged so as not to re-enter the building e.g. via outside air intakes, nor cause pollution to other areas?	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance of all internal building areas in a clean state?	<input type="checkbox"/>	<input type="checkbox"/>



	Yes	No
Sealing of all external walls, windows, doors, etc. prior to commencement of construction work?	<input type="checkbox"/>	<input type="checkbox"/>
Prevention of insect and rodent entry to area during construction phase?	<input type="checkbox"/>	<input type="checkbox"/>
Separation of construction work traffic and healthcare traffic during construction phase?	<input type="checkbox"/>	<input type="checkbox"/>
Thorough cleaning of area on completion of construction work, including surfaces, under floor and ducts? (Further guidance on cleaning can be found in the NHSScotland National Cleaning Services Specification produced by the HAI Task Force)	<input type="checkbox"/>	<input type="checkbox"/>
Enforcement of control and reporting system to ensure compliance with above issues?	<input type="checkbox"/>	<input type="checkbox"/>

**The answers to the above questions should be 'yes'. Where a potential hazard is identified, a careful assessment of that hazard must be undertaken.**

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## 5. Development Stage 4: HAI-SCRIBE applied to the built healthcare facility in operation



Within the built healthcare facility it is important to ensure there will be an ongoing application of HAI-SCRIBE. This is of particular importance where there are alterations to the building, to arrangements within the building, and to procedures and practices. The three key stages involved in HAI-SCRIBE have a continuous application:

1. Identify the hazard.
2. Assess the risk from the identified hazard.
3. Manage the risk to eliminate or minimise impact.

Healthcare managers are familiar with audits of performance and the concept of 'due diligence'. Programmed audits of the healthcare facility are an essential part of 'due diligence' and records of these audits should be maintained. This will already be in place in relation to a number of activities within the healthcare facility e.g. food hygiene. The audits will monitor the ongoing application of HAI-SCRIBE, bearing in mind that the system must not become a mechanical, box-ticking exercise, but rather a rigorous questioning and auditing of the operating healthcare facility.

A record of the initial application of HAI-SCRIBE and all subsequent applications and reviews must be kept and be available for reference. The records of the applications of HAI-SCRIBE and the regular reviews of the system should be reported to the appropriate management group of the healthcare facility. This may be the organisation's risk management group or formal group which addresses risk management and they should be advised on an annual basis.



Issues for audit purposes will include the following.

## 5.1 The neighbourhood environment

In considering whether there are industrial and commercial developments in the neighbourhood which may present a risk of noise, smell, other pollution or infection, reference should be made to Development Stage 1.

Neighbourhoods change with new or extended industries and commercial operations being developed. The managers of the healthcare facility need to be alert to developments in the neighbourhood which may present an HAI risk.

## 5.2 The healthcare facility

### Finishes and floors, walls, ceilings, doors, windows, fixtures and fittings

	Yes	No
Is the flooring, impervious and easily cleaned? (With the aid of specialist equipment as appropriate.) (Carpeting is not appropriate in any clinical or associated area.)	<input type="checkbox"/>	<input type="checkbox"/>
Are the walls smooth, impervious and easily cleaned?	<input type="checkbox"/>	<input type="checkbox"/>
Are the ceilings smooth and easily cleaned?	<input type="checkbox"/>	<input type="checkbox"/>
Are the right angle junctions between floors, walls and ceilings covered to ease cleaning?	<input type="checkbox"/>	<input type="checkbox"/>
Are surfaces of floors, walls and ceilings maintained in good condition to enable effective cleaning?	<input type="checkbox"/>	<input type="checkbox"/>
Are surface joints, which should be kept to a minimum, effectively sealed?	<input type="checkbox"/>	<input type="checkbox"/>
Is the use of window blinds and the material they are made from been carefully considered, remembering the need to maintain the blinds in a clean condition?	<input type="checkbox"/>	<input type="checkbox"/>
Are all surfaces, fittings, fixtures and furnishings designed for easy cleaning and to enable them to be maintained in a clean condition?	<input type="checkbox"/>	<input type="checkbox"/>
Are soft furnishings covered in an impervious material in all clinical and associated areas, and are curtains able to withstand washing at disinfection temperatures?	<input type="checkbox"/>	<input type="checkbox"/>



### Space around beds and isolation rooms

	Yes	No
Is the space around beds in accordance with current NHSScotland guidance?	<input type="checkbox"/>	<input type="checkbox"/>
Are there sufficient single rooms to accommodate patients known to be an infection or potential infection risk?	<input type="checkbox"/>	<input type="checkbox"/>
Is the bathroom/shower/toilet accommodation sufficient and conveniently accessible, with toilet facilities no more than 12m from the bed area?	<input type="checkbox"/>	<input type="checkbox"/>
Is the bathroom/shower/toilet accommodation easily cleaned?	<input type="checkbox"/>	<input type="checkbox"/>
Are there sufficient en-suite single rooms with negative/positive pressure ventilation to minimise risk of infection spread from particular patients?	<input type="checkbox"/>	<input type="checkbox"/>

### Provision of hand-wash basins, liquid soap dispensers, paper towels and alcohol gel dispensers

It should be noted in all references to provision of hand-wash basins, liquid soap dispensers, paper towels and alcohol gel dispensers that the effective use of alcohol gel first requires hands to be physically clean.

It should also be noted that alcohol gel dispensers may be secured to the wall, however, they may also be secured to the trolley or to staff belts.

	Yes	No
Does each single room have a hand-wash basin, liquid soap dispenser, paper towels, and alcohol gel dispenser over and above the hand-wash basin in the en-suite facility?	<input type="checkbox"/>	<input type="checkbox"/>
Do intensive care and high dependency units have sufficient hand-wash basins, liquid soap dispensers, paper towels, and alcohol gel dispensers conveniently accessible to ensure the practice of good hand hygiene? (Good practice suggests one hand-wash facility per bed space.)	<input type="checkbox"/>	<input type="checkbox"/>
Is there provision of hand-wash basins, liquid soap dispensers, paper towels, and alcohol gel dispensers in lower dependency settings like mental health units, acute, elderly and long term care settings appropriate to the situation with a ratio of 1 basin/dispenser to 4–6 beds?	<input type="checkbox"/>	<input type="checkbox"/>
Do out-patient areas and primary care settings have a hand-wash basin close to where clinical procedures are carried out?	<input type="checkbox"/>	<input type="checkbox"/>





	Yes	No
Do all toilets have a hand-wash basin, liquid soap dispenser, paper towels, and alcohol gel dispenser?	<input type="checkbox"/>	<input type="checkbox"/>
Are all hand-wash basins used exclusively for hand hygiene purposes?	<input type="checkbox"/>	<input type="checkbox"/>
Does each hand-wash basin have wall mounted liquid soap dispenser, paper towel dispenser and alcohol gel dispenser?	<input type="checkbox"/>	<input type="checkbox"/>
Does each hand-wash basin satisfy the requirement not to be fitted with a plug?	<input type="checkbox"/>	<input type="checkbox"/>
Are elbow-operated or other non-touch mixer taps provided in clinical areas?	<input type="checkbox"/>	<input type="checkbox"/>
Does each hand-wash basin have a waterproof splashback surface?	<input type="checkbox"/>	<input type="checkbox"/>
Is each hand-wash basin provided with an appropriate waste bin for used hand towels?	<input type="checkbox"/>	<input type="checkbox"/>

**Provision of facilities for decontamination**

	Yes	No
Are separate, appropriately sized sinks provided locally, where required, for decontamination? (The sinks should be large enough to immerse the largest piece of equipment and there should be twin sinks, one for washing and one for rinsing. A hand-wash basin should be provided close to the twin sinks.)	<input type="checkbox"/>	<input type="checkbox"/>
Are appropriate decontamination facilities provided centrally for sterilization of specialist equipment?	<input type="checkbox"/>	<input type="checkbox"/>
Is there adequate provision in terms of transport, storage, etc. to ensure separation of clean and used equipment and to prevent any risk of contamination of cleaned equipment?	<input type="checkbox"/>	<input type="checkbox"/>
Does the system in operation comply with the current guidance on decontamination facilities and procedures?	<input type="checkbox"/>	<input type="checkbox"/>

**Engineering services**

	Yes	No
Are heat emitters, including low surface temperature radiators, designed, installed and maintained in a manner that prevents build up of dust and contaminants and are they easy to clean?	<input type="checkbox"/>	<input type="checkbox"/>



	Yes	No
Is the ventilation system designed specifically for use within a healthcare facility.	<input type="checkbox"/>	<input type="checkbox"/>
Is the ventilation system designed so that it does not contribute to the spread of infection within the healthcare facility. (Ventilation should dilute airborne contamination by removing contaminated air from the room or immediate patient vicinity and replacing it with clean air from the outside or from low-risk areas within the healthcare facility. Ventilation systems should be in accordance with SHTM 2025: 'Ventilation in Healthcare Premises'.)	<input type="checkbox"/>	<input type="checkbox"/>
Does the ventilation system design ensure that components of the system do not introduce contaminants into the air stream e.g. cooling coils, humidification systems?	<input type="checkbox"/>	<input type="checkbox"/>
Are the ventilation system components e.g. air handling, ventilation ductwork designed to allow them to be easily cleaned?	<input type="checkbox"/>	<input type="checkbox"/>
Does the ventilation design exclude certain humidification systems e.g. water spray humidifiers?	<input type="checkbox"/>	<input type="checkbox"/>
Does the ventilation design recognise that a steam humidification system is preferred with the system designed and controlled so as not to cause long lasting surface wetness?	<input type="checkbox"/>	<input type="checkbox"/>
Are the grilles designed to allow easy maintenance and cleaning?	<input type="checkbox"/>	<input type="checkbox"/>
Is the positioning of extract vents clear of inlet vents to prevent risk of contamination?	<input type="checkbox"/>	<input type="checkbox"/>
Does the design and operation of re-circulation of air systems take account of dilution of contaminants and the space to be served?	<input type="checkbox"/>	<input type="checkbox"/>
Is the ventilation of theatres and isolation rooms in accordance with current guidance (SHTM 2025 and the Scottish Hospital Infection Manual)?	<input type="checkbox"/>	<input type="checkbox"/>
Does the ventilation of areas where re-circulation or spread of pathogens is a risk (including all clinical areas) ensure full fresh air recovery and air change rates in accordance with current guidance (SHTM 2025)?	<input type="checkbox"/>	<input type="checkbox"/>
Is mechanical ventilation preferred to natural ventilation?	<input type="checkbox"/>	<input type="checkbox"/>
Does means of control of pathogens consider whether dilution or entrainment is the more appropriate for particular situations?	<input type="checkbox"/>	<input type="checkbox"/>
Does the positioning of air intakes and air outlets take into account the need to minimise risk of contamination?	<input type="checkbox"/>	<input type="checkbox"/>



	Yes	No
In situations where ventilation systems are used for removal of pathogens, does the design and operation of the system take account of infection risk associated with maintenance of the system?	<input type="checkbox"/>	<input type="checkbox"/>
Are specialist ventilation systems such as fume cupboards installed and maintained in accordance with manufacturer instructions?	<input type="checkbox"/>	<input type="checkbox"/>
Is the lighting designed so that lamps can be easily cleaned with minimal opportunity for dust to collect?	<input type="checkbox"/>	<input type="checkbox"/>
Are vacuum-controlled units with overflow protection devices for mechanical suction used to avoid contaminating the system with aspirated body fluid?	<input type="checkbox"/>	<input type="checkbox"/>
Are water systems designed, installed and maintained in accordance with current guidance (SHTM 2040: 'The control of legionella in healthcare premises – A code of practice' and SHTM 2027: 'Hot and cold water supplies, storage and mains services'.)	<input type="checkbox"/>	<input type="checkbox"/>
Is contamination of the water supply prevented by good design of pipework, appropriate storage, and care during refurbishment work?	<input type="checkbox"/>	<input type="checkbox"/>
In particular:		
Is the water supply system designed to allow programmed cleaning of the water storage tanks?	<input type="checkbox"/>	<input type="checkbox"/>
Is the water supply system designed to ensure maintenance of a high temperature in hot water supplies or for the introduction of a form of on-line disinfection if lower temperature hot water is used to avoid thermostatic mixing valves and scalding (in line with Health and Safety Executive guidance)?	<input type="checkbox"/>	<input type="checkbox"/>
Is the water supply system designed to ensure regular maintenance of plant and the minimising of dead-legs?	<input type="checkbox"/>	<input type="checkbox"/>
Is the water supply system designed to ensure cold water systems are maintained at the appropriate temperature?	<input type="checkbox"/>	<input type="checkbox"/>
Is the water supply system designed to minimise water storage (in line with NHSScotland guidance)?	<input type="checkbox"/>	<input type="checkbox"/>
Is the water supply system designed to ensure protection of immunocompromised patients (e.g. dialysis patients and their Reverse Osmosis supply), who are at risk from certain organisms found in water supplies?	<input type="checkbox"/>	<input type="checkbox"/>



Yes No

Is the water supply system designed to allow the making of ice for the immuno-compromised by putting drinking water into single-use icemakers and then into a conventional freezer?

Is the water distribution system designed to discourage bacterial growth?

Are facilities available to enable special interventions for legionella such as chlorination/chlorine dioxide, copper/silver ionisation treatment of water?

Is the drainage system design, especially within the healthcare facility building, fit for purpose with access points for maintenance carefully sited to minimise HAI risk?

Are surface mounted services avoided and services concealed with sufficient access points appropriately sited to ease maintenance and cleaning? (These services would include water, drainage, heating, medical gas, wiring, alarm system, telecoms, equipment such as light fittings, bedhead services, heat emitters.)

Is the concealed service ducting designed, installed and maintained to minimise risk of pest infestation?

Does the design and build of the facility allow programmed maintenance of the fabric to ensure the integrity of the structure and particularly the prevention of water ingress and leaks and prevention of pigeon and other bird access?

### Storage

Yes No

Is there suitable and sufficient storage provided in each area of the healthcare facility for patients' clothes and possessions, domestic cleaning equipment and laundry, large pieces of equipment like beds, mattresses, hoists, wheelchairs, trolleys, and other equipment including medical devices, wound care, and intravenous infusion equipment?

Is there separate, suitable storage for contaminated material and clean material to prevent risk of contamination?

### Laundry and linen services

Yes No

Do the laundering facilities have the capacity to cope with the throughput of the healthcare facility?



Yes No

Is there provision for strict separation of dirty and clean linen to minimise risk of contamination, with a dirty to clean workflow and sufficient and separate storage capacity?

Is there provision for appropriate colour-coded bagging of laundry into categories (i.e. used, heat labile and infectious) to minimise risk of contamination?

Is the on-site laundry of suitable construction and design to minimise risk of contamination and is the laundry equipment fit-for-purpose?

Is the laundry provided with suitable, sufficient and appropriately sited hand-wash basins, liquid soap dispenser, and paper towels?

**The answers to all the above questions should be 'yes'. Where a potential hazard is identified, a careful assessment of that hazard must be undertaken. Health economics is about prioritising competing demands on finite resources, and its application to infection risk must take account of cost in terms of finance and perhaps more importantly in terms of human illness and death.**

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## Appendix 1: Examples of functions/services provided by a healthcare facility

### Expanded from Scottish Healthcare Costs 2002/2003

[http://www.isdscotland.org/isd/files/costs\\_2003.pdf](http://www.isdscotland.org/isd/files/costs_2003.pdf)

#### Clinical

Accident and emergency  
Adolescent psychiatry  
Anaesthetics  
Blood transfusion  
Breast screening service  
Cardiac surgery  
Cardiology  
Cardiothoracic surgery  
Child and adolescent  
Child psychiatry  
Chiroprody  
Clinical chemistry  
Clinical genetics  
Clinical oncology  
Clinical pharmacology and therapeutics  
Communicable diseases  
Community child health  
Community dental practice  
Community psychiatry  
Dental public health  
Dermatology  
Diabetes  
Diagnostic radiology  
Ear nose and throat  
Endocrinology and diabetes  
Endocrinology  
Family planning service  
Forensic psychiatry  
GP obstetrics  
GP other than obstetrics  
Gastroenterology  
General dental practice  
General medicine  
General practice  
General psychiatry (mental illness)  
General surgery  
Genito-urinary medicine  
Geriatric medicine  
Gynaecology  
Haematology  
Homeopathy  
Immunology  
Learning disabilities  
Medical oncology  
Medical paediatrics  
Microbiology  
Midwifery  
Nephrology  
Neurology  
Neurosurgery  
Nuclear medicine  
Obstetrics and gynaecology  
Obstetrics ante-natal  
Obstetrics post-natal  
Obstetrics  
Occupational health  
Ophthalmology  
Oral medicine  
Oral surgery  
Orthodontics  
Orthopaedics  
Paediatric dentistry  
Palliative medicine  
Pathology  
Plastic surgery  
Psychiatry of old age  
Psychotherapy  
Public health medicine  
Rehabilitation medicine  
Respiratory medicine  
Restorative dentistry  
Rheumatology  
Surgical paediatrics  
Surgical podiatry  
Thoracic surgery  
Urology  
Vascular surgery  
Virology  
Well woman service



## Non clinical

Administration  
Car parking  
Catering  
Conference support  
Education  
Human resources  
Laundry services  
Patient transport

Power generation and distribution  
Residences  
Retail  
University  
Waste disposal services  
Work and plant  
Circulation

## Acute

Cardio thoracic group

- Cardio thoracic surgery
- Cardiac surgery
- Thoracic surgery

Communicable diseases group

- Communicable diseases
- Infectious diseases

Dental group

- Orthodontics
- Paediatric dentistry
- Restorative dentistry

ENT

- Ear nose and throat
- Otolaryngology

Surgery group

- General surgery
- Vascular surgery
- Maxillo-facial surgery

Medical group

- General medicine
- Cardiology
- Endocrinology
- Gastroenterology
- Genito-urinary medicine
- Uro-pelvic medicine
- Homeopathy
- Medical oncology
- Clinical pharmacy therapeutics
- Nuclear medicine
- Palliative medicine

Oral group

- Oral surgery
- Oral medicine

Accident and emergency  
Coronary care unit  
Dermatology  
Gynaecology  
Haematology  
Intensive care unit  
Medical paediatrics  
Nephrology  
Neurology  
Neurosurgery  
Ophthalmology

Orthopaedics  
Plastic surgery  
Radiotherapy  
Rehabilitation medicine  
Respiratory medicine  
Rheumatology  
Spinal paralysis  
Surgical paediatrics  
Urology  
Maternity

- Obstetrics specialist group
- Obstetrics ante natal
- Obstetrics post natal
- Obstetrics
- Midwifery
- Obstetrics GP
- Special care baby unit

Psychiatry

- Forensic psychiatry
- General psychiatry
- Psychotherapy
- Child psychiatry
- Adolescent psychiatry
- Psychiatry of old age

Community Care

- Community psychiatric nursing
- Community midwifery
- Health visiting
- General practice
- General dental practice
- Community OT
- Pharmacy
- Optician
- Community chiropody

Other clinical services

- Decontamination
- Laboratory
- Mortuary
- Operating theatres
- Pathology
- Clinical pharmacy
- Radiology
- X-ray



## Acute (continued)

### Primary care

- Mental health group
- Adult mental health
- Continuing mental health
- Elderly mental care
- Learning disabilities

### Intensive psychiatric care group

- Addiction in primary care
- Assessment in primary care
- Rehabilitation in primary care

### Elderly mental health

- Young chronic disabled
- Mental health day hospital
- Palliative care
- Resource centre
- Minor injuries unit
- Occupational physio and speech therapy
- Learning disabilities
- Geriatric assessment
- Geriatric continuing care
- Young physically disabled

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