Health Information and Quality Authority

An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

Report of the unannounced inspection at Beaumont Hospital, Dublin

Monitoring programme undertaken against the National Standards for the prevention and control of healthcare-associated infections in acute healthcare services

Date of on-site inspection: 24 August 2017

About the Health Information and Quality Authority

The Health Information and Quality Authority (HIQA) is an independent authority established to drive high-quality and safe care for people using our health and social care services in Ireland. HIQA's role is to develop standards, inspect and review health and social care services and support informed decisions on how services are delivered.

HIQA aims to safeguard people and improve the safety and quality of health and social care services across its full range of functions.

HIQA's mandate to date extends across a specified range of public, private and voluntary sector services. Reporting to the Minister for Health and engaging with the Minister for Children and Youth Affairs, HIQA has statutory responsibility for:

- **Setting Standards for Health and Social Services —** Developing person-centred standards, based on evidence and best international practice, for health and social care services in Ireland.
- **Regulation —** Registering and inspecting designated centres.
- **Monitoring Children's Services —** Monitoring and inspecting children's social services.
- **Monitoring Healthcare Safety and Quality —** Monitoring the safety and quality of health services and investigating as necessary serious concerns about the health and welfare of people who use these services.
- **Health Technology Assessment —** Providing advice that enables the best outcome for people who use our health service and the best use of resources by evaluating the clinical effectiveness and cost-effectiveness of drugs, equipment, diagnostic techniques and health promotion and protection activities.
- **Health Information —** Advising on the efficient and secure collection and sharing of health information, setting standards, evaluating information resources and publishing information about the delivery and performance of Ireland's health and social care services.

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1. Introduction

HIQA monitors the implementation of the *National Standards for the prevention and control of healthcare-associated infections in acute healthcare services*[1] in public acute hospitals in Ireland to determine if hospitals have effective arrangements in place to protect patients from acquiring healthcare-associated infection. The *National Standards for the prevention and control of healthcare-associated infections in acute healthcare services* will be referred to as the National Standards in this report.

In 2017, HIQA commenced a revised monitoring programme against the National Standards. The aim of this revised monitoring programme is to assess aspects of the governance, management and implementation of designated programmes to prevent and control healthcare-associated infections in hospitals. This monitoring programme comprises Phases One, Two and Three which will be described next.

The National Standards were updated in 2017 and therefore supersede the previous version. Hospitals should work towards implementing these revised National Standards.

Phase One

All public acute hospitals were requested to complete and return a self-assessment tool to HIQA during April and May 2017. The self-assessment tool comprised specific questions in relation to the:

- hospital infection prevention and control programme and associated oversight arrangements,
- training of hospital personnel to implement policies, procedures, protocols, guidelines and evidence-based practice in relation to the prevention and control of infection,
- the systems in place to detect, prevent, and respond to healthcare-associated infections and multidrug-resistant organisms.

The hospital Chief Executive Officer or General Manager and the Health Service Executive (HSE) Hospital Group Chief Executive Officer were asked to verify that the information provided to HIQA accurately reflected the infection prevention arrangements within the hospital at that time.

Phase Two

Using a revised assessment methodology HIQA commenced a programme of unannounced inspections against the National Standards in public acute hospitals in May 2017.

Specific lines of enquiry were developed to facilitate monitoring in order to validate some aspects of self-assessment tools submitted by individual hospitals. The lines of enquiry which are aligned to the National Standards are included in this report in Appendix 1.

Further information can be found in the *Guide to the monitoring programme undertaken against the National Standards for the prevention and control of healthcare-associated infections* [2] which was published in May 2017 and is available on HIQA's website: www.hiqa.ie

Phase Three

Phase Three of this monitoring programme will focus on the reprocessing of reusable invasive medical devices and HIQA will commence onsite inspections in this regard in 2018.

Information about this inspection

This inspection report was completed following an unannounced inspection carried out at Beaumont Hospital by Authorised Persons from HIQA; Noreen Flannelly-Kinsella, Aileen O' Brien and Shane Grogan. The inspection was carried out on 24 August 2017 between 09:50hrs and 17:30hrs.

Prior to this inspection, authorised persons reviewed the hospital's completed self-assessment tool and related documentation submitted to HIQA earlier in May 2017.

During this inspection inspectors spoke with hospital managers and staff, and members of the Infection Prevention and Control Team. Inspectors requested and reviewed documentation and data and observed practice within the clinical environment in a small sample of clinical areas which included:

- The Intensive Care Unit
- A surgical ward.

Inspection findings presented in this report are aligned to HIQA's monitoring lines of enquiry as shown in Appendix 1. The inspection team used specifically designed monitoring tools during this inspection in relation to aspects of:

- Prevention of invasive device-related infection (Section 2.5.1)
- Prevention and control of transmission of antimicrobial-resistant bacteria (Section 2.6.1)
- Safe injection practice (Section 2.6.2)

HIQA would like to acknowledge the cooperation of the hospital management team and all staff who facilitated and contributed to this unannounced inspection.

2. Findings at Beaumont Hospital

The following sections 2.1 to 2.8 present the general findings of this unannounced inspection which are aligned to monitoring lines of enquiry.

2.1 Governance

Line of enquiry 1.1

The hospital has formalised governance arrangements with clear lines of accountability and responsibility around the prevention and control of healthcare-associated infections.

Governance arrangements

Beaumont Hospital is a voluntary public acute hospital which is both a university teaching and tertiary referral hospital. The hospital is part of the Royal College of Surgeons in Ireland (RCSI) Hospital Group.

Inspectors found that that there were clear lines of accountability and responsibility in Beaumont Hospital in relation to governance and management arrangements for the prevention and control of healthcare-associated infection. The Chief Executive was accountable for overall management and monitoring of the prevention and control of healthcare-associated infection at the hospital and reported to the Hospital Board.

Within the current HSE hospital group structure a chief executive of a hospital would report to a hospital group chief executive officer under the HSE Accountability Framework. At the time of inspection, the Chief Executive Officer of the RCSI Hospital Group was also the Chief Executive of Beaumont Hospital.

The infection prevention and control service in the hospital was delivered by a specialist infection prevention and control team who reported to the Infection Prevention and Control Committee. The committee, which was chaired by the Director of Nursing, co-ordinated and provided oversight of the infection prevention and control programme. The committee formally reported into the Clinical Governance Committee, who in turn reported into the Executive Management Group which was led by the Chief Executive. The Executive Management Group reported to the Hospital Board. Formalised reporting structures also included direct reporting to the Executive Management Group from the Infection Prevention and Control Committee during outbreaks of infection at the hospital.

The Clinical Governance Committee was chaired by the Director of Clinical Governance, a consultant microbiologist, also a member of the Infection Prevention

and Control Team, the Infection Prevention and Control Committee and the Executive Management Group. Membership of the Clinical Governance Committee included the Director of Nursing and the Chief Executive in addition to hospital clinical directors. Effective reporting systems in relation to infection prevention and control through a bottom up and top down reporting process was evident from review of the minutes of these meetings.

The infection prevention and control service was led by a consultant microbiologist, co-ordinated by the Infection Prevention and Control Committee, and delivered by a specialist multidisciplinary infection prevention and control team. Consultant microbiologist advice was available to clinical staff twenty four hours a day, seven days a week, in line with National Standards. The Microbiology Department in the hospital was accredited by the Irish National Accreditation Board.

Infection prevention and control team

The aim of the Infection Prevention and Control Team was to reduce the risk of infection through education, surveillance and action. The team held formal weekly meetings which were chaired by a consultant microbiologist and membership included:

- six consultant microbiologists (total of 3.8 whole-time equivalent positions (WTE))[*]
- one WTE specialist registrar
- one part-time specialist registrar
- one WTE registrar in microbiology
- five WTE infection prevention and control nurses, which included an assistant director of nursing, clinical nurse manager 3, clinical nurse specialist and two clinical nurse managers 2
- 0.5 WTE infection prevention and control nurse based in St Joseph's Hospital, Raheny and 0.3 WTE renal virology nurse based in the Department of Nephrology
- one chief medical scientist
- two WTE surveillance scientists
- one WTE antimicrobial pharmacist
- 1.5 WTE administrative support.

The team's workload was described in the infection prevention and control team annual report 2016 and included infection surveillance and outbreak management, delivery of education and review of policies, procedures and guidelines. The team

[*] Whole-time equivalent (WTE): allows part-time workers' working hours to be standardised against those working full-time. For example, the standardised figure is 1.0, which refers to a full-time worker. 0.5 refers to an employee that works half full-time hours.

also attended and provided expert advice at hospital meetings such as clinical governance, hospital directorate and management meetings, decontamination, hygiene, water safety, medication safety, hand hygiene promotional group and blood borne virus committee meetings. The team also participated in preliminary design phases of refurbishment and building projects at the hospital.

Infection prevention and control team meetings had a defined agenda which included feedback, consideration and action plans in relation to the following infection prevention and control issues:

- cases of infectious disease
- cases of colonisation or infection with transmissible micro-organisms including multidrug-resistant organisms (hospital and non-hospital acquired)
- episodes and sources of blood-stream infection
- emerging viral threats
- numbers of patients who were isolated in a single room within 24 hours of identified indication for transmission-based precautions
- water and air safety
- building works
- infection prevention and control patient screening
- death notifications associated with healthcare-associated infection
- risk management
- strategic planning.

Infection prevention and control committee

The Infection Prevention and Control Committee was responsible for overseeing and co-ordinating the hospital's infection prevention and control programme. The role of the committee included oversight and monitoring of all aspects of prevention and control of healthcare-associated infection and monitoring the effectiveness of the infection prevention and control programme. The committee was responsible for identifying and escalating risk and providing leadership and support to hospital directorates, committees and subgroups in relation to the infection prevention and control programme. In addition the committee approved the infection prevention and control annual plan and ratified hospital infection prevention and control policies and procedures. The committee had defined terms of reference detailing the frequency of meetings, quorum and membership. The committee had multi-disciplinary directorate and management team representation. Clinical membership included the infection prevention and control team, clinical directorate nurse managers and managers from decontamination, antimicrobial stewardship, hand hygiene and influenza monitoring committees. Corporate services were represented by management teams from hygiene services, health and safety, and operational and technical services.

Infection prevention and control committee meetings followed a standardised agenda which included the following:

- governance and reporting structures
- policy approval and development
- effective and safe care
- performance data feedback, monitoring, audit and evaluation
- safe patient environment including air, ventilation and water safety
- occupational health
- surveillance, antimicrobial consumption, outbreak reports and patient screening
- standard and transmission-based precautions
- education and training
- risk management
- budgets
- capital development updates.

Monitoring and evaluation

The hospital monitored and reported the following performance indicators in relation to the prevention and control of healthcare-associated infection in line with Health Service Executive national reporting requirements:

- hospital-acquired *Staphylococcus aureus* bloodstream infection
- hospital-acquired *Clostridium difficile* infection.

The Infection Prevention and Control Team also monitored local performance indicators as follows:

- surveillance of 'alert' organisms and 'alert' conditions[†]
- clusters or outbreaks of infection
- data reported to the European Antimicrobial Resistant Surveillance Network (EARS-Net)[‡]
- colonisation and bloodstream infections due to *Staphylococcus aureus and* vancomycin-resistant *Enterococci*
- new and recurrent hospital-acquired *Clostridium difficile infection*

[†] Alert conditions include physical symptoms such as skin rashes, vomiting, diarrhoea, respiratory illness that could be due to an infectious illness

[‡] EARS-Net performs surveillance of antimicrobial susceptibility of bacteria causing infections in humans including; Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa, Acinetobacter species, Streptococcus pneumoniae, Staphylococcus aureus, Enterococcus faecalis and Enterococcus faecium.

- new cases of Carbapenemase-producing *Enterobacteriaceae*[§] and
- antimicrobial usage and resistance patterns.

The Infection Prevention and Control Team reported key infection prevention and control issues to the Executive Management Group on a monthly basis via an integrated quality and risk reporting system. Membership of the Executive Management Group also included clinical directors in the hospital. The Infection Prevention and Control Team performed detailed analysis of new cases of *Staphylococcus aureus* bloodstream infection and *Clostridium difficile* infection.

Healthcare-associated infection data was also reported online to each hospital directorate on a quarterly basis and was presented at infection prevention and control committee meetings and at clinical governance committee meetings. Performance data presented included healthcare-associated infection and antimicrobial resistance surveillance reports, blood stream infections, outbreak reports, staff vaccination updates, incidents and risks, quality improvement initiatives, hospital hygiene, care bundle compliance and hand hygiene compliance and training. Detailed outcome measurements were also monitored and reported on in the Intensive Care Unit.

Hospital management also monitored performance in respect of the following parameters:

- median hospital total antimicrobial consumption
- alcohol hand rub consumption
- percentage compliance of hospital staff with the World Health Organisation 5 moments of hand hygiene
- mandatory hand hygiene training uptake by current healthcare staff who interact with patients in the rolling 24 month period.

The infection prevention and control team conducted audits across the hospital in 2016 in relation to:

- hand hygiene
- weekly environmental and patient equipment hygiene
- transmission-based precautions
- 'dirty' utility rooms[**]

[§] Carbapenemase-producing *Enterobacteriaceae* (CPE), are a family of Gram-negative bacteria which can cause infections that are difficult to treat because of high levels of resistance to antimicrobials.

[**] Rooms equipped for the disposal of body fluids and the decontamination of reusable equipment such as bedpans, urinals, commodes and body fluid measuring jugs. Waste, used linen and contaminated instruments may also be temporarily stored in this room prior to collection for disposal, laundering or decontamination.

- mattress and pillows
- personal protective equipment and
- aseptic non-touch techniques.

Other process measures monitored at the hospital included care bundle implementation and findings in this regard will be presented in section 2.5.1.

The Hygiene Services Task Group had responsibility for the management of the environment and patient equipment which involved weekly auditing schedules in the hospital. The aim of the group was to audit all clinical areas twice per year and high risk clinical areas on a quarterly basis. Poorer performing areas were re-audited within a week and a process was put in place to address findings. Documentation reviewed showed that hospital hygiene audit results were tracked and trended by hospital management. This group also had formalised linkages with a wider general services forum in the RCSI Hospital Group.

Monthly quality and safety walk-rounds were undertaken by the Executive Management Group in the hospital and these involved meeting staff, and identifying examples of good practice and areas for improvement in relation to hospital hygiene and facilities.

Beaumont Hospital participated in a national point prevalence survey of hospital-acquired infections and antimicrobial use in May 2017 which was part of a European-wide point prevalence study. This demonstrates a commitment by the hospital to proactively identify areas for improvement in the hospital.

2.2 Risk management

Line of enquiry 1.2

Risks in relation to the prevention and control of infection are identified and managed.

The hospital had systems in place to identify and manage risk in relation to the prevention and control of healthcare-associated infection. Hospital management informed inspectors that it was hospital policy to report incidents related to the prevention and control of healthcare-associated infection on the hospital incident management system.

Hospital managers told inspectors that infection prevention and control risk assessments had been undertaken in each clinical directorate area and updated twice yearly by the Infection Prevention and Control Team.

Significant risks identified in relation to the prevention and control of infection at the hospital had been recorded in the hospital's corporate risk register since 2012. These risks were in relation to insufficient bed capacity, the placement of additional beds on wards and a lack of sufficient isolation facilities. Two additional significant risks had been included in the hospital's corporate risk register in 2016. These were in relation to the number of outbreaks already reported by the hospital and the probability of a Carbapenemase-producing *Enterobacteriaceae* outbreak occurring in the hospital. Some of the contributing factors identified included the following:

- lack of isolation rooms
- additional beds on wards when the Emergency Department was overcrowded
- inadequate nurse patient ratio
- increased number of immunosuppressed patients
- inability to close beds when the Emergency Department was overcrowded
- other competing demands.

Collectively these risks, in tandem with dated inpatient infrastructure, do not facilitate effective prevention and control in an acute hospital setting.

To address identified risks in relation to infection prevention and control, the hospital had implemented a number of control measures in the interim of future capital development. These included the approval of additional resources to support same day onsite diagnostic testing in cases of influenza virus infection and to facilitate timely implementation of infection prevention and control measures. An influenza planning group had been introduced in the hospital. Additional measures included

the roll-out of initiatives to improve staff vaccination uptake, ongoing surveillance and education programmes, quarterly management programmes for enhanced cleaning, and patient equipment replacement programmes.

In order to optimise available bed capacity patient flow was actively managed at the hospital by a multi-disciplinary team in order to coordinate the management of patients through their acute care journey and to manage the discharge process of patients who required long term care or care support in the community. Clinical ward managers and infection prevention and control nurses attended daily patient flow team meetings. Essential information in relation to bed capacity, single room and cohorting availability, and infection prevention and control requirements were discussed at these meetings in order to facilitate timely isolation of patients requiring transmission-based precautions.

In addition, the hospital had made a capital submission to HSE estates for expansion of the existing Emergency Department and development of a new High Dependency Unit.

The Integrated Quality and Safety Department in the hospital supported and advised clinical directorates and the Clinical Governance Committee on risk management and patient safety concerns and devised local hospital quality and patient safety metrics in relation to infection prevention and control. These included the following:

- the number of confirmed cases of Carbapenemase-producing *Enterobacteriaceae*
- the rate of microbiologically-confirmed infections post transrectal ultrasound-guided prostate biopsy submitted to the National Cancer Control Programme.

Risks identified by the Infection Prevention and Control Team were included in the annual infection prevention and control report for 2016. These included inadequate single room capacity, suboptimal and dated infrastructure with high bed occupancy and fourteen outbreaks of transmissible organisms in 2016 which impacted significantly on the delivery of the infection prevention and control programme.

Review of minutes of Infection Prevention and Control Meetings, Clinical Governance Meetings and Executive Management Group meetings showed that there was regular review of risks relevant to infection prevention and control at these meetings.

2.3 Policies, procedures and guidelines

Line of enquiry 2

The hospital has policies, procedures and guidelines in relation to the prevention and control of infection and hospital hygiene.

Current HSE policy states that hospital policies, procedures and guidelines should be reviewed every three years.[3]

The Infection Prevention and Control Team had developed a comprehensive suite of policies, procedures and guidelines in relation to infection prevention and control which had been ratified by the Infection Prevention and Control Committee. The hospital had an electronic document management system to facilitate document version control and access to staff across the hospital. Inspectors found that these documents were accessible to staff in the clinical areas inspected.

Standard operating procedures in relation to infection prevention and control were also accessible to staff at point of use and contained written instructions and recommended steps as guidance for users. A sample was reviewed and these related to bedpan decontamination, management of chemicals, maintenance of a 'dirty' utility room and decontamination in relation to *Clostridium difficile* infection.

Apart from a policy in relation to the management of urinary catheters which was being updated at the time of inspection all other policies in relation to infection prevention and control were up to date. The team had plans to review policy, procedures and guidelines in 2017 as referred to in the infection prevention and control operational plan.

2.4 Staff training and education

Line of enquiry 3

Hospital personnel are trained in relation to the prevention and control of healthcare-associated infections.

Hand hygiene training in the hospital was mandatory for staff at induction and every two years thereafter in line with national hygiene guidelines.[4] Hand hygiene training was provided through scheduled sessions and hand hygiene 'blitz' events. This training was blended, and comprised both face-to-face sessions and eLearning training programmes which had been developed by staff in Beaumont Hospital.

Infection prevention and control education was mandatory for relevant hospital staff at induction and two yearly thereafter. Content included standard and transmission-based precautions, decontamination of equipment, environmental hygiene and safe injection practices. Documentation viewed by inspectors showed that 93% of staff in the Intensive Care Unit and 90% of staff in the surgical ward had completed this training in the previous two years. The Infection Prevention and Control Team were undertaking a training needs analysis at the time of the inspection to align infection prevention and control education to the national framework for such knowledge and skills.[5]

Documentation reviewed by inspectors indicated that additional training and education was provided in response to identified training needs, outbreaks of infection and hospital building projects. Additional sessions provided were in relation to transmissible infections, Carbapenemase-producing *Enterobacteriaceae*, 'dirty' utility room management and aspergillus education for staff and external contractors.

A competency-based training programme for nursing staff was provided in relation to intravenous cannulation upon commencement of their employment at the hospital. Infection prevention and control education was also provided to non-consultant hospital doctors at induction and at 'grand rounds'[††] and journal club presentations. In addition, mandatory training workshops were provided for staff with responsibility for patient equipment cleaning in the hospital. Training in relation to antimicrobial stewardship was provided to relevant clinical staff.

All staff at the hospital had access to advice from the Infection Prevention and Control Team and the Antimicrobial Pharmacist. Clinical staff had access to advice

[††] Grand rounds are formal meetings where physicians and other clinical support and administrative staff discuss the clinical case of one or more patients. Grand rounds originated as part of medical training

from a consultant microbiologist twenty-four hours a day every day. The Infection Prevention and Control Team planned to pilot an infection prevention and control link practitioner[‡‡] project.

[‡‡]Hospital staff who in addition to performing their own job support the Infection Prevention and Control Team to promote good practice in relation to infection prevention and control.

2.5 Implementation of evidence-based and best practice

Line of enquiry 4.1

The hospital has implemented evidence-based best practice to prevent intravascular device-related infection and urinary catheter-associated infection, ventilator-associated pneumonia and surgical site infection.

2.5.1 Prevention of invasive device-related infection

Care bundles[§§] to reduce the risk of different types of infection have been introduced across many health services over the past number of years, and there have been a number of guidelines[6,7,8] published in recent years recommending their introduction across the Irish health system.

Beaumont Hospital had embedded a programme of audit, feedback and quality improvement plans in relation to infection prevention care bundles in the hospital. The implementation of care bundles to prevent invasive device-related infection was reviewed in both clinical areas inspected.

The General Intensive Care Unit

Inspectors looked at aspects of the prevention of invasive device-related infection in the Intensive Care Unit and found that staff in the unit were committed to implementing evidence-based practice in order to reduce the risk of infection for patients.

Care bundles for peripheral vascular catheters and central venous access devices were in place and compliance with care bundle implementation was audited every month. Compliance with peripheral vascular catheter care bundle implementation was 100% from January to July 2017. In August 2017, the compliance rate dropped to 80%. On reviewing the reason for this decrease, staff identified a need to improve documentation which was communicated to staff in the unit. Monthly central venous access device and urinary catheter care bundle compliance audit results showed 100% compliance for the previous five months which demonstrates consistent good practice in recording interventions.

The Infection Prevention and Control Team presented healthcare-associated infection data reports on a quarterly basis to unit staff and these were also displayed on the staff notice board. Healthcare-associated infection data included numbers of unit-acquired bloodstream infections, central vascular catheter-related infections in addition to Meticillin-Resistant *Staphylococcus aureus* and *Clostridium difficile*

[§§]A bundle is a small, straightforward set of evidence-based practices that, when performed collectively and reliably, have been proven to improve patient outcomes.

infection incidence. These reports were viewed by inspectors and were noted to include discussion in relation to infection trends, hand hygiene compliance, staffing resources and infrastructural challenges in the unit. These reports recognised the inadequate and cramped conditions in the unit and the need for redevelopment of this high risk area.

Ventilator-associated pneumonia care bundles were not formally audited but it was apparent that evidence-based practice for ventilated patients was implemented as demonstrated in electronic nursing records reviewed by inspectors. This included measures to prevent aspiration of saliva, regular oral hygiene, regular review of sedation and assessment for weaning and extubation. Inspectors were informed that a ventilator-associated pneumonia prevention protocol was under review and that the introduction of specialised endotracheal tubes was planned to facilitate sub-glottic suctioning which was an evidence–based practice shown to reduce the risk of ventilator-associated pneumonia. Record keeping in respect of measures to prevent ventilator-associated pneumonia was being refined to facilitate audit of practice.

A standard operating procedure had been developed by staff in the unit for taking specimens from the respiratory tract of patients with an endotracheal tube in place which involved using an aseptic non-touch technique. Education had been provided to staff to support implementation of this protocol. The use of disposable bronchoscopes had been introduced in the unit.

Staff in the unit had audited staff practice in relation to the disinfection of vascular catheter hubs prior to use and had addressed opportunities for improvement that were identified. Education had been provided to staff to share the learning from audit findings. In addition to ultrasound probe decontamination, disposable ultrasound probe sheaths and sachets of sterile single dose ultrasound gel had been introduced to reduce the risk of infection during ultrasound-guided intravascular device placement.

A staff nurse in the unit had developed an erasable display poster which clearly presented performance indicator data on the staff notice board. The poster clearly displayed up to date performance feedback in relation to care bundle compliance, hand hygiene compliance, bare below elbow compliance, number of cases of Meticillin-Resistant *Staphylococcus aureus*, cases of *Clostridium difficile*, the date of the last bloodstream infection and the date of the last intravascular device-related bloodstream infection. There was also a space on the poster to communicate any identified need for improvement. This is an example of innovative and good practice and shows how performance information can be clearly presented to hospital staff and used to drive improvements. Staff in the Intensive Care Unit were developing a 'how are we doing' performance board whereby this type of information could be shared with families and visitors of patients in the unit.

Surgical ward

Care bundles for intravascular devices and urinary catheters were also in place in the surgical ward visited. Compliance with peripheral vascular catheter care bundle implementation in 2017 was recorded as 87% and 93% in quarter one and quarter two respectively, showing some variation in practice. The hospital had addressed deficiencies in relation to care bundle compliance audits by implementing a quality improvement plan. This represents good practice and demonstrates a commitment to monitoring and improving the quality of care.

Similarly, urinary catheter care bundle compliance audit results for the same period showed 87% and 98% compliance respectively. Evidence indicates that compliance with all care bundle components should consistently be 100%.

The hospital had a programme of invasive device-related infection surveillance which provided feedback at ward level on performance in relation to blood stream infections. Feedback was displayed in the ward on a 'knowing how we are doing' performance board. Performance data displayed showed that it had been 530 days since the last peripheral vascular catheter-related bloodstream infection in the ward.

2.5.2 Surveillance of invasive device-related and surgical site infection

The surveillance of healthcare-associated infection is one of the core components of an effective infection prevention and control programme.[9,10,11] National guidelines recommend healthcare-associated infection surveillance in relation to surgical site infection, central venous access device-related infection, urinary catheter-associated urinary tract infection and ventilator-associated pneumonia.[12,13,14] Other health systems have advanced the surveillance of healthcare-associated infection to the benefit of both patients and health service providers by demonstrating reductions in these type of infections.[15,16]

Detailed surveillance of healthcare-associated infections was performed at Beaumont Hospital in relation to intravascular catheter-related bloodstream infection. Documentation reviewed showed that staff successfully addressed an area for improvement identified through surveillance by reducing the rate of vascular catheter-related *Staphylococcus aureus* bloodstream infections among patients undergoing haemodialysis.

Additionally the hospital also showed that they had successfully reduced the number of *Staphylococcus aureus* bloodstream infections associated with intravascular devices by 25% in 2016. This was attributed to the provision of ongoing education and awareness sessions in clinical areas aligned to the roll-out of a pilot project 'Scrub the Hub'. To support additional quality improvement initiatives in relation to hospital-acquired bloodstream infection in 2017, inspectors were informed that the

hospital had secured an additional 0.5 WTE post to support targeted training in relation to aseptic non-touch techniques and to fully implement the 'Scrub the Hub' initiative across the hospital.

Surveillance of ventilator-associated pneumonia and catheter-associated urinary tract infection was not routinely performed in the hospital. Limited surgical site infection surveillance was performed in targeted areas in specialist directorates. It was reported to inspectors that the hospital was exploring the possibility of formalising targeted surgical site infection surveillance in some specialities at the hospital. HIQA acknowledge that the undertaking of such surveillance would require additional resources. It is recommended that surveillance of healthcare-associated infection is targeted in patients at greatest risk of infection or in areas where deficiencies have been identified.

The hospital did not have a policy in relation to the prevention of surgical site infection however inspectors were informed that a surgical site care bundle had been implemented and that guidelines were available for surgical antimicrobial prophylaxis. Such a policy should be developed based on best practice guidelines.[17,18,19,20]

2.6 Systems to prevent and manage healthcare-associated infections and multidrug-resistant organisms

Line of enquiry 4.2

The hospital has systems in place to detect, prevent, and respond to healthcare-associated infections and multidrug-resistant organisms in line with national guidelines.

2.6.1 Preventing the spread of antimicrobial-resistant organisms

Beaumont Hospital had many systems in place to prevent, detect and manage healthcare-associated infections and multidrug-resistant organisms in line with national guidelines. The hospital had a computerised system which would alert staff in situations when a patient who had been in contact with or previously diagnosed with transmissible microorganism was readmitted to the hospital. This helped staff to identify patients colonised with antimicrobial-resistant bacteria so that appropriate screening and accommodation could be arranged. Additionally, an automated electronic report was generated four hourly for the Infection Prevention and Control Team in relation to the admission of patients flagged for important multidrug-resistant organisms. The team informed staff if isolation facilities were required and also attended patient flow meetings in the hospital so that appropriate accommodation could be arranged for patients. Weekly alert notifications were emailed from the Infection Prevention and Control Team to clinical areas with the latest national guidance in relation to screening for Carbapenemase-producing *Enterobacteriaceae* as appropriate.

The hospital also had systems in place for the early detection of potentially infectious patients. It was reported that screening of patients for colonisation or infection was largely performed in line with national guidelines.[21,22] It was reported that a business case had been submitted to the HSE by hospital management for additional resources required to support full implementation of national guidelines in relation to screening for Carbapenemase-producing *Enterobacteriaceae*.

Hospital isolation facilities

Hospital managers told inspectors that there were 836 patient beds in Beaumont Hospital. This included both inpatient and day case beds. On the day of inspection 648 in-patient beds were occupied. The hospital had 133 single rooms in total of which 102 had en-suite facilities. The majority of single rooms at the hospital had en-suite toilet facilities which is beneficial from an infection prevention and control perspective. In addition, there were eight neutral or negative pressure isolation

rooms for patients with airborne infection. On the day of inspection 64 inpatients required transmission-based precautions of which 58 were isolated in single rooms.

'Trolley Watch'*** data indicated that sixteen patients were accommodated on trolleys in the Emergency Department and three extra patients were accommodated in ward areas on the day before this inspection. This means that there was insufficient capacity at the hospital to accommodate all patients admitted on that day. The hospital Chief Executive identified that there were no extra patients accommodated in ward areas on the day of inspection.

Inspectors looked at implementation of aspects of transmission-based precautions by using a monitoring tool to assess the prevention and control of transmission of antimicrobial-resistant bacteria in both clinical areas inspected.

The General Intensive Care Unit

The Intensive Care Unit could accommodate 12 patients and included six beds in an open plan arrangement in addition to six single rooms. Two of these rooms were isolation facilities with specialised ventilation. All patients requiring isolation in the unit were accommodated in single rooms on the day of inspection, as appropriate.

Nursing observations for patients in the unit were managed electronically and each bed space was equipped with a computer terminal. Records reviewed by inspectors showed that microbiological screening results and any identified infection control measures were recorded on the system. Microbiology results could be accessed by staff at each bedside and an alert system was in place to highlight patients colonised or infected with multidrug-resistant organisms. There were systems in place to communicate patient information in relation to infection control at the time of admission and discharge from the unit.

Environmental surfaces and patient equipment inspected in the unit were visibly clean without exception. Inspectors were informed that staff in the unit had worked on decluttering and optimising available storage spaces and this was evident on the day of inspection. Cleaning specifications were in place which clearly identified all environmental surfaces and patient equipment to be cleaned, the required frequency of cleaning and the staff discipline responsible in line with national cleaning guidelines.[23,24,25] There was a clearly defined process for identifying patient equipment which needed to be cleaned and for identifying equipment which had been cleaned. Nurse managers in the unit performed daily checks of isolation room air ventilation settings and individual bed spaces. There was an agreed standard operating procedure in place whereby a bedpan washer that was out of order for

*** Trolley Watch Figure are compiled by the Irish Nurses and Midwives Organisation to show the number of admitted patients in hospital who are accommodated on trolleys each day because of a shortage of available hospital beds. Online. Available at: https://www.inmo.ie/6022

more than twenty-four hours could be replaced with a spare appliance, which is good practice.

An environmental hygiene overall audit compliance score of 92% was recorded for the patient environment and patient equipment in a management audit in the unit in April 2017 and this was reflected on the day of inspection.

Overall there were good processes in place to prevent and control infection. There was ongoing measurement of these processes in addition to measurement of outcomes among patients receiving intensive care at the hospital. This showed that quality and safety in relation to the prevention and control of infection was regularly evaluated in line with National Standards.

The infrastructure of the Intensive Care Unit was outdated and was not in line with recommended specifications for a modern day critical care facility.[26] The design of the unit did not facilitate effective infection prevention and control because of the open plan design and limited space between the six beds in that area, and insufficient ancillary facilities. Four of the single patient rooms in the unit did not have anterooms and therefore these opened directly into the open plan area of the unit which was not in line with recommended guidelines. There was one toilet in the unit which was used by both patients and visitors. The staff work station was effectively an office space in the open plan patient accommodation area which was less than ideal from an infection control perspective. The outdated infrastructure and design of both the general and neurosurgical intensive care facilities at the hospital were clearly identified by the Infection Prevention and Control Team in their annual report for 2016.

There were insufficient facilities within the unit for the storage and management of sterile supplies and medications and patient equipment. Clean and sterile supplies were inappropriately stored on open shelving or in carts with open top drawers in the open plan patient accommodation area. It is recommended that sterile supplies are stored in fully enclosed storage units to avoid inadvertent contamination.

Some opportunities for improvement were identified in relation to general maintenance in the unit, parts of the floor covering were worn and some parts of woodwork paint was damaged on door architraves. The location of radiators and exposed pipe work behind beds did not facilitate access for cleaning. Staff had compiled a list in response to a recent request from hospital management so that deficiencies in respect of maintenance and equipment requirements could be addressed.

Some improvements had been made to the unit in recent years with the addition of two isolation rooms and retrofitting of an air handling system in addition to renovation and maintenance works. Healthcare environments should be planned,

designed, developed and maintained to facilitate effective cleaning and compliance with infection prevention and control best practice.[27] The need to modernise the infrastructure of general intensive care facilities at the hospital needs to be addressed in the hospital site development plan.

Surgical ward

The infrastructure of the surgical ward was also outdated. The ward could accommodate 35 patients and included four multi-occupancy rooms and five single rooms of which four had en-suite facilities. There was also an open plan area at the end of the ward that contained both a six-bed and four-bed bay area. The ward accommodated an extra bed if required whenever the hospital's bed capacity escalation policy had been implemented.

On the day of inspection six patients required transmission-based precautions. Four of these patients were accommodated in single rooms. The other two patients were accommodated in areas with patients without a transmissible infection. Staff told inspectors that sometimes patients who required transmission-based precautions may be accommodated in a shared ward area to facilitate closer monitoring of care. Although infection prevention and control measures were in place, this arrangement was less than ideal and does not facilitate effective containment of transmissible infection.

Signage to communicate isolation precautions was in place for the single isolation rooms. However, inspectors observed that doors to the four single isolation rooms accommodating patients requiring transmission-based precautions were open. Staff told inspectors that the decision to leave the doors open had been made following a risk-assessment of each patient.

There was limited space between beds in the six-bedded rooms which was less than ideal from an infection prevention and control perspective. In addition, there was no door to a clinical room therefore the room opened directly onto a ward corridor. There was no dedicated hand hygiene sink facility in the 'dirty' utility room and the cleaner's equipment room. The need to modernise the infrastructure of the ward should be addressed in future site development plans.

Nursing admission documentation in the surgical ward reviewed by inspectors included an infection status section and an infection prevention and control risk assessment in respect of all patients admitted or patients transferred from other wards or healthcare facilities. The admission record prompted nurses to follow some of the elements of the national guidance documents in relation to screening requirements.

Overall the patient environment and patient equipment observed in the areas inspected was visibly clean with few exceptions. An environmental hygiene overall audit compliance score of 92% with desirable standards was recorded in the ward in April 2017. Clean patient equipment was labelled with decontamination tags to denote cleaning had taken place. Cleaning specifications were also in place in the surgical ward which clearly identified the majority of environmental surfaces and patient equipment to be cleaned, the required frequency of cleaning and the staff discipline responsible in line with national cleaning guidelines. Cleaning of fridges should be included in local cleaning schedules and should be aligned to minimal cleaning frequencies for higher risk areas.[23,24]

Inappropriate storage of items of patient equipment was evident in a patient waiting area. In addition, office equipment was located in a treatment room and a clinical room as the ward did not have a dedicated office space for such equipment. Use of these rooms as both an office and a clinical room is not appropriate and requires review. Staff told inspectors that they were in the process of reviewing storage facilities on the ward and this was evident on the day of inspection. Some opportunities for improvement were also identified in relation to general maintenance in this ward.

The overall hospital hygiene audit results for quarter two 2017 showed 90% compliance with desirable standards which was a similar finding to the same period in 2016.

2.6.2 Safe injection practice

Inspectors looked at implementation of aspects of standard precautions to assess safe injection practice in the clinical areas inspected.

The General Intensive Care Unit

Staff who spoke with inspectors were able to describe recommended practice in relation to giving injections safely. Inspectors observed nurses preparing medication for injection on stainless steel trolleys using aseptic non-touch technique as appropriate.

A procedure tray containing prepared intravenous medication was observed on a stainless steel trolley located in the open plan patient accommodation area of the unit during the inspection. The tray contained multiple syringes of injectable medication which were either unlabelled or insufficiently labelled and also multiple vials of different types of injectable medications. To reduce the risk of transmission of infection to patients, intravenous medications should be prepared in a clean environment using an aseptic non-touch technique immediately prior to use where possible.[28] This practice should be clinically risk assessed and consideration should

be given to the introduction of commercially available single dose prefilled syringes or compounding of medications deemed to be required in a central pharmacy. This issue was identified to hospital management on the day of inspection so that risks identified could be mitigated as a matter of priority. Correspondence received by HIQA from the hospital Chief Executive following this inspection stated that this issue had been immediately addressed by hospital management.

Good practice was observed in relation to the management of a blood analyser in the unit whereby this equipment was located in a designated room with both hand hygiene and cleaning facilities. Staff used a checklist to indicate that the machine was cleaned after each use and this was evident on the day of inspection.

Multi-dose vials of insulin were appropriately stored, away from the point of care. Two vials were labelled with the date of opening but were not dedicated single patient use. A third open vial was not labelled with the date of opening. It is recommended that the use of multi-dose vials is avoided where possible or otherwise designated single patient use and labelled with the date of opening.

Surgical ward

Inspectors reviewed elements of safe injection practice and implementation of aspects of standard precautions in the surgical ward inspected. Staff who spoke with inspectors were also able to describe recommended practice in relation to giving injections safely.

The ward had a clearly designated area for medication preparation in the treatment room. Good practice was observed in relation to the management of procedure trays used during medication administration. A clinical room had been divided so that there was clear separation of both clean and dirty functions. Staff placed used procedure trays in the dirty area to identify that they needed to be cleaned. Following cleaning, the trays were stored in either the clean side of the clinical room or in a treatment room.

Multi-dose vials of insulin were labelled with the date of opening and were dedicated single patient use as recommended. In line with European Union Sharps Directive and Regulations 2010/32/EU[29] the hospital had introduced safe needle technology to reduce sharps injuries among staff.

2.6.3 Other measures to prevent the transmission of infection

Hand hygiene

Essential components of the World Health Organisation (WHO) multimodal improvement strategy4 were in place at Beaumont Hospital. The hospital participated in national hand hygiene audits, results of which are published twice a

year. The hospital achieved 84% hand hygiene compliance in May 2017 which was below the HSE's desirable target of 90% hand hygiene compliance among staff. This was a decrease from previous measurement periods in 2016 where a rate of 90% was achieved. Inspectors were informed that targeted hand hygiene training had been provided to relevant staff groups to address non-compliances at the time of the hand hygiene audit in May 2017.

Staff in the Intensive Care Unit achieved 100% hand hygiene compliance in an audit performed in August 2017. Hand hygiene compliance ranged from 86-93% in the preceding six months. Hand hygiene audits were performed monthly by locally trained auditors in the unit and any non-compliances were addressed directly in order to promote learning at the time of audit.

Monthly hand hygiene audits in the surgical ward inspected showed that staff in this area achieved 93% hand hygiene compliance in an audit performed in July 2017. In the same ward, overall hand hygiene audit compliance results for quarter one 2017 also showed 93% compliance.

Documentation provided by the hospital showed that 85% of relevant hospital staff had completed hand hygiene training in the previous two years. This included 92% of staff in the General Intensive Care Unit and 100% of staff in the surgical ward inspected.

Alcohol gel was available at the point of care in the clinical areas inspected in line with best practice guidelines. Hand hygiene advisory posters were available, up-to-date, clean and appropriately displayed in the areas inspected.

Outbreak management

Outbreaks of infection at the hospital were documented in the 2016 infection prevention and control report. This report showed that there had been fourteen outbreaks of infection in the hospital in the preceding 12 months which posed many challenges for the hospital and impacted on activities such as updating policies and guidelines, education and audit.

Recurring challenges faced by the hospital to effectively prevent and control the number of outbreaks included a lack of isolation facilities and high occupancy rates. Performance reports showed that 51% of newly diagnosed patients with Meticillin-Resistant *Staphylococcus Aureus* were isolated within 24 hours. Notwithstanding these challenges hospital management told inspectors that necessary control measures in relation to transmissible infections had been implemented for patients who required transmission-based precautions.

Outbreak reports were produced in respect of outbreaks of infection by the Infection Prevention and Control Team and these were presented at the Infection Prevention

and Control Committee and to senior management in the hospital in line with National Standards. Documentation reviewed showed that outbreaks of infection were effectively managed however it was reported that ward closures were difficult to achieve at times due to high bed occupancy rates, and overcrowding in the Emergency Department.

In addition to daily outbreak control team meetings and early implementation of control measures, additional control measures were put in place which included increased auditing of practices in relation to hand hygiene compliance and transmission-based precautions, and increased environmental and patient equipment hygiene auditing. Action plans were put in place to control outbreaks and these included assigning dedicated staff where possible to care for patients colonised with resistant bacteria. Additionally, reports showed that additional training and education was provided to patients, visitors and staff. Other measures included the introduction of a minimum twice daily influenza testing during the influenza season, promotion of staff influenza vaccination, increasing the number of isolation rooms, introduction of pulp disposal units and disinfectant wipes to disinfect frequently used patient equipment.

Factors in relation to hospital infrastructure and bed capacity which contribute to the onset of outbreaks of infection and hinder their management need to be substantively reviewed and addressed. The practice of managing patients with transmissible infection in open plan patient accommodation needs to be reviewed.

Prevention of water-borne infection

The hospital Water Safety Committee, chaired by the Head of Facilities Management, provided oversight of the management of water services in the hospital. Documentation reviewed by inspectors showed that the hospital continued to have positive water sample results in relation to legionella in some areas. These risks in relation to legionella had been included in the hospital corporate risk register.

The hospital had implemented a number of control measures in relation to legionella prevention such as water temperature monitoring, on-line chlorine dioxide dosing, removal of dead end pipes, and routine flushing and monthly water sampling schedules. The hospital had also developed a policy on control of legionella for the hospital. It was reported to inspectors that the hospital was awaiting the final report of a formal legionella risk assessment which was in progress at the time of inspection.

2.7 Quality improvement initiatives

Multiple projects to enhance the prevention and control of healthcare-associated infection had been undertaken by staff at the hospital. These included some of the following:

Clostridium difficile infection reduction

A quality improvement initiative undertaken by the Infection Prevention and Control Team and staff in Beaumont Hospital to reduce the rate of healthcare-associated *Clostridium difficile* infection saw a 57% reduction in the rate of *Clostridium difficile* over a year. This was attributed to enhanced environmental disinfection processes, introduction of new laboratory testing methods, change in treatment and mattress audit and replacement programmes.

'Scrub the Hub' initiative

A multidisciplinary evidence-based quality improvement initiative had been implemented as a pilot project to improve vascular catheter care and aseptic practices and to reduce the risk of bloodstream infection. One to one education sessions, staff information leaflets and posters to highlight the importance of this initiative had been introduced during the pilot. The Infection Prevention and Control Team planned to roll-out this initiative across the hospital to reduce the risk of blood stream infection.

Influenza vaccination uptake

The hospital had improved influenza vaccination uptake among staff in 2016 in comparison to the previous influenza season. Efforts to improve vaccine uptake included peer vaccination and staff education sessions.[30] In addition, feedback was given on vaccination uptake performance scores to each clinical directorate. The hospital should continue to build on this improvement for the coming influenza season. Documentation reviewed showed that the uptake of influenza vaccination was included as a key performance indicator for clinical directorates in the hospital.

Quality and patient safety conference

Beaumont Hospital hosted an annual quality and patient safety meeting for staff in May 2017. At this meeting hospital staff shared learning from local quality and safety improvement initiatives with colleagues. A number of oral and poster presentations were presented by the staff in relation to the prevention and control of healthcare-associated infection and some of these were in relation to:

- the 'Scrub the Hub' initiative

- a 'Shot On The Spot' by the 'Flu Crew': a directorate peer influenza vaccinator programme for the 2016/17 season to increase staff influenza vaccine uptake
- 'Improving surgical antimicrobial prophylaxis prescribing on an orthopaedic ward': surgical antimicrobial prophylaxis prescribing improved from 20% to 100% over a seven month period by direct engagement with clinicians and timely feedback of audit results and education.
- 'Outbreak Surveillance: Necessity is the Mother of Invention': the Infection Prevention and Control Team developed a local database to support outbreak management.
- 'Six years of CRE in an Irish tertiary hospital': a retrospective audit conducted in relation to detection of Carbapenem-resistant *Enterobacteriaceae* in patients. The audit concluded that there was an urgent need to fully implement national screening guidelines.
- 'It's the way that you do it': developing a standardised operating procedure for taking tracheal aspirate and bronchoalveolar lavage in the Intensive Care Unit.
- 'Surveillance data on healthcare-associated infections. Whose data is it?: a multi-disciplinary approach to developing an interactive interface for monitoring healthcare-associated infection and engaging with front line staff with surveillance data.

In addition, hospital staff recently published a research article entitled 'Invasive MRSA infections in neurosurgical patients - a decade of progress' in an international medical journal around trends in the incidence of MRSA invasive infection in a national neurosurgical centre over a 10-year period.[31]

Measuring and assessing current practices through collection and analysis of data, identifying trends and areas for improvement and implementing the necessary changes to improve the service are key components of a quality improvement framework and were evident from review of the above quality improvement initiatives undertaken in Beaumont Hospital.

2.8 Progress since the previous HIQA inspection

HIQA reviewed the quality improvement plan[32] developed by the hospital following the 2015 HIQA infection prevention and control inspection. The hospital reported that all the issues identified by HIQA during the last inspection had been addressed by the hospital. The hospital had addressed issues in relation to previous legionella risk assessments including the installation of a water treatment system aimed at preventing legionella growth.

The hospital had reviewed and updated isolation room signage and risk assessment processes. Batch preparation and pre-priming of intravenous administration sets at the start of the working day had been discontinued in one clinical area. However, the hospital needs to ensure that this practice has been discontinued throughout the hospital. The hospital had reviewed processes in relation to cleaning and management of ultrasound probes in the radiology department and a standard operating procedure had been developed for cleaning of ultrasound machines. Additionally a sluice hopper had been installed in the radiology department.

Since the last HIQA inspection two significant capital development projects had been completed at the hospital. The National Kidney Transplant service ward had been redeveloped and refurbished and was officially opened in January 2016. In addition a new Haemodialysis Unit in the hospital was opened in June 2017 which comprised 34 patient treatment stations. Capital design plans had been devised in relation to redeveloping and expanding the existing Emergency Department at the hospital.

3. Conclusion

Effective leadership, governance and management arrangements were evident around the prevention and control of healthcare-associated infection in Beaumont Hospital. The hospital was providing positive leadership in this regard and this provides good example for other service providers.

The hospital management team was clearly focused on monitoring structures, processes and outcomes and implementing evidence-based practice to inform any improvements in relation to the prevention and control of healthcare-associated infection at the hospital.

The hospital had systems in place to identify and manage risks in relation to the prevention and control of healthcare-associated infections. Hospital staff were supported to implement best practice in relation to infection prevention and control with up-to-date policies, procedures and guidelines.

The hospital had implemented a number of quality improvement initiatives to address findings in relation to outcome-based information which represented a commitment to promoting safer patient care. The hospital had implemented evidence-based care bundles and had an active audit and feedback programme in place and should continue to drive full implementation of all essential care bundle components.

Overall, patient equipment and the patient environment was generally clean in the areas inspected. There was good ownership in relation to hospital hygiene and evidence of clear processes and responsibilities from clinical areas through to executive management level. An electronic hospital auditing system facilitated regular trending, analysis and oversight of audit results at both local and senior management level. The hospital needs to continue working towards sustaining full compliance with national hand hygiene targets in relation to hand hygiene compliance.

Beaumont Hospital design dates back to the 1970's and was therefore not aligned to modern healthcare facilities requirements. The recent capital development projects that had been completed such as the National Kidney Transplant service ward and the new Haemodialysis Unit are welcome developments. However, the infrastructure and design of intensive care facilities at the hospital needs to be addressed in the hospital site development plan going forward.

Notwithstanding the new developments, factors in relation to broader hospital infrastructure, insufficient bed capacity and lack of available isolation rooms which contribute to the onset of outbreaks of infection and hinder their management need to be substantively reviewed and addressed.

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5. Appendix 1

Lines of enquiry for the monitoring programme undertaken against the *National Standards for the prevention and control of healthcare-associated infections in acute healthcare services*

Number	Line of enquiry	Relevant National Standard
1.1	The hospital has formalised governance arrangements with clear lines of accountability and responsibility around the prevention and control of healthcare-associated infections.	2.1, 2.2, 2.3, 2.4, 2.5, 2.6, 2.7, 2.8, 5.2, 5.3, 5.4, 6.1, 7.1
1.2	Risks in relation to the prevention and control of infection are identified and managed.	2.1, 2.3, 2.5, 3.1, 3.6, 3.7, 3.8
2	The hospital has policies, procedures and guidelines in relation to the prevention and control of infection and hospital hygiene.	2.1, 2.5, 3.1, 3.6, 3.8, 5.4, 7.2
3	Hospital personnel are trained and in relation to the prevention and control of healthcare-associated infection	2.1, 2.8, 3.1, 3.2, 3.3, 3.6, 6.1, 6.2
4.1	The hospital has implemented evidence-based best practice to prevent intravascular device-related infection and urinary catheter-associated infection, ventilator-associated pneumonia and surgical site infection.	1.1, 2.1, 2.3, 3.5
4.2	The hospital has systems in place to detect, prevent, and respond to healthcare-associated infections and multi-drug resistant organisms in line with national guidelines.	2.1, 2.3, 2.5, 3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.8,

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