Health Information and Quality Authority

An tÚdarás Um Fhaisnéis agus Cáilíocht Sláinte

Report of the unannounced inspection at Cork University Hospital.

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: 27 July 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
- 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 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 Cork University Hospital by Authorised Persons from HIQA; Aileen O' Brien, Katrina Sugrue, Noreen Flannelly-Kinsella and Shane Grogan on 27 July 2017 between 09:30hrs and 17:10hrs.

Prior to this inspection, inspectors 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 also reviewed documentation and data and observed practice within the clinical environment in a small sample of clinical areas which included:

- the General Intensive Care Unit and
- 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 Cork University 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

Cork University Hospital is a statutory hospital which is both a university teaching and tertiary referral hospital, owned and managed by the Health Service Executive and is part of the South/South West Hospital Group. Within the South/South West Hospital Group, Cork University Hospital also forms part of a smaller hospital group with Mallow General Hospital and Bantry General Hospital.

Inspectors found through this inspection that Cork University Hospital did not have effective governance arrangements for the prevention and control of healthcare-associated infection.

Hospital management informed inspectors that there was a defined reporting structure for the Infection Prevention and Control Committee. It was explained to HIQA that the Chief Executive Officer held overall responsibility for the prevention and control of healthcare-associated infection at the hospital. The Infection Prevention and Control Team at Cork University Hospital reported to a joint infection prevention and control committee which included Cork University Maternity, Mallow General Hospital and Bantry General Hospital. This committee reported to the Executive Quality and Safety Committee which was one of five high-level oversight committees at the hospital. The Executive Quality and Safety Committee reported to the Executive Management Board which reported to the Chief Executive Officer. The Chief Executive Officer reported to the South/South West Hospital Group Chief Executive Officer.

Hospital management stated that the prevention and control of healthcare-associated infection at the hospital was not a standing agenda item at meetings of Executive Quality and Safety Committee and that issues in relation to infection prevention and control were reported periodically. Minutes of monthly meetings of the Executive Quality and Safety Committee held from January to June 2017

reviewed by inspectors did not include reference to reporting from the Infection Prevention and Control Committee. A regular reporting structure to this oversight committee should be formalised going forward. Effective reporting systems should be designed to ensure that any emerging infection prevention and control risks can be identified and managed early through a top down and bottom up reporting process at all levels of relevant staff throughout the hospital.

The hospital management organisational diagram provided to HIQA indicated formal lines of communication between the Executive Quality and Safety Committee and a risk management committee and clinical directorates at the hospital. There did not appear to be a formalised arrangement whereby infection prevention and control issues could be clearly communicated between high-level hospital oversight committees. Governance and communication arrangements need to be clearly defined and communicated to relevant staff.

The Infection Prevention and Control Committee included representation from four hospitals including Cork University Hospital, Cork University Maternity Hospital, Bantry General Hospital and Mallow General Hospital. HIQA notes that governance arrangements within the South/South-West Hospital Group changed in 2017 in respect of maternity services. In the past, Cork University Hospital and Cork University Maternity Hospital were jointly governed by the Chief Executive Officer in Cork University Hospital, these two hospitals now had separate individual governance arrangements. This arrangement was not reflected in minutes of the Infection Prevention and Control Committee and the committee's terms of reference. Cork University Hospital and Cork University Maternity Hospital are located on the same site and it was HIQA's understanding that some functions such as cleaning remain shared across both hospitals.

Inspectors were informed that the structure and functionality of the Infection Prevention and Control Team had been recently reviewed and that the Chief Executive Officer had recently taken up the role of chairperson on the Infection Prevention and Control Committee. It is recommended that governance and management arrangements in respect of the prevention and control of healthcare-associated infection at Cork University Hospital, which now has separate governance structures to Cork University Maternity Hospital, should be clearly redefined to reflect these recent changes.

Infection prevention and control committee

Terms of reference for Infection Prevention and Control Committee showed that it incorporated hygiene and the decontamination of reusable invasive medical devices across the four hospitals. This document also stated that the committee's objectives included risk management in respect of the prevention and control of healthcare-associated infection, revision and oversight of implementation of policies, procedures

and guidelines and oversight of the implementation of National Standards. The committee was responsible for approving an annual plan and an annual report in relation to infection prevention and control. The committee's terms of reference specified that the committee chairperson would formally report to the Executive Quality and Safety Committee on a quarterly basis using an agreed template. This frequency of formalised reporting did not appear to be in place at the time of inspection. This needs to be reviewed. It is also recommended that meetings of the committee are scheduled to ensure that either the chairperson or co-chairperson is present at meetings in line with formally identified attendance requirements specified in the committee's terms of reference.

The committee met monthly and documentation reviewed showed that membership included representation from infection prevention and control nursing staff from Cork University Hospital, Cork University Maternity Hospital, Bantry General Hospital, Mallow General Hospital, in addition to representation from clinical microbiology, nursing and midwifery management, hygiene services, decontamination, medical engineering, the microbiology laboratory, quality and risk management, pharmacy, occupational health; diagnostics, medical, and surgical directorates and public health. Minutes of meetings of the Infection Prevention and Control Committee reviewed by inspectors showed that the terms of reference did not include named representatives from medical and surgical directorates in Cork University Hospital. This requires review.

Hospital management informed inspectors of plans to establish a South/South West Hospital Group Infection Prevention and Control Committee which should facilitate collaboration among all hospitals in this hospital group.

Infection prevention and control service

Clinical microbiology services were provided in Cork University Hospital, Bantry General Hospital, Mallow General Hospital and Cork University Maternity Hospital by 2.5 whole time equivalent (WTE)* consultant microbiologists. The service was also staffed by two non-consultant hospital doctors at registrar and specialist registrar grades. Consultant microbiologist advice was available twenty-four hours a day and this was provided on a rotational basis by consultant microbiologists based at Cork University Hospital.

The Infection Prevention and Control Team was led by one consultant microbiologist and also included 3.6 WTE infection prevention and control nurses, one WTE surveillance scientist, one WTE antimicrobial pharmacist, a chief medical scientist

* 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.

and an administrative assistant. The administrative support position was also shared with community services. One infection prevention and control nurse position (0.6 WTE) was assigned specifically to promote good hand hygiene practices. The formal allocation of infection prevention and control nurses in Cork University Hospital was 4.6 WTE, one position on the team had been temporarily vacant since 2016 but this vacancy had not been filled. Other members of the Infection Prevention and Control Team had responsibilities across the four hospitals.

Inspectors were informed that the infection prevention and control team considered that infection prevention and control nurse staffing levels were below desirable levels given the size of the hospital and the complexity of services provided. The infection prevention and control annual report indicated that ongoing infection prevention and control team deficiencies had the potential to impact on the implementation of annual programmes in relation to infection prevention and control and environmental hygiene auditing. Identified deficiencies were also outlined by hospital management in respect of consultant microbiologist staffing levels in that there was an identified need by the hospital for an additional consultant microbiologist position to provide services to Bantry General Hospital and Mallow General Hospital.

Bantry General Hospital and Mallow General Hospital were both represented at meetings of the Infection Prevention and Control Committee. Inspectors were informed that although clinical microbiology services including twenty four hour advice were provided to Bantry General Hospital and Mallow General Hospital by consultant microbiologists in Cork University Hospital, there was no formally allocated provision of infection prevention and control advice by a consultant microbiologist to these two hospitals. This arrangement has as far back as 2012 been identified as a concern by HIQA through prior inspection, and requires review.

The Infection Prevention and Control Team workload was described in the team's annual plan. Documentation reviewed showed that team meetings included discussion of alert organism surveillance[†], hand hygiene, hospital hygiene, care bundles, staff education, procurement and any clinical issues arising in line with the infection prevention and control annual plan.

The Infection Prevention and Control Team was represented on the Quality Improvement Team, a documentation group, a care bundle group, the Hygiene Services Team, a housekeeping review group, an operating theatre review group and a capital projects group.

[†] Alert organisms are micro-organisms that pose a significant risk of transmission to non-infected patients or healthcare workers.

Monitoring and evaluation

Monitoring arrangements at executive management level as described to inspectors and reviewed in documentation did not provide assurance of clear effective oversight of the prevention and control of healthcare-associated infection which is required in a large tertiary referral hospital.

The hospital reported data in relation to the prevention and control of healthcare-associated infection in a monthly hospital patient safety indicator report for management and clinicians and the South/South West Hospital Group. Nationally mandated performance indicators monitored included the:

- percentage compliance of hospital staff with the World Health Organisation's five moments of hand hygiene using the national hand hygiene auditing tool
- rate of new cases of hospital-acquired *Clostridium difficile* infection
- rate of new cases of hospital-acquired *Staphylococcus aureus* bloodstream infection.

Other than national performance indicators above there were no other locally agreed performance indicators in relation to healthcare associated infection.

The Infection Prevention and Control and Microbiology Team's informed inspectors that they routinely monitored the following:

- surveillance of 'alert' organisms and 'alert' conditions[‡]
- clusters or outbreaks of infection
- data reported to the European Antimicrobial Resistance Surveillance Network (EARS-Net)[§]
- colonisation and bloodstream infections due to vancomycin-resistant Enterococci
- antimicrobial resistance patterns
- surveillance of antimicrobial usage
- enhanced *Clostridium difficile* infection surveillance.

Hand hygiene and infection prevention and control training uptake by staff was recorded centrally. Hospital management reported that hand hygiene and infection prevention and control-related training was reported to the Infection Prevention and Control Committee on a monthly basis.

[‡] 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.*

Cork University Hospital had not participated in the recent national point prevalence survey of hospital-acquired infections and antimicrobial use which was part of a European-wide point prevalence study occurring every five years. The participation in such studies can help to identify opportunities for improvement. Given the complexity of services provided at the hospital and the limited arrangements in place at the hospital to measure the occurrence of healthcare-associated infection, arrangements should have been put in place to facilitate participation in this important national survey.

The hospital had participated in previous national annual antimicrobial point prevalence surveys.

Management hygiene audits were performed across the hospital by a trained auditing team on a weekly schedule across clinical areas and departments. The frequency of environmental hygiene auditing was not graded according to risk. Hospital management audited one clinical area or department per week which meant that each clinical area or department at the hospital was audited once a year and the process included reaudit of underperforming areas. This frequency of audit needs to be reviewed to ensure that higher risk areas are audited at appropriate intervals in line with national guidelines.[18,19]

Overview reports of hygiene audit findings for 2016 were reviewed by inspectors. The annual hygiene report reviewed did not comprehensively track and trend hygiene standards from an organisational perspective. Quality improvement plans had been developed but were not updated following completion of works. Management informed inspectors that reporting in this regard was under review and was being refined to clearly reflect the standard of the environmental and patient equipment hygiene at the hospital. It is acknowledged that hospital management had undertaken significant work since the last HIQA inspection to progress improvements in relation to hospital hygiene.

Documentation reviewed by inspectors showed that many issues relating to infrastructure identified through audit remained ongoing and lacked documented appropriate timelines for completion.

Staff in the clinical areas inspected performed monthly local area hygiene audits but findings from these audits reports did not appear to be centrally monitored by hospital management. The standardisation of audit tools was reported to be under review. Hospital management reported that local hygiene audits were governed by a hygiene audit process, which set out a pathway for escalating audit findings through a directorate management structure.

There was no collective oversight of care bundle implementation across the hospital. This information could be used to target improvements where indicated.

Documentation reviewed showed that incidents in relation to the prevention and control of healthcare associated infection were not routinely reported at the hospital. Recording of such incidents is good practice and this information should be used to identify risks and to identify opportunities for improvement.

Overall monitoring to measure and report on the effectiveness of infection prevention and control measures was limited and insufficient given that the hospital is a large tertiary referral centre providing highly specialised and complex services to patients who are vulnerable to infection. Monitoring arrangements in respect of the prevention and control of healthcare-associated infection at the hospital should be in line with National Standards.

Service providers should have formalised governance arrangements in place to ensure the delivery of safe and effective infection prevention and control across the service.

2.2 Risk management

Line of enquiry 1.2

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

Risks in relation to the prevention and control of infection should be identified and effectively mitigated or managed. Any gaps or serious risks identified in the service's ability to prevent and control healthcare-associated infections must be addressed in a timely manner.1

Inspectors reviewed the corporate risk register for the hospital. Documentation provided showed that hospital management had identified one risk in respect of the prevention and control of healthcare-associated infection at the hospital. The risk description referred to non-compliance with National Standards which included inadequate isolation, surveillance and microbiological screening resources. Control measures described on the risk register included the use of private and two and three bedded rooms to isolate patients with infection and the implementation of hygiene improvement measures and oversight of the prevention and control of healthcare-associated infection. Documentation reviewed showed that this risk was first entered in the risk register in August 2010 and remained ongoing seven years later.

Management arrangements for the prevention and control of healthcare-associated infection at Cork University Hospital had not been sufficiently resourced and progressed at the hospital for a number of years. Hospital management had identified a need for additional personnel at the hospital to include consultant microbiologist, infection prevention and control nurse manager and surveillance scientist positions. Inspectors were informed that risks in respect of infection prevention and control team staffing resources had been escalated to the South/South West Hospital Group over the past three years. Hospital management stated that in successive funding estimates the hospital had prioritised the recruitment of an additional consultant microbiologist over other posts and this has again been submitted as a priority for 2018. At the time of inspection, there was no agreed timeframe in which these positions would be sanctioned.

Inspectors were informed that the hospital operated at 100% capacity and that this had impacted on the performance of deep cleaning of clinical areas and maintenance works. In addition, management staff described technical problems in relation to water tank cleaning in one area of the hospital. Inspectors were also told that the

hospital did not have a designated decontamination coordinator but the appointment of this position was in progress.

In line with National Standards, infection prevention and control programme activities should include regular service-wide risk assessment. In addition, there should be regular review of the infection prevention and control programme to evaluate its ongoing effectiveness, and determine any gaps that could affect the safe delivery of care. The review should include full consideration of the scale and complexity of services provided, hospital activity levels and the resources required to deliver the infection prevention and control service. There should be prioritisation of actions to mitigate risks to the service.1 This did not appear to be the case in Cork University Hospital based on the findings from this inspection.

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.

The hospital had a comprehensive suite of infection prevention and control policies, procedures and guidelines which were most recently revised in June 2017 and were approved by a consultant microbiologist. Staff had access to these policies, procedures and guidelines on the hospital's electronic document access system in clinical areas.

Inspectors reviewed other hospital policies which related to the management of invasive devices. The majority of hospital policies and procedures in relation to urinary catheter and intravascular device management were overdue for revision. Documentation reviewed showed that the review cycle for local policies, procedures and guidelines was every two years. It is also recommended that the implementation of care bundles is included in subsequent revision of such policies and procedures.

Inspectors found that there were printed copies of older versions of infection prevention and control policies, procedures and guidelines in the Intensive Care Unit. This finding should be addressed so that staff only have access to the most up to date versions of these documents. Policies, procedures and guidelines were accessible electronically at the central workstation in the unit but not at each bedside on the day of inspection. This matter was being reviewed at the hospital.

Inspectors were informed that the hospital used national guidelines in relation to some aspects of infection prevention and control. It is recommended that national guidelines which have been formally adapted as local policies should be clearly identifiable as mandated Cork University Hospital policies that include approval and review dates.

Access to and organisation and labelling of documents in the hospital's electronic document management system could be refined and improved so as to facilitate easy access to hospital policies, procedures and guidelines by staff.

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 at the hospital was mandatory for relevant hospital staff every two years in line with national recommendations. [3]

The Infection Prevention and Control Team provided both formal and informal clinical area and departmental-based training sessions as required. Educational activities in relation to hand hygiene included nurse education sessions, hand hygiene promotion days, conference sessions and video projects.

Prevention and control of healthcare-associated infection training sessions were scheduled on a regular basis for hospital staff. Inspectors found that the content of the infection control training programme was basic and included education in relation to hand hygiene, waste management and blood and body fluid exposure. This training was mandatory for relevant staff every two years. Documentation reviewed showed that 76% of relevant hospital staff had completed training in relation to the prevention and control of healthcare-associated infection in the preceding 24 months. Staff attendance at training was recorded using an electronic system which facilitated central tracking and trending of attendance by each staff discipline.

Once off training in relation to aseptic non-touch technique was provided to nursing staff during training sessions around peripheral venous catheter insertion and intravenous medication administration.

Hospital management informed inspectors that the hospital was in the process of revising mandatory training content for staff in relation to the prevention and control of healthcare-associated infection at the hospital. It is recommended that staff training around infection prevention and control is aligned to national guidance for such knowledge and skills and expanded further to include transmission-based precautions and aseptic technique for clinical staff involved in direct patient care.[4]

All staff at the hospital had access to advice from the Infection Prevention and Control Team and clinical staff had access to advice from clinical microbiology staff and the Antimicrobial Pharmacist. Training in relation to antimicrobial stewardship was provided to relevant clinical staff. Infection prevention and control education was provided to non-consultant hospital doctors at induction.

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 published in recent years recommending their introduction across the Irish health system.[5, 6, 7] The implementation of care bundles to prevent invasive device-related infection was reviewed in both of the clinical areas inspected.

The General Intensive Care Unit

Inspectors looked at aspects of the prevention of invasive device-related infection in the General Intensive Care Unit.

Care bundles were introduced in Cork University Hospital in 2016. Care bundles for peripheral vascular catheters and central venous access devices were in place in the General Intensive Care Unit and compliance with care bundle implementation was audited every month. Monthly peripheral catheter care bundle compliance audit results showed 100% compliance with implementation in the three months prior to this inspection. Monthly central venous access device care bundle compliance audit results showed 100% compliance for the previous six months which demonstrates consistent good practice in recording care interventions. It was reported that care bundle audit results were regularly fed back to staff locally and that education and support around care bundle implementation was provided by the nursing department.

Inspectors were informed that urinary catheter care bundles had been introduced in the unit in the past four months and that staff were working to embed these and to commence auditing of urinary catheter care bundle implementation.

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 from mechanical ventilation. It is recommended that the implementation of care bundles to reduce the risk of

ventilator-associated pneumonia and urinary catheter associated urinary tract infection are implemented and audited in the unit in line with national guidelines.9

Surgical Ward

Care bundles for peripheral vascular catheters were in place in the surgical ward inspected and compliance with care bundle implementation was audited every month. Monthly peripheral catheter care bundle compliance audit results showed that in the period January to June 2017 the monthly compliance rate was below 100% for four out of these five months. This shows that while implementation of care bundles to reduce infection associated with invasive devices had been progressed on this ward there was more to be done to ensure that 100% compliance was consistently achieved. Implementation and auditing of urinary catheter care bundles needs to be progressed across the hospital as recommended following the previous HIQA inspection at the hospital in 2016.[8]

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]

Surveillance of these types of healthcare-associated infection was not performed at University Hospital Cork. HIQA acknowledges that implementation of surveillance programmes for healthcare-associated infection requires sufficient resources and expertise. Given that Cork University Hospital is a tertiary referral hospital with multiple complex specialities, the implementation of targeted surveillance programmes for healthcare-associated infections needs to be progressed. This will require the necessary investment and support.

The hospital had prescribing guidelines for surgical antimicrobial prophylaxis. The Infection Prevention and Control Team had reviewed local practices in relation to preoperative skin preparation and had identified opportunities for improvement in 2016. Subsequently, the team had drafted a policy in relation to the timing of hair clipping if required before surgery. At the time of inspection this policy had not been implemented. Specific recommendations made by the Infection Prevention and

[**] Surveillance is defined as the ongoing, systematic collection, analysis, interpretation and evaluation of health data closely integrated with the timely dissemination of these data to those who need it.

Control Team to reduce the risk of post-operative infection following review of local practices should have been implemented in a timely manner.

2.6 Systems to prevent and manage healthcare-associated infections and multi-drug 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

Inspectors looked at implementation of aspects of transmission-based precautions and measures to prevent the spread of antimicrobial-resistant organisms to patients.

Hospital isolation facilities

There were 624 hospital beds in Cork University Hospital of which 476 beds were occupied on the day of inspection. The hospital had 27 purpose built isolation rooms with specialised ventilation. Nineteen of these rooms were part of the Cardiac Renal Centre which opened in 2010. The majority of single rooms at the hospital had ensuite toilet facilities which is beneficial from an infection prevention and control perspective. Hospital management reported that there were a total of 126 single rooms at the hospital and that 67 of these could be used to isolate patients with transmissible infection. Eleven patients for whom isolation precautions were indicated were not accommodated in single rooms on the day of inspection. Hospital management should review the allocation of hospital beds to facilitate the accommodation of patients with infection in single rooms if indicated.

Microbiological testing

Funding to perform testing for influenza virus and norovirus by the microbiology laboratory within the hospital was introduced in 2016. This should facilitate more rapid detection of potentially infectious patients and timely implementation of infection control measures.

Intensive Care Unit

The General Intensive Care Unit could accommodate 10 patients and included seven beds in an open plan arrangement in addition to three single rooms. 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 this system was used to record microbiological screening results and any identified infection control measures.

The infrastructure of the General Intensive Care Unit was outdated and was not in line with recommended specifications for a modern day critical care facility.[17] Healthcare environments should be planned, designed, developed and maintained to facilitate effective cleaning and compliance with infection prevention and control best practice.1

The design of the unit did not facilitate effective infection prevention and control because of limited isolation facilities, limited space between beds, and insufficient ancillary rooms to facilitate the storage and management of equipment and supplies. The unit did not have isolation facilities with specialised ventilation required for managing patients with airborne infection. Single patient rooms did not have anterooms and these and ancillary rooms including the 'dirty' utility room opened directly into the open plan area of the unit which was not in line with recommended guidelines.[17] There was one toilet in the unit which was used by both patients and visitors. Inspectors were informed that there was a medium term plan to create a new general intensive care unit at the hospital. The need to modernise the infrastructure of general intensive care facilities at the hospital needs to be addressed in the site development plan.

Storage space in the unit was quite limited. There were insufficient facilities for the storage and management of sterile supplies and medications, waste, linen and patient equipment. There was no dedicated space or room where staff could clean patient equipment. On the day of inspection medical equipment for the unit was temporarily stored in an adjacent unoccupied unit. Suitable arrangements need to be put in place to facilitate storage of this equipment in a designated clean area that is readily accessible to staff. Hospital management confirmed that this matter was under review at the time of inspection.

Clean and sterile supplies were inappropriately stored on open shelving in the open plan area of the unit. Clean supplies were also stored inappropriately in a 'dirty' utility room[††]. This practice increases the risk of contaminating clean supplies with faecal or other microorganisms and could increase the risk of spreading infection.

The 'dirty' utility room was not equipped with a washer/disinfector to decontaminate reusable bedpan holders. It is recommended that reusable items such as bedpan holders are disinfected by heat. This deficiency should be addressed. The layout and size of the 'dirty' utility room did not facilitate the separation of clean and dirty

[††] A room 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.

activities in this room. The storage and management of waste in this room needs to be reviewed so as to optimise the available space for day to day activity.

The staff work station contained multiple files and paper work in open shelving and was effectively an office space in the open plan area of the unit. This requires review as ideally paper work and office equipment should be stored in a separate area so as to facilitate cleaning. Electronic data and information storage facilities both centrally and at individual bed spaces should be optimised to reduce the need for hard copy document storage in this area.

Overall, environmental surfaces and patient equipment inspected in the unit were visibly clean with a few exceptions - one commode was unclean, a computer terminal and a television set were dusty and surfaces of a clean equipment modular storage system were also dusty. These items need to be included in a regular cleaning schedule. Surfaces in patient zones need to be cleaned at least once a day. There should be a customised cleaning specification for the unit including items/surfaces to be cleaned, cleaning frequency, cleaning method and staff discipline responsible in line with recommended guidelines.[18,19,20]

Deficiencies were identified in relation to general maintenance in the unit, parts of floor covering was worn and damaged, and wall and woodwork paint was worn and damaged in one single room that was inspected. There should be a programme of preventative maintenance so as to facilitate effective cleaning in this high-risk area.

An environmental hygiene audit compliance score of 78% was recorded in a management audit in the unit in March 2017 which was less than desirable. Deficiencies identified in relation to cleaning and maintenance in high-risk areas such as Intensive Care Units should be addressed as soon as possible.

Surgical ward

The surgical ward could accommodate 35 patients and included five single rooms and seven multi-occupancy rooms containing two, four or six beds. With the exception of one single room, all other rooms had en-suite toilet and shower facilities. All patients requiring isolation in the surgical ward were accommodated in single rooms on the day of inspection as appropriate. There was limited space between beds in six-bedded rooms which was less than ideal from an infection prevention and control perspective.

Patient assessment to determine previous colonisation or infection with a transmissible microorganism was undertaken in the Day of Surgery Admission Unit prior to admission to the ward. The Infection Prevention and Control Team informed staff if isolation facilities were required so that appropriate accommodation could be arranged.

The hospital had systems in place to identify patients with transmissible infection at the time of admission to hospital. A computerised system helped staff to identify patients colonised with resistant bacteria so that appropriate screening and accommodation could be arranged.

Inspectors reviewed patient admission and transfer documents. Nursing admission and transfer records had been developed to clearly identify any infection prevention and control risks in respect of patients admitted to the hospital or transferred to other wards or healthcare facilities.

The nursing admission and transfer record included a designated section on infection control and facilitated recording of information such as a history of colonisation with multi-drug resistant organisms and any gastrointestinal or respiratory illness suggestive of infection. In addition, the nursing admission record prompted nurses to admit potentially infectious patients to a single room. The nursing transfer record included a reminder to notify by telephone, the ward or facility receiving a patient if isolation facilities were required. Additionally, the nursing transfer record detailed the type, date of insertion and site of indwelling intravascular devices and urinary catheters

The patient environment was mostly visibly clean in the areas inspected but there were some exceptions which included the side rails of a vacant bed, a patient armchair, a medication dispensing trolley, a number of alcohol gel dispensers, the door of a medication fridge and a bedpan storage rack.

Opportunities for improvement were observed in relation to patient equipment hygiene. A number of items of patient equipment were either stained or dusty and these included three commodes, an electronic thermometer, a blood pressure cuff, a drip stand and a portable suction machine.

A patient equipment cleaning logbook reviewed by inspectors showed that cleaning frequencies for some items of patient equipment were not aligned to recommended national guidelines.[19] Commodes were not included in the logbook. Items that could be cleaned weekly were included in a daily checklist. Inspectors also found that the cleaning logbook was not consistently completed which does not provide assurance that patient equipment was regularly cleaned. Inspectors were informed that staff responsible for cleaning patient equipment had competing demands on their time such as direct patient care. Local arrangements and specifications for cleaning of patient equipment in this ward should be reviewed and there should be sufficient resources allocated to patient equipment cleaning every day.

Hygiene audits performed locally in the surgical ward showed that results for patient equipment and environmental hygiene were above 80% for the period January to June 2017.

It was reported that members of the housekeeping team had dual roles which included both cleaning and catering duties. This is not the operational norm in the majority of Irish hospitals. There is a risk that dual responsibilities may dilute the effectiveness of both roles. Hospital management told inspectors that this was being reviewed.

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.

Intensive Care Unit

Staff spoken with 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.

An emergency bag located in a medication fridge contained multiple syringes of injectable medication which were either unlabelled or insufficiently labelled. The bag also contained vials of multiple different injectable medications. The interior surfaces of the bag did not appear to be clean and elastic material within this bag did not facilitate effective cleaning. 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.[21] This practice should be risk assessed and consideration should be given to the introduction of commercially available single dose prefilled syringes or compounding of medications 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.

Surgical ward

Staff spoken with were able to describe recommended practice in relation to giving injections safely.

The medication preparation area identified to inspectors by staff was not designated for medication preparation only. Items not required for medication preparation were stored in this space and staff were observed using this work surface to update paperwork. There should be a clearly designated and sufficient space for medication preparation and this area should be kept clean and free of items not required for medication preparation.

Procedure trays with integrated sharps containers were stacked in the medication preparation area; these should be stored singly on a stable surface to avoid accidental sharps injury to staff. Some of these trays contained a small stock of

sterile supplies such as cotton wool balls and lancets. Only supplies required for a single procedure should be taken to the point of care and procedure trays should be emptied of supplies after each use to facilitate cleaning after each use.

2.6.3 Other measures to prevent the transmission of infection

Hand hygiene

University Hospital Cork participated in national hand hygiene audits, results of which are published twice a year. The hospital achieved 90% hand hygiene compliance in May 2017 which was in line with the HSE's desirable target of 90% hand hygiene compliance among staff.

Monthly hand hygiene audits in the General Intensive Care Unit showed that staff in this area achieved an average of 77% hand hygiene compliance between January and June 2017 which was below the desirable target of 90%. This requires targeted improvement.

Monthly hand hygiene audits in the surgical ward showed that staff in this area achieved 80-86% compliance between April and June 2017 which was also below the desirable target of 90%. Records reviewed by inspectors showed that 100% of relevant staff in the ward were up to date with hand hygiene training at the time of inspection.

Outbreak management

Outbreaks of infection at the hospital were documented in the 2016 infection prevention and control report reviewed by inspectors which stated that clusters of infections among patients were managed routinely. Detailed outbreak reports were not produced in respect of larger outbreaks of infection resulting in service disruption and this was attributed to a lack of resources within the Infection Prevention and Control Team. National Standards recommend that a report outlining the outcome of an investigation of an outbreak is presented to senior management, with feedback of outbreak control learning points provided to staff to identify any areas for improvement. The Infection Prevention and Control Team at the hospital should be sufficiently supported and resourced to facilitate this work to enable shared learning across the hospital.

Prevention of water-borne infection

Similar to the findings of the 2016 HIQA unannounced inspection against the National Standards, a site risk assessment for legionella had not been completed at the time of this inspection.8 Inspectors were informed that a formal independent legionella risk assessment had been commenced at the hospital on 12 June 2017 and that schematic drawings would be produced in conjunction with the risk

assessment. Protracted delays in completion of this risk assessment were attributed by hospital management to tender and procurement issues.

Hospital management informed inspectors that measures in relation to legionella prevention were implemented on a continual basis and these included:

- water temperature monitoring
- water tank cleaning
- automatic and manual flushing of water outlets
- cleaning and chlorination of shower heads
- flushing of the cold water supply to the renal dialysis unit water processing system.

Inspectors were informed, however, that one of the main water storage tanks in the hospital had not be cleaned for some time because of practical difficulties that could be experienced if the tank were to be emptied. This arrangement requires a risk assessment and review.

Hospital management reported that routine water testing for legionella bacteria had not been carried out at the hospital for a number of years but that testing of water samples for legionella bacteria would commence in September 2017 as indicated in the pending risk assessment report.

The hospital did not have a formalised structure to oversee water monitoring across the hospital at the time of inspection, inspectors were informed that hospital management was in the process of establishing an environmental monitoring committee. Again this highlights deficiencies at the hospital in respect of oversight and monitoring arrangements in relation the prevention and control of healthcare-associated infection.

National guidelines recommend that a legionella risk assessment is performed, reviewed on an annual basis and independently audited every two years. The hospital needs to fully re-evaluate and improve upon its approach to the management of legionella prevention to date in line with Irish national guidelines and legislation. Risks identified in the completed risk assessment report should be addressed within recommended timeframes and the hospital should be sufficiently resourced to do this.

2.7 Quality improvement initiatives

Hospital management were asked to provide inspectors with information about any quality improvement initiatives or new measures that had been implemented in relation to the prevention and control of infection at the hospital. Efforts to enhance the prevention and control of healthcare-associated infection at the hospital included the following initiative:

- The hospital was planning to trial an initiative to improve care of patients with an indwelling urinary catheter as such devices are associated with an increased risk of catheter-associated urinary tract infection. The initiative included plans to provide a 'urinary catheter passport' which had been developed by both community and hospital-based specialists to patients with these devices. The passport was designed to facilitate delivery of consistent evidence-based care and to support the transition of patients from hospital to the community.

2.8 Progress since the previous HIQA inspection

Hospital management had developed quality improvement plans in relation to the prevention and control of healthcare-associated infection and hygiene following the last HIQA inspection in 2015. Documentation reviewed by inspectors showed that improvement measures implemented at the hospital included the following:

- achievement of overall staff hand hygiene compliance of 90% and development of a hospital hand hygiene improvement strategy
- formation of a hygiene quality improvement team to fully review and improve hygiene standards and related monitoring arrangements at the hospital
- ongoing review of housekeeping staff job descriptions and of dual cleaning and catering roles
- purchase of new equipment
- provision of additional staff education in respect of prevention and control of healthcare-associated infection
- formal training of staff to perform hygiene audits
- weekly management hygiene audits in departments and clinical areas across the hospital
- staff education and competency assessment for housekeeping staff
- review of aspergillosis control measures and education for patients and staff
- implementation of care bundles and related training and audit
- inspectors were informed that plans were in place to implement a new operating theatre audit tool with a defined process to address any deficiencies identified.

In addition, hospital management had implemented a revised environmental hygiene audit tool in 2016. A process had been implemented whereby managers in poorer performing areas audited were required to develop a quality improvement plan to identify specific issues requiring improvement within specified timeframes. Inspectors were informed that local area managers were invited to present these quality improvement plans at meetings of the Hygiene Quality Improvement Team in 2016. This was part of a wider project hospital management overseen by hospital management to improve the standard of hospital hygiene.

Hospital management informed inspectors that infrastructural improvements had been carried out in a number of clinical areas at the hospital since the last inspection.

3. Conclusion

Overall, Inspectors found that Cork University Hospital did not have effective governance arrangements for the prevention and control of healthcare-associated infection. HIQA identified a number of gaps in the provision of the infection prevention and control service which were of concern given the size of the hospital and the complexity of services provided. Specifically, deficiencies were identified by hospital management in respect of consultant microbiologist resources and by the Infection Prevention and Control Team in respect of infection control nurse staffing levels. Reporting and monitoring arrangements at executive management level described in this report did not provide assurance of clear effective oversight of the prevention and control of healthcare-associated infection which is required in a large tertiary referral hospital.

Poor practice identified during this inspection in relation to the management of medication for injection needs to be addressed as a priority. The need to modernise the infrastructure of general intensive care facilities at the hospital needs to be addressed in the site development plan.

Notwithstanding the identified areas for improvement found during this inspection, inspectors found that the hospital achieved 90% hand hygiene compliance in the National hand hygiene audit May 2017 which was in line with the HSE's desirable target of 90% hand hygiene compliance among staff. Overall, environmental surfaces and patient equipment in the two clinical areas inspected were visibly clean with few exceptions. Work was in progress to improve the hospital infrastructure which included plans to build a new radiation oncology centre. The hospital built a new Cardiac Renal Centre in 2010.

From here, it is recommended that efforts to advance the infection prevention and control programme at the hospital be expedited. These efforts should include a benchmarking exercise, to compare both the level of infection prevention and control team staffing, and the overall effectiveness of the programme, relative to other comparable hospitals both in an Irish context and in line with best practice guidelines. Improvement in the delivery of an effective infection prevention and control programme at the hospital will require improved leadership, governance and management both at senior management level, and within the infection prevention and control team.

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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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