



**Health
Information
and Quality
Authority**

An tÚdarás Um Fhaisnéis
agus Cáilíocht Sláinte

Report of the unannounced inspection of University Hospital Limerick

Monitoring programme against the *National Standards for the prevention and control of healthcare-associated infections in acute healthcare services* during the COVID-19 pandemic

Date of inspection: 29 October 2020

About the Health Information and Quality Authority (HIQA)

The Health Information and Quality Authority (HIQA) is an independent statutory authority established to promote safety and quality in the provision of health and social care services for the benefit of the health and welfare of the public.

HIQA's mandate to date extends across a wide range of public, private and voluntary sector services. Reporting to the Minister for Health and engaging with the Minister for Children, Equality, Disability, Integration and Youth, HIQA has responsibility for the following:

- **Setting standards for health and social care services** — Developing person-centred standards and guidance, based on evidence and international best practice, for health and social care services in Ireland.
- **Regulating social care services** — The Chief Inspector within HIQA is responsible for registering and inspecting residential services for older people and people with a disability, and children's special care units.
- **Regulating health services** — Regulating medical exposure to ionising radiation.
- **Monitoring services** — Monitoring the safety and quality of health services and children's social services, and investigating as necessary serious concerns about the health and welfare of people who use these services.
- **Health technology assessment** — Evaluating the clinical and cost-effectiveness of health programmes, policies, medicines, medical equipment, diagnostic and surgical techniques, health promotion and protection activities, and providing advice to enable the best use of resources and the best outcomes for people who use our health service.
- **Health information** — Advising on the efficient and secure collection and sharing of health information, setting standards, evaluating information resources and publishing information on the delivery and performance of Ireland's health and social care services.
- **National Care Experience Programme** — Carrying out national service-user experience surveys across a range of health services, in conjunction with the Department of Health and the HSE.

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1.0 Information about this monitoring programme

Under the Health Act 2007, Section 8(1) (c) confers the Health Information and Quality Authority (HIQA) with statutory responsibility for monitoring the quality and safety of healthcare among other functions. In light of the ongoing COVID-19 pandemic, HIQA has developed a monitoring programme to assess compliance against the *National Standards for the prevention and control of healthcare-associated infections in acute healthcare services*¹ during the COVID-19 pandemic.

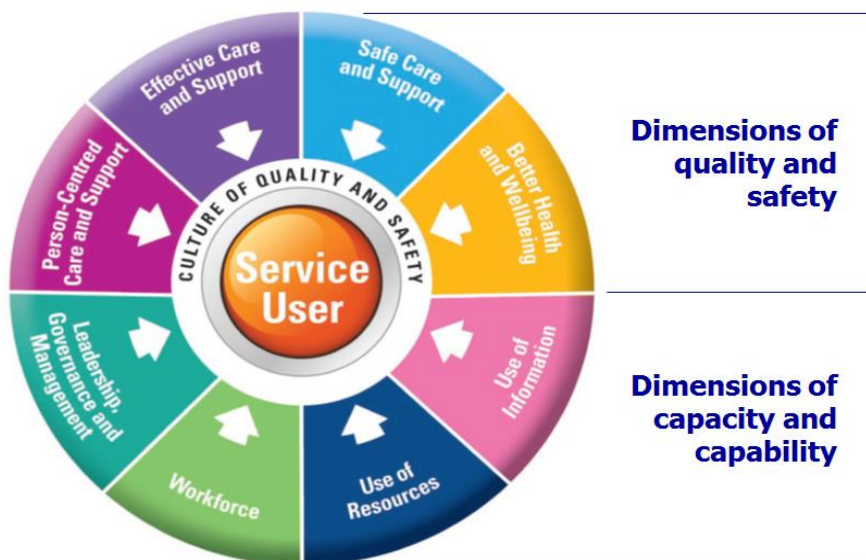
The national standards provide a framework for service providers to assess and improve the service they provide particularly during an outbreak of infection including COVID-19.

Inspection findings are grouped under the National Standards dimensions of:

1. Quality and safety
2. Capacity and capability

Under each of these dimensions, the standards* are organised for ease of reporting.

Figure 1: National Standards for infection prevention and control in acute healthcare services



* National Standards for the prevention and control of healthcare-associated infections in acute healthcare services

Report structure

The lines of enquiry for this monitoring programme of infection prevention and control in acute healthcare services will focus on six specific national standards within four of the eight themes of the standards, spanning both the capacity and capability and quality and safety dimensions.

This monitoring programme assesses acute healthcare services' **capacity and capability** through the following standards:

| Capacity and Capability | |
|---|---|
| Theme | Standard |
| 5: Leadership, Governance and Management | Standard 5.3: Service providers have formalised governance arrangements in place to ensure the delivery of safe and effective infection prevention and control across the service. |
| 6: Workforce | Standard 6.1: Service providers plan, organise and manage their workforce to meet the services' infection prevention and control needs. |

HIQA also assesses Acute Healthcare Services' provision under the dimensions of **quality and safety** through the following standards:

| Quality and Safety | |
|--|---|
| Theme | Standard |
| 2: Effective Care & Support | <p>Standard 2.6: Healthcare is provided in a clean and safe physical environment that minimises the risk of transmitting a healthcare-associated infection.</p> <p>Standard 2.7 Equipment is cleaned and maintained to minimise the risk of transmitting a healthcare-associated infection.</p> |
| 3: Safe Care and Support | <p>Standard 3.1. Service providers integrate risk management practices into daily work routine to improve the prevention and control of healthcare-associated infections.</p> <p>Standard 3.8 Services have a system in place to manage and control infection outbreaks in a timely and effective manner.</p> |

Judgment Descriptors

The inspection team have used an assessment judgment framework to guide them in assessing and judging a service’s compliance with the national standards. The assessment judgment framework guides service providers in their preparation for inspection and support inspectors to gather evidence when monitoring or assessing a service and to make judgments on compliance.

Following a review of the evidence gathered during the inspection a judgment has been made on how the service performed. The following judgment descriptors have been used:

| Compliant | Substantially compliant | Partially compliant | Non-compliant |
|--|--|--|---|
| A judgment of compliant means that on the basis of this inspection, the service is in compliance with the relevant national standards. | A judgment of substantially compliant means that the service met most of the requirements of the National Standards but some action is required to be fully compliant. | A judgment of partially compliant means that the service met some of the requirements of the relevant National Standard while other requirements were not met. These deficiencies, while not currently presenting significant risks, may present moderate risks which could lead to significant risks for patients over time if not addressed. | A judgment of non-compliant means that this inspection of the service has identified one or more findings which indicate that the relevant standard has not been met, and that this deficiency is such that it represents a significant risk to patients. |

1.1 Hospital Profile

The University Limerick Hospitals Group comprises University Hospital Limerick, University Maternity Hospital Limerick, Nenagh Hospital, Ennis Hospital, Croom Hospital and St. John's Hospital. The six sites function as a single hospital system. Services are delivered across the six sites under the leadership of four clinical directorates, namely: Medicine Directorate; Peri-operative Directorate; Diagnostics Directorate and Maternal and Child Health Directorate.

University Hospital Limerick is the Model 4 hospital[†] for the region providing major surgery, cancer treatment and care, emergency department services, as well as a range of other medical, diagnostic and therapy services.

1.2 Information about this inspection

This inspection report was completed following an unannounced inspection carried out by Authorised Persons, HIQA; Kathryn Hanly, Bairbre Moynihan and Kay Sugrue on 29 October 2020 between 09:00 hrs. and 15:50 hrs.

HIQA's focus during this inspection included a detailed evaluation of how, on the day of the inspection, University Hospital Limerick had acted to minimise the spread of healthcare-associated infections; with a particular focus on systems to prevent, detect and manage COVID-19. HIQA noted that the hospital had experienced a COVID-19 outbreak in August 2020. This report presents the findings on the day of inspection, inclusive of how outbreaks of infection were managed.

Inspectors spoke with hospital managers, staff, representatives from the Infection Prevention and Control Committee and patients. Inspectors also requested and reviewed documentation, data and observed the clinical environment in a sample of clinical areas which included:

- Trauma Ward (Orthopaedic Ward - non COVID-19 pathway)
- Cystic Fibrosis (CF) Unit (the designated COVID-19 isolation ward).

In addition, inspectors conducted a walkthrough of the emergency department and the Acute Medical Assessment Unit.

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

[†] Model 4 Hospital: Admits undifferentiated acute medical patients including tertiary referred patients. Level 4 Hospitals have a category 3 or 3S ICU on site, a Medical Assessment Unit which is open on a continuous basis (24 hours, every day of the year) and an ED, including a CDU on site.

2.0 Inspection Findings

The following sections present the general findings of this unannounced inspection.

- Section 2.1 Capacity and Capability
- Section 2.2 Quality and Safety

2.1 Capacity and Capability

This section describes arrangements for the leadership, governance and management of the service at this hospital, and HIQA's evaluation of how effective these were in ensuring that a high quality safe service was being provided. It includes how the service provider is assured that there are effective governance structures and oversight arrangements in place for clear accountability, decision-making, risk management and performance assurance. This includes how responsibility and accountability for infection prevention and control is integrated at all levels of the service. This is underpinned by effective communication among staff. Inspectors also reviewed how service providers plan, manage and organise their workforce to ensure enough staff are available at the right time with the right skills and expertise and have the necessary resources to meet the service's infection prevention and control needs.

Theme 5: Leadership, Governance and Management

Standard 5.3: Service providers have formalised governance arrangements in place to ensure the delivery of safe and effective infection prevention and control across the service.

Judgment Standard 5.3: Compliant

Corporate and Clinical Governance

Inspectors found that there were clear lines of accountability and responsibility in relation to the prevention and control of healthcare-associated infection at the hospital.

The Infection Prevention and Control Committee at University Hospital Limerick was established and functioned at University of Limerick Hospitals Group level and was ultimately accountable to the Chief Executive Officer (CEO) of the hospital who was also the Chief Executive Officer of University of Limerick Hospitals Group. St John's Hospital in Limerick, did not come under the overarching infection prevention and control governance arrangements which were applicable to the remaining five hospitals within Hospitals Group (University Hospital Limerick, University Maternity Hospital Limerick, Nenagh Hospital, Croom Hospital and Ennis Hospital).

The Infection Prevention and Control Committee reported to the Quality and Safety Executive Committee (QUALSEC) who in turn reported to the group Executive Management Team. (Appendix 1) These committees also functioned at University of Limerick Hospitals Group level.

Good governance and managerial support are crucial to support outbreak management. The hospital had appointed a Consultant in Infectious Diseases as the clinical lead for COVID-19. A University of Limerick Hospitals Group, COVID-19 Hospital Management Team was established at the onset of the pandemic (Appendix 2). The COVID-19 Hospital Management Team was chaired by the CEO. Membership of the COVID-19 Hospital Management Team included representation from senior hospital management, clinical leads from each directorate, nurse managers, infection prevention and control nurses and consultant microbiologists. Collectively this group was responsible for capacity and capability planning, workforce planning, equipment and supplies, clinical and non-clinical services, risk management and communications and business continuity planning. The team had also identified local care pathways for COVID-19 and non-COVID-19 service delivery and these pathways were clearly communicated within the hospital. Minutes from meetings of the COVID-19 Hospital Management Team held in October 2020, showed that the team had comprehensive oversight of all COVID-19 related issues and day-to-day operations across the hospital group.

Individualised COVID-19 continuity plans were developed by each directorate. Plans were responsive to both low prevalence scenarios, with low numbers of COVID-19 presentations and to higher prevalence scenarios, with higher numbers of COVID-19 presentations at the hospital.

A HSE Area Crisis Management Team was also established in response to the COVID-19 pandemic and this included representatives from University Hospital Limerick. A review of this committee was outside the scope of this inspection. However, the formation of this committee demonstrated a coordinated approach to the management of COVID-19 in the region.

Overall, discussions with staff indicated general satisfaction with the governance structures that had been implemented in response to COVID-19. Staff articulated that they felt supported by hospital management and that the pathways for streaming[‡] patients into COVID-19 and non-COVID-19 services were clear.

COVID-19 preparedness and outbreak management will be further discussed in section 2.2 of this report.

Emergency Department and Hospital Capacity

[‡] Streaming is a hands off assessment that involves asking what the presenting complaint is and identifying risk factors for COVID-19. The outcome dictates which zone or service the patient moves to.

Overcrowding at University Hospital Limerick, including in the emergency department has been identified as an ongoing challenge for the hospital and an area of concern for HIQA in recent years. Overcrowding in hospitals has been shown to increase the risk of spreading infection² and is of particular concern in the context of possible future additional demands posed by the pandemic at the hospital over the coming winter months.

A contributing factor for hospital overcrowding was deemed to be the insufficient inpatient bed capacity at the hospital and in the wider region.³ Significant efforts had been employed to increase inpatient bed capacity to help alleviate overcrowding and in response to the COVID-19 pandemic. For example the University of Limerick Hospitals Group had established an intermediate care facility in June 2020. This facility operated as a fully-equipped Model One hospital[§], and provided care for patients who were ready to be discharged from the acute hospitals in the hospital group, but who need extra recovery or rehabilitation time before going home or being transferred to a nursing home. The temporary 68-bed facility, with capacity to scale up to 84 beds, was located in the University of Limerick Sports Arena. The intermediate care facility had recently closed after almost five months of providing multidisciplinary step-down rehabilitative care to a total of 187 non-Covid-19 patients.

Inspectors were informed that staff members had been reassigned from the intermediate care facility to support the phased opening of additional bed capacity within University Hospital Limerick with 98 new beds due to be operational by January 2021. This included;

- 14 single rooms with en suite bathroom facilities in a new two-storey block. This was “rapid build construction” developed as part of the Government’s national action plan for the COVID-19 pandemic.
- 24 single rooms in a new haematology/oncology block.
- 60 single rooms in a new inpatient block. The new block had three wards each comprising 20 single rooms with en suite bathroom facilities. Two of these wards were to be allocated as isolation facilities for patients being cared for with transmission-based precautions.

The hospital had activated their escalation policy in response to the increased number of patients in the emergency department on the day of inspection. HIQA has previously raised concerns about the practice of boarding extra patients on trolleys on corridors during periods of escalation. During this inspection, inspectors were

[§] Model 1 hospital: A community/district hospital, with sub-acute in-patient beds. Patients with rehabilitation, respite and/ or non-complex palliative care needs and patients who remain under the care of GPs may be admitted appropriately to in-patient beds in this hospital. These patients will be managed under the care of a medical officer (e.g. a designated GP or groups of GPs) who will be supported as necessary by consultant physicians. This hospital will not have an ED, ICU, high dependency unit (HDU), coronary care unit (CCU), or an AMU/AMAU/MAU.

informed by management that a decision had been made at the onset of the COVID-19 pandemic that additional patients were not to be accommodated on trolleys in inpatient wards while awaiting an inpatient bed.

Findings from the emergency department will be further discussed in section 2.2 of this report.

Antimicrobial Stewardship Programme

The hospital had a well-established antimicrobial stewardship programme. The programme was co-ordinated by a multi-disciplinary antimicrobial stewardship team. The national antibiotic care bundle** was used to monitor the quality of antimicrobial prescribing. Quarterly performance updates in relation to antimicrobial stewardship were reported through established infection prevention and control governance structures. The antimicrobial pharmacist was a member of the hospital's infection prevention and control committee and attended outbreak control team meetings, as required.

Monitoring, Audit and Quality Assurance Arrangements

The hospital's infection prevention and control surveillance programme included surveillance of 'alert' organisms^{††}, 'alert' conditions^{‡‡} and Notifiable Diseases.⁴ In addition, the Executive Management Team provided further assurance of the quality and safety of services at the hospital to the HSE and the general public through the reporting of nationally mandated key performance indicators against the 2020 HSE service plan targets.⁵

Surveillance scientists compiled comprehensive quarterly surveillance and analysis reports for healthcare associated infections and epidemiologically significant organisms. This data was presented to the Infection Prevention and Control Committee and to the Directorate Management Teams.

Infection control surveillance software was used by the infection prevention and control team. This system provided a seamless surveillance system for tracking patients with alert organisms. In the context of COVID-19, it provided real time data of patients with positive and suspected COVID-19 as well as contacts of confirmed cases.

** Care bundles which are a collection of high impact evidence-based interventions, have been shown to be an effective way to ensure the effective and consistent delivery of high quality medical care. The RCPI (Royal College of Physicians of Ireland) Hospital Antibiotic Stewardship Working Group has developed a care bundle to define the key elements required for safe and effective antibiotic prescribing in hospital settings. This care bundle is called the "Start Smart, then focus" care bundle which has been adapted from a care bundle developed by the UK Department of Health, and has been endorsed by RCPI and RCSI (Royal College of Surgeons of Ireland).

†† Alert organisms are identified in the microbiology laboratory and include organisms such as Carbapenemase-Producing *Enterobacteriales* (CPE) and other antibiotic resistant organisms.

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

Assurance as to the effectiveness of the infection prevention and control systems and processes were provided through audit and monitoring of multiple elements of the infection prevention and control programme. These included but were not limited to the following:

- Monthly environmental and equipment hygiene audits were co-ordinated by the hygiene services department and included participation from departmental staff and the infection prevention and control team. Results from these audits were tracked and trended, which was good practice and facilitated the identification of areas for improvement. Where areas failed to achieve 90% compliance a quality improvement plan was developed. Inspectors noted that wards 3A and 3D had failed to meet the 90% compliance target in environmental hygiene audits throughout 2020. This was a particular concern given that both areas had experienced a number of outbreaks during 2020.
- Audits of donning and doffing personal protective equipment (PPE) were undertaken by the infection prevention and control team since the onset of the COVID-19 pandemic.
- Carbapenemase-Producing *Enterobacteriales*^{§§} (CPE) screening audits monitored compliance with the hospital's screening for CPE guidelines. The results indicated that compliance with screening targets varied with few wards achieving 100% compliance.
- Care bundles^{***} audits, including peripheral venous catheter, central venous catheter, peripherally inserted central venous catheter, urinary catheter and *Clostridioides difficile* infection bundles were completed at ward level to assist in the prevention of healthcare associated infections.
- Audits of compliance with Aspergillus⁺⁺⁺ control measures⁶ were carried out for all on-going construction work.
- Quarterly hand hygiene audits were undertaken in all areas (more frequently depending on outbreak status or audit results). The hospital also participated in national hand hygiene audits, the results of which are published twice a year. The hospital's overall compliance in the national hand hygiene audits completed in 2019 were above the HSE's national target of 90%.

Policies, Procedures and Guidelines

^{§§} Carbapenemase-Producing *Enterobacteriaceae* (CPE), are a family of bacteria which can cause infections that are difficult to treat because they are resistant to most antimicrobials, including a class of antimicrobials called carbapenems which have typically been used as a reliable last line treatment option for serious infection. Bloodstream infection with CPE has resulted in patient death in 50% of cases in some published studies internationally.

^{***} A care bundle consists of a number of evidence based practices which when consistently implemented together reduce the risk of device related infection.

⁺⁺⁺ Healthcare-associated invasive aspergillosis is an infection that can be potentially life threatening in patients with impaired immune systems. It is caused by fungal spores that may be transmitted in dust created by excavation and building work.

The hospital had a suite of infection prevention and control guidelines which covered aspects of standard precautions, transmission-based precautions and outbreak management. In addition, inspectors were provided with a number of COVID-19 plans developed by directorates to support and guide staff on the management of scheduled and unscheduled patient care during the pandemic.

Up-to-date guidelines and COVID-19 information was made available to staff in electronic format on computer desktops via the "iHub".

Influenza Vaccination

Uptake rates for influenza vaccine amongst hospital staff in the 2019/2020 influenza season was 40%. This was considerably below the national uptake target of 60%.⁷

It has been acknowledged that the health system and wider society should prepare for the potential for co-epidemics of COVID-19 and seasonal influenza in 2020/2021.⁸

A Flu Committee was established in the hospital to implement and oversee the influenza vaccination programme with the aim of significantly improving the uptake in line with the 2020 national target of 75%.⁵

Vaccinations were administered by a team of peer vaccinators. However, supply chain issues had resulted in the delay in facilitating recent vaccine clinics. A review of documentation by inspectors indicated that these issues had been resolved with further clinics due to run from 03 November 2020.

Quality Improvement Plan (QIP)

Inspectors reviewed the quality improvement plan developed following HIQA's unannounced inspection in July 2019. Progress had been made in addressing the findings of the 2019 inspection.⁹ Twenty of the 32 actions identified in the plan had been completed and work was in progress to complete the remaining 12 actions. This included extensive refurbishment of Ward 3A where during the 2019 inspection, inspectors had identified that improvements were required in the general infrastructure and maintenance.

Notwithstanding the additional bed capacity due to be operational by January 2021, a significant portion of University Hospital Limerick comprised of older wards with nightingale-style^{***} rooms. The design and layout of these rooms did not facilitate the effective prevention of healthcare-associated infection and were not in line with recommended guidelines.^{10,11} Inspectors were informed that capital funding was

^{***} A nightingale-style room consists of one long ward with a large number of beds arranged along the sides, without subdivision of the room into bays. From an infection prevention and control perspective, the higher number of patients accommodated in nightingale wards increases the risk of infection transmission, especially if beds are spaced too close together.

required to upgrade the older hospital infrastructure including the remaining nightingale-style rooms. A business case had been submitted to the HSE and funding had been secured for some remedial works. Inspectors were informed that works were prioritised to areas with a high prevalence of healthcare associated infections. However, a timeline for the completion of remedial works was not available on the day of inspection.

Theme 6: Workforce

Standard 6.1: Service providers plan, organise and manage their workforce to meet the services' infection prevention and control needs.

Judgment Standard 6.1: Substantially compliant

Improvements were required in the uptake of mandatory infection prevention and control training.

The infection prevention and control service was overseen by the infection prevention and control team. The team advised on all aspects of infection prevention and control, performed surveillance of alert organisms and delivered education to all grades of staff. The infection prevention and control team provided service to five of the six hospitals in University of Limerick Hospitals Group namely: University Hospital Limerick, University Maternity Hospital Limerick, Ennis Hospital, Nenagh Hospital and Croom Hospital.

Infection prevention and control nurses were allocated to cover the medical, peri-operative and maternal and child directorates within the hospital. In addition two team members had a specific remit and responsibilities for infection prevention and control of CPE across the hospital group.

A third consultant microbiologist had been appointed and was in place since September 2019. Microbiological laboratory support is central to an effective infection prevention and control programme. Inspectors were informed that nine additional laboratory staff positions had been approved to support the additional COVID-19 testing capacity in the hospital.

HIQA acknowledges the hospital's positive progress in relation to improved infection prevention and control team resources in recent years. Hospital management informed inspectors that additional nursing and administrative support had been provided to the infection prevention and control workforce during the COVID-19 pandemic.

The infection prevention and control team comprised;

- three whole time equivalent (WTE)^{§§§} consultant microbiologists
- three WTE microbiology non-consultant hospital doctors (NCHDs)
- 12.5 WTE infection control nurses (this complement was inclusive of two vacant infection prevention and control nursing posts and 2.5 WTE newly approved infection prevention and control nursing posts)
- five WTE antimicrobial pharmacists
- three WTE surveillance scientists (this is inclusive of 1 approved post not in position)
- one WTE specialist scientist for CPE
- 3.5 WTE administrative support.

Occupational health supports were provided regionally. In addition there was one WTE Consultant in Infectious Diseases and nine WTE Infectious Diseases NCHDs.

Infection Prevention and Control Education

The infection prevention and control team provided a range of both formal and informal ongoing educational sessions to staff on infection prevention and control procedures and practices.

Hand hygiene training was mandatory and was completed during orientation and annually thereafter for all clinical staff and staff who may have contact with patients. At the time of the inspection, 64% of relevant staff had attended hand hygiene training in University of Limerick Hospital within the previous year. This low uptake is a concern and should be addressed by management at the hospital.

Additional training in COVID-19 and standard and transmission based precautions including the appropriate use of PPE had been provided by the infection prevention and control team. Overall, 2,471 PPE training episodes had been delivered at the hospital since the onset of the COVID-19 pandemic. However, records reviewed indicated that only 195 staff members had attended standard precautions training and three staff had attended transmission based precautions training in 2020.

Fit testing^{****} FFP2 facemasks^{††††} to avoid COVID-19 transmission was provided to all clinical staff likely to undertake procedures that involve or may involve the generation of aerosols (aerosol generating procedures (APGs)) within the emergency department and intensive care unit.

^{§§§} 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.

^{****} Tight-fitting facemasks rely on having a good seal with the wearer's face. In order to be effective the mask must fit tightly to the wearers face, fit testing should be undertaken by a trained professional.

^{††††} An FFP2 facemask is recommended for patients with respiratory symptoms or suspected or confirmed COVID-19 who require an aerosol generating procedure.

2.2 Quality and Safety

This section looks at how acute healthcare services ensure that infection prevention and control outbreak/s including COVID-19, are managed to protect people using the healthcare service. This includes how the services identify any work practice, equipment and environmental risks and put in place protective measures to address the risk, particularly during a pandemic.

It also focuses on how these services ensure that staff adhere to infection prevention control best practice and antimicrobial stewardship to achieve best possible outcomes for people during the ongoing COVID-19 pandemic.

Theme 2: Effective Care and Support

Standard 2.6: Healthcare is provided in a clean and safe physical environment that minimises the risk of transmitting a healthcare-associated infection.

Judgment Standard 2.6: Partially compliant

A number of concerns relating to infrastructural and maintenance issues were identified by HIQA in the Trauma ward. The infrastructural issues, which include but are not limited to the inherent design of the ward inclusive of large multi-occupancy rooms, were acknowledged by hospital managers and were included on the corporate risk register. Furthermore management outlined and HIQA observed a number of controls in place to address risks presented by this ward environment. On the day of the inspection, HIQA determined that best efforts were being made to manage risks presented by this infrastructural arrangement. However in the absence of alternate accommodation, and in the context of constrained bed capacity at hospital, HIQA identified that it would likely be difficult for the hospital to fully mitigate risks presented by COVID-19 in this ward given the inherent arrangement of the ward environment. Ongoing efforts to both maintain optimal infection control practices in the unit, allied to ongoing and dynamic risk assessment will be needed to reduce risks for patients in a ward environment such as this as the pandemic continues.

The Trauma Ward and CF Unit were assessed by inspectors. In addition, inspectors conducted a walkthrough of the emergency department.

Transmission-based precautions were applied to patients suspected or confirmed to be infected with agents transmitted by the contact and droplet routes in line with national guidelines.¹² Personal protective equipment was readily available outside isolation rooms and appropriate signage was visible on the doors of isolation rooms.

Emergency Department Environment and Infrastructure

The new emergency department at University Hospital Limerick opened in 2017. The department was built to a modern specification with surfaces, finishes and furnishings that readily facilitated effective cleaning. The department comprised four triage rooms and 49 single treatment rooms within four zones.

National guidelines recommended¹³ that patients presenting to the emergency department undergo a formal COVID-19 risk assessment conducted by a senior decision maker⁺⁺⁺ in a single task streaming area (navigation hub) and be subsequently allocated to either the COVID-19 or non-COVID-19 pathways. Post streaming at the navigation hub, a more formal Manchester Triage process^{§§§§} may be undertaken in the triage areas, as required.

Inspectors were informed that on arrival to the emergency department that all patients checked in at reception and waited to be called for triage and subsequent streaming. Patients were required to wear a surgical mask in the waiting room. Waiting areas allowed for minimum physical spacing (1m+).¹⁰ However, the waiting area and public toilets within the emergency department had not been divided into COVID or non-COVID-19 zones as recommended in national guidelines.¹³ This should be reviewed to minimise the risk of COVID-19 cross transmission within waiting areas.

Patients were triaged from the waiting room by nursing staff to determine their COVID status and clinical acuity. Hospital protocols indicated that the triage and streaming was supported by a senior clinical decision maker. A structured COVID-19 risk assessment administered at triage facilitated the streaming of patients into COVID-19 and non-COVID-19 patient pathways. However, the delay in streaming posed a potential weakness in the process for early identification of suspected and positive cases of COVID-19 and should be addressed in line with HSE guidelines¹³ following this inspection. This issue was highlighted to management at the close out of the onsite inspection.

The 49 treatment rooms within the emergency department were divided into four zones;

- Zone A: non-COVID-19 pathway/COVID-19 not clinically suspected
- Zone B: COVID-19 pathway/at risk of COVID-19

⁺⁺⁺ Senior decision makers are defined here as those who have undergone appropriate training to make independent decisions around patient admission and discharge: Registrar grade and above or Advance Nurse Practitioner.

^{§§§§} The Manchester Triage System is a clinical risk management tool used by clinicians worldwide to enable them to allocate patients into one of five categories of urgency ranging from needing immediate resuscitation (category one – triage and treatment are simultaneous) to non-urgent from a clinical perspective (category five).

- Zone C : COVID-19 pathway/at risk of COVID-19
- Zone D: COVID-19 pathway/at risk of COVID-19.

Medical and nursing staff were, as far as possible, allocated to work in particular COVID-19 or non-COVID-19 zones. Non-COVID patients were streamed from triage to the Medical and Surgical Assessment Units.

On the day of inspection inspectors were informed that 34 patients within the emergency department had been admitted and were awaiting transfer to an inpatient bed at the hospital. Due to overcrowding, eleven of these patients were accommodated on trolleys in corridors of the department. Physical distancing was maintained between these trolleys in line with national guidelines.¹⁰

However, it was reported by management that compliance with physical distancing had been challenging during recent periods of overcrowding in the emergency department. While accepting that the hospital was in a state of transition in terms of increased capacity, it is necessary following this inspection that the potential for crowding within the emergency department continue to be closely monitored and effectively managed by the hospital, hospital group and national HSE.

Cystic Fibrosis (CF) Unit

The CF unit comprised of nine single rooms with en suite bathroom facilities. The unit had been designated as an isolation unit for COVID-19 patients. The unit had not been used to accommodate cystic fibrosis inpatients during the COVID-19 pandemic. Arrangements were in place for cystic fibrosis patients to attend a virtual clinic fortnightly. Essential outpatient visits were facilitated in the adjacent outpatient's clinic. A plan was in place to relocate the COVID-19 isolation unit to the new two-storey 14 bedded block.

The unit had been built to a modern specification with surfaces, finishes and furnishings that readily facilitated effective cleaning. Overall, on the day of inspection the general environment in the unit was visibly clean.

There was a lack of storage space in the unit resulting in the inappropriate storage of equipment and supplies. For example, the office area used by nursing staff was also used for the storage of clinical supplies and equipment. Milk and butter was inappropriately stored in a medication fridge in the clean utility room. Failure to appropriately segregate functional areas poses a risk of cross contamination and requires review.

There was no designated cleaner's room on the unit. The cleaning trolley and supplies used on the unit were stored in the adjacent outpatients department. Furthermore it was reported to inspectors that the same cleaner cleaned both areas. To reduce the risk of cross contamination, equipment used in the cleaning and disinfection of the isolation area should be stored separately to equipment used in other areas of the hospital.

Trauma Orthopaedic Ward

The 29-bedded surgical ward comprised:

- a 14-bedded nightingale-style room
- a six-bedded multi-occupancy room
- three two bedded rooms
- three single rooms with ensuite bathroom facilities.

The infrastructure of Trauma Ward was not optimal from an infection prevention and control perspective. Inspectors identified a lack of isolation facilities, a nightingale-style room, lack of appropriate/functioning hand washing sinks and insufficient ancillary rooms to facilitate the storage and management of equipment, linen and supplies. Infrastructural issues were acknowledged by hospital managers and were included on the corporate risk register.

Inspectors identified that notwithstanding efforts made to ensure that required physical distancing between patients could be maintained, in the six-bedded multi-occupancy room, the potential to maintain such distancing while conducting all aspects of patient care and rehabilitation could likely provide difficult to sustain.¹⁰ Following this inspection, it is recommended that a risk assessment is undertaken to ensure physical distancing can be safely maintained and staff are able to attend to one patient without impinging on the bed space or equipment of a neighbouring patient.

The hospital did not have adequate single room facilities to effectively isolate or segregate all patients being cared for with transmission-based precautions. When faced with a competing need for isolation facilities, staff sought the expertise of the infection prevention and control team regarding isolation prioritisation. On the day of inspection, two patients were isolated with transmission based precautions within a 14 bedded nightingale-style room. Such an approach is not ideal in an acute hospital setting, it would be preferable to accommodate such patients in single rooms. This issue was highlighted to management at the close out of the onsite inspection.

While the ward appeared visibly clean, inspectors observed ward-wide issues related to maintenance. Surfaces and finishes were worn and poorly maintained and as such did not facilitate effective cleaning. This is of particular concern in an orthopaedic trauma ward where patients are at greater risk of surgical site infection.^{14,15}

Discussion with Patients

Patients were complementary in their feedback to inspectors and expressed satisfaction about the standard of environmental hygiene and the care provided within the wards inspected.

Standard 2.7 Equipment is cleaned and maintained to minimise the risk of transmitting a healthcare-associated infection.

Judgment Standard 2.7: Substantially compliant

Staff were not allocated sufficient time to perform routine cleaning duties.

Equipment Hygiene

Overall, equipment in the both areas inspected was generally clean, however there were some exceptions. For example, staining was noted on a commode in Trauma Ward. The unclean commode was of significant importance in the context of reducing the potential for transmission of CPE and *Clostridioides difficile*, and should be a particular focus for improvement.

A green tagging system was in use to identify equipment that had been cleaned. Trauma Ward had achieved 99% compliance in the September 2020 equipment hygiene audit. However, patient equipment cleaning checklists reviewed by inspectors indicated that cleaning had not been consistently performed on Trauma Ward. It was reported to HIQA that staff responsible for cleaning patient equipment were not regularly allocated time to perform routine cleaning due to competing demands such as patient care and other duties. This should be reviewed.

Theme 3: Safe Care and Support

Standard 3.1. Service providers integrate risk management practices into daily work routine to improve the prevention and control of healthcare-associated infections.

Judgment Standard 3.1: Compliant

University Hospital Limerick had systems in place for the proactive identification, assessment, mitigation, monitoring and reporting of infection risks in line with the service's risk management policy.

Risk Management

Risk was a standing agenda item at the Quality and Safety Executive Committee meeting.

Risks identified in clinical areas were addressed at clinical area level or were documented and escalated to directorate level or higher as required. Infection prevention and control risks on directorate risk registers were a standing agenda item at meetings of the infection control committee. Inspectors were informed by management that high risks were escalated in line with HSE risk management

processes.¹⁶ Infection prevention and control risks noted by inspectors on the corporate risk register^{††} included, but were not limited to the following:

- hospital infrastructure
- environmental hygiene
- COVID-19
- non-compliance with HSE performance indicators⁵ for CPE, *Clostridioides difficile* and bacteraemia.

A COVID-19 specific risk register was developed at the onset of the pandemic to enable identification of all risks and to put in place mitigating measures to address these. The COVID-19 risk register was reviewed and open risks were escalated to the corporate risk register.

Incident Reporting

Hospital management informed inspectors that it was hospital policy to report incidents of healthcare-associated infection and non-compliance with infection prevention and control guidelines on the national incident management system (NIMS).^{*****} The number of infection prevention and control incidents reported was tracked on a monthly basis by the Quality and Risk Department.

Standard 3.8 Services have a system in place to manage and control infection outbreaks in a timely and effective manner.

Judgment Standard 3.8: Partially Compliant

While HIQA identified expected systems and processes in place to correctly manage outbreaks, a recent track record of difficulty in managing CPE and *Clostridioides difficile* was noted. This highlighted a requirement to further enhanced these measures in the context of the hospitals underlying infrastructure, occupancy rates and other factors including those posed by the incidence of CPE colonisation in the hospital's catchment population.

Measures to Prevent and Control the Risk of COVID-19

In addition to the governance and leadership measures discussed in section 2.1, the hospital had implemented a range of measures as part of its COVID-19 preparedness plans. These included but were not limited to:

- SARS-CoV-2^{†††††} surveillance testing for all adult non Maternity patients on admission
- onsite SARS-CoV-2 testing for symptomatic staff

^{*****} The State Claims Agency National Incident Management System is a risk management system that enables hospitals to report incidents in accordance with their statutory reporting obligation.

^{†††††} The virus, which causes COVID-19 infection, is called SARS-CoV-2 and belongs to the broad family of viruses known as coronaviruses.

- appropriate use and supply of PPE
- posters displayed on walls throughout the hospital to raise awareness of COVID-19
- extensive infection prevention and control training provided across all staff disciplines
- enhanced staff communication in relation to COVID-19 and infection prevention and control via a dedicated mobile application
- restricted group meetings and social interaction among staff
- visiting restrictions.

One of the central public health measures identified in the response to COVID-19 is the use of testing and tracing to identify cases of infection. The hospital had significantly increased on-site testing capacity and reduced turnaround time for test result availability since the onset of the COVID-19 pandemic.

The majority of on-site testing for SARS- CoV-2 was provided with “batch” tests that generally provided results in either four or eight hours. Limited rapid SARS-CoV-2 testing capability was also made available to assist patient flow in the emergency department. A new purpose-built COVID-19 laboratory, which will boost testing capacity at University Hospital Limerick was under construction at the time of the inspection. Staff redeployment had taken place in order to facilitate local testing and tracing capacity. A dedicated team performed SARS-CoV-2 testing in an on-site testing pod. An on-site contact tracing team had also been established.

COVID-19 Outbreak

An outbreak of COVID-19 occurred on an inpatient ward in August 2020. A total of two confirmed cases were identified (one patient and one staff member). A multidisciplinary outbreak team was convened to advise and oversee the management of the COVID-19 outbreak and the local Public Health Department was informed. The ward was temporarily closed to admissions. Infection prevention and control measures¹² were immediately implemented to effectively manage and contain the outbreak in a timely manner.

Outbreak investigation is one of the key components of outbreak management that feeds into quality care and prevention of disease transmission. The infection prevention and control team prepared an outbreak report at the conclusion of outbreak. The outbreak report identified early detection, rapid contact tracing and implementation of immediate infection control measures as key in containing the outbreak.

The primary objective of incident management is to learn from the incident in order to reduce the risk of recurrence and make care safer for future patients.¹⁷ The

outbreak report included a learning notice⁺⁺⁺⁺ which detailed what happened; how and why it happened; what can be done to reduce the risk of recurrence and make care safer; and, what was learned. Learning notices were brought to the attention of relevant staff by line managers. This was good practice.

CPE Outbreak

The National CPE Public Health Emergency^{§§§§§} declared by the Minister for Health on 25 October 2017 is ongoing. University Hospital Limerick has experienced repeated outbreaks of CPE since 2011.^{*****} Despite the implementation of a number of mitigating measures at the hospital, new cases of hospital-acquired CPE continued to be identified. However, a review of documentation by inspectors indicated that there had been no cases of CPE bloodstream infections detected at the hospital since June 2015.

Multidisciplinary outbreak teams were convened to advise and oversee the management of CPE outbreaks. Investigations of the five CPE outbreaks that had occurred in 2020 revealed the contributing factors to be multi-faceted. These factors remained largely unchanged from previous HIQA inspections. They include;

- a reservoir of people in the hospital catchment area who are colonised with CPE
- hospital infrastructure; including accommodation of patients in multi-occupancy nightingale-style rooms, insufficient spatial separation between beds in some inpatient areas and a relative lack of isolation facilities
- maintenance issues throughout the affected wards including damaged flooring and paintwork
- environmental reservoirs for CPE.

The hospital had enacted a number of interventions in response to these factors including;

- strengthened governance in relation to CPE across the University of Limerick Hospital Group including the establishment of a CPE Strategic Committee
- antimicrobial stewardship initiatives to ensure appropriate use of broad-spectrum antimicrobials (particularly carbapenems e.g. meropenem)

⁺⁺⁺⁺ Learning notices are designed to improve safety and security through sharing of learning across services and divisions.

^{§§§§§} A public health emergency is described as any serious or unexpected event, due to an infectious disease, which causes, or threatens to cause, death or serious illness to large sections of the population, an individual region or a specific cohort of individuals and which will have a major impact on the normal functioning of the health system and on society in general.

^{*****} An outbreak of CPE should be declared if there are if there are two or more linked cases of CPE or an increase in the incidence of CPE above the background rate for that institution.

- to trace the possible environmental reservoirs, extensive environmental screening was performed and a number of remedial actions had been planned to address the presence of CPE in hand hygiene sinks
- the provision of rapid CPE testing using direct Polymerase chain reaction (PCR) ⁺⁺⁺⁺⁺ of rectal swabs had recently been rolled out.

Clostridioides difficile infection

The University of Limerick Hospitals Group 2019 performance indicator⁷ for *Clostridioides difficile* was at 4.6 per 10,000 bed-days used. This figure was significantly higher than the desirable HSE performance indicator for *Clostridioides difficile* infection which is less than or equal to 2.0 cases per 10,000 bed-days used. The increased incidence was attributed to a prolonged outbreak of *Clostridioides difficile* infection in multiple clinical areas of University Hospital Limerick between November 2018 and February 2020. A multidisciplinary outbreak team was convened to advise and oversee the management of the outbreak.

A total of 50 cases of *Clostridioides difficile* infection were identified of which 32 were deemed hospital acquired cases associated with University Hospital Limerick. Samples from patients who acquired *Clostridioides difficile* infection within the hospital were sent for ribotyping. A predominant strain of *Clostridioides difficile* ribotype 002, which was genetically identical and common between 12 patients was identified. This would indicate that there was cross infection between patients.

In the context of an overcrowded hospital with persistently high activity levels and with infrastructural and maintenance issues, environmental contamination was considered as a possible contributory factor to the increased *Clostridioides difficile* infection rates. Enhanced equipment and environmental hygiene were among the multifaceted control measures implemented.

Reports also indicated that antimicrobial consumption may have contributed to the incidence of *Clostridioides difficile* infection rates. Therefore, antimicrobial stewardship was an important outbreak control measure. Targeted *Clostridioides difficile* antimicrobial stewardship rounds were conducted to ensure appropriate antimicrobial use.

The outbreak of *Clostridioides difficile* was closed in February 2020. The outbreak report concluded that a decrease in admissions at the onset of the COVID-19 pandemic, the introduction of a new sporicidal clean product, along with retraining of all staff in correct hand hygiene and PPE use likely contributed to better cleaning,

⁺⁺⁺⁺⁺ Polymerase chain reaction (PCR) is a method widely used in laboratories to rapidly make millions to billions of copies of a specific DNA sample, allowing scientists to take a very small sample of DNA and amplify it to a large enough amount to study in detail.

less overcrowding and less antibiotic selective pressure in the hospital. These measures were in turn helpful in controlling the outbreak.

Documentation reviewed by inspectors indicated that that the hospital wide incidence of *Clostridioides difficile* infection in the first six months of 2020 was 2.2 cases per 10,000 bed-days used. If further outbreaks are to be prevented prevention and control of *Clostridioides difficile* infection must remain a priority for all relevant staff in the hospital including hospital management.

3.0 Conclusion

Overall this inspection identified that University Hospital Limerick was compliant with two of the six of the *National Standards for the Prevention and Control of Healthcare-associated Infections in Acute Healthcare Services* assessed. A judgment of substantially complaint was made against two standards and a judgment of partially complaint was made against two standards.

To aid national efforts in addressing COVID-19, in April 2020 the National Public Health Emergency Team requested that HIQA provide a desktop evaluation of infection prevention and control preparedness relating to COVID-19 in public acute hospitals.¹⁸ The self-assessment exercise conducted by University Limerick Hospitals Group raised concerns relating to a number of aspects of environmental or equipment cleaning in the hospital group, which tallied with findings from some of HIQA's inspections of the past. Furthermore, this risk assessment also highlighted that the hospital might be additionally challenged by COVID-19 due to inherent challenges posed by constrained hospital bed capacity, and poor ward infrastructure on the older parts of the hospital campus.

The clinical areas visited on the day of HIQA's inspection were visibly clean. However, further actions are needed to reduce infection control risks at the hospital, especially when one considers the aforementioned difficulties University Hospital Limerick faces in relation to ward infrastructure in some of its older wards, and the potential for overcrowding, which pre-pandemic was severe. The persistent overcrowding at the hospital, including in the hospital's emergency department, also contributes to the difficulty in managing healthcare associated infections, and has been previously highlighted as a problem by HIQA through prior monitoring work.

Leadership, Governance and Management

Inspectors found that that there were clear lines of accountability and responsibility in relation to governance and management arrangements for the prevention and control of healthcare-associated infection at the hospital.

The COVID-19 Hospital Management Team was responsible for preparing and overseeing the hospital groups COVID-19 response in line with national guidance.

Pathways for streaming patients into COVID-19 and non-COVID-19 services had been identified, and insofar as possible each stream had separate infrastructure and staffing.

Significant efforts had been employed to increase inpatient bed capacity to help alleviate overcrowding and in response to the COVID-19 pandemic. The intermediate care facility provided the hospital with extra capacity to manage the Covid-19 crisis from June to October 2020. HIQA also notes that phased opening of additional bed capacity had commenced with 98 new beds due to be operational by January 2021. However, in the interim, it is important that the hospital ensures that all measures are in place to manage the risk from COVID-19, and other potentially transmissible infectious diseases, within current accommodation constraints.

Workforce

Inspectors noted the extra challenges and workload experienced by hospital staff including the infection prevention and control team since March 2020 in managing COVID-19 in addition to other competing infection prevention and control demands. Recruitment and retention of skilled staff was identified by management as an ongoing challenge faced by the hospital. However, infection prevention and control team resources and supports had been significantly increased to deliver a comprehensive and sustainable clinical microbiology and infection prevention and control service.

Up-to-date infection prevention and control policies and procedures were in place. Efforts to integrate infection prevention and control guidelines into practice were underpinned by mandatory infection prevention and control education and training. However improvements were required in uptake of this training.

Effective Care and Support

Overall patient equipment and the environment in the wards inspected were generally clean with some exceptions.

However, a number of infrastructural and maintenance issues, identified during the course of the inspection, had the potential to impact on infection prevention and control measures in Trauma Ward, which is regarded as a high risk clinical area. Deficiencies in ongoing infrastructure and maintenance need to be addressed as a matter of priority.

Safe Care and Support

Systems were in place to identify and manage risk in relation to the prevention and control of healthcare-associated infections. Overall, senior management had good oversight of the infection prevention and control risks on the corporate risk register.

While it may be extremely difficult to prevent all outbreaks in a hospital setting, careful management can mitigate spread of infection and limit the impact of outbreaks on the delivery of healthcare services. Overall, inspectors were satisfied on the day of inspection that, with the exception of the emergency department waiting area, the hospital had implemented appropriate control measures to manage the threat posed by COVID-19.

However, despite the implementation of a number of mitigating measures at the hospital, new cases of hospital-acquired CPE continued to be identified. The hospital also experienced a prolonged outbreak of *Clostridioides difficile* infection in multiple clinical areas between November 2018 and February 2020.

This inspection identified multiple factors that significantly increase the risk of further outbreaks. These factors included but were not limited to; regular overcrowding at the hospital, large multi-occupancy nightingale-style rooms combined with insufficient isolation facilities, and deficiencies in ward maintenance in the older hospital wards.

Consequently, following this inspection, University Hospital Limerick needs to continue to be supported within national structures to effectively address issues in relation to hospital infrastructure, capacity and resources in order to prevent further outbreaks, meet non-COVID-19 unscheduled care demand and manage the potential for a resurgence of COVID-19 as the pandemic continues.

4.0 References

- 1 Health Information and Quality Authority. National Standards for the prevention and control of healthcare-associated infections in acute healthcare services. Dublin: Health Information and Quality Authority; 2017. [Online]. Available online from: <https://www.hiqa.ie/sites/default/files/2017-05/2017-HIQA-National-Standards-Healthcare-Association-Infections.pdf>
- 2 Kaier K, Mutters N and Frank U. Bed occupancy rates and hospital-acquired infections—should beds be kept empty? *Clinical Microbiology and Infection*. October 2012; 18 (10), pp 941-945. Available online from: <https://www.sciencedirect.com/science/article/pii/S1198743X14610909>
- 3 University of Limerick Hospitals Group. UL Hospitals Group 2019 Operational Plan. Limerick: Health Service Executive; 2019. Available online from: <https://www.hse.ie/eng/services/publications/serviceplans/service-plans-2019/operational-plans-2019/university-of-limerick-hospital-group-operational-plan-delivery-plan-2019.pdf>
- 4 Health Protection Surveillance Centre. Notifiable Diseases and their respective causative pathogens specified to be Infectious Diseases under Infectious Diseases (Amendment) Regulations 2020 (S.I. No. 53 of 2020) February 2020. Available online from: <https://www.hpsc.ie/notifiablediseases/listofnotifiablediseases/List%20of%20Notifiable%20Diseases%20February%202020.pdf>
- 5 Health Service Executive. National Service Plan. Dublin: Health Service Executive; 2020. Available online from: <https://www.hse.ie/eng/services/publications/national-service-plan-2020.pdf>
- 6 Fenelon L and Aspergillus Sub-committee of the Scientific Advisory Committee, National Disease Surveillance Centre. *National Guidelines for the Prevention of Nosocomial Invasive Aspergillosis During Construction/Renovation Activities*. Dublin: National Disease Surveillance Centre; 2002. Available online from: <http://www.hpsc.ie/A-Z/Respiratory/Aspergillosis/Guidance/File,896,en.pdf>
7. Health Service Executive. National Service Plan. Dublin: Health Service Executive; 2019. Available online from: <https://www.hse.ie/eng/services/publications/serviceplans/national-service-plan-2019.pdf>
- 8 Burki, T. Double threat of COVID-19 and influenza. *The Lancet*. October 2020. Available online from: [https://www.thelancet.com/journals/lanres/article/PIIS2213-2600\(20\)30508-7/fulltext](https://www.thelancet.com/journals/lanres/article/PIIS2213-2600(20)30508-7/fulltext)

9 Health Information and Quality Authority. Report of the unannounced inspection at University Hospital Limerick. Dublin: Health Information and Quality Authority; 2019. Available online from:

<https://www.hiqa.ie/system/files?file=inspectionreports/university-hospital-limerick-02-july-2019.pdf>

10 Health Service Executive. Infection Control Guiding Principles for Buildings Acute Hospitals and Community Settings. Dublin: Health Service Executive; August 2020. Available online from:

<https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/guidance/infectionpreventionandcontrolguidance/residentialcarefacilities/Infection%20Control%20Guiding%20Principles%20for%20Building.pdf>

11. Department of Health, United Kingdom. Health Building Note 00-09. Infection Control in the built environment. Department of Health; March 2013. Available online from: <https://www.gov.uk/government/publications/guidance-for-infection-control-in-the-built-environment>

12 Health Protection Surveillance Centre/Health Service Executive. Acute Hospital Infection Prevention and Control Precautions for Possible or Confirmed COVID-19 in a Pandemic Setting. Dublin: Health Protection Surveillance Centre/ Health Service Executive; September 2020. Available online from: <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/guidance/infectionpreventionandcontrolguidance/InfectionPreventionandControlPrecautionsforAcuteSettings-COVID-19.pdf>

13 Health Service Executive. Interim Guidance for Adult Unscheduled Care Pathway in the COVID-19 era; The Acute Floor. Dublin: Health Service Executive; 2020. Available online from: https://hse.drsteevenslibrary.ie/ld.php?content_id=33212096

14 Al-Mulhim FA, Baragbah MA , Sadat-Ali M, Alomran AS, and Azam MQ. Prevalence of Surgical Site Infection in Orthopedic Surgery: A 5-year Analysis. *International Surgery*. 2014 May; 99 (3): pp 264-268. Available online from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4027911/>

15 Rachel T, Sarah G, Hanyuan S, Alexandra F, Elvis F, Marc P et al. Surgical site infection in orthopedic trauma: A case–control study evaluating risk factors and cost. *Clinical Journal of Orthopaedics and Trauma*. 2015 December; 6 (4): pp 220-226. Available online from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4600831/>

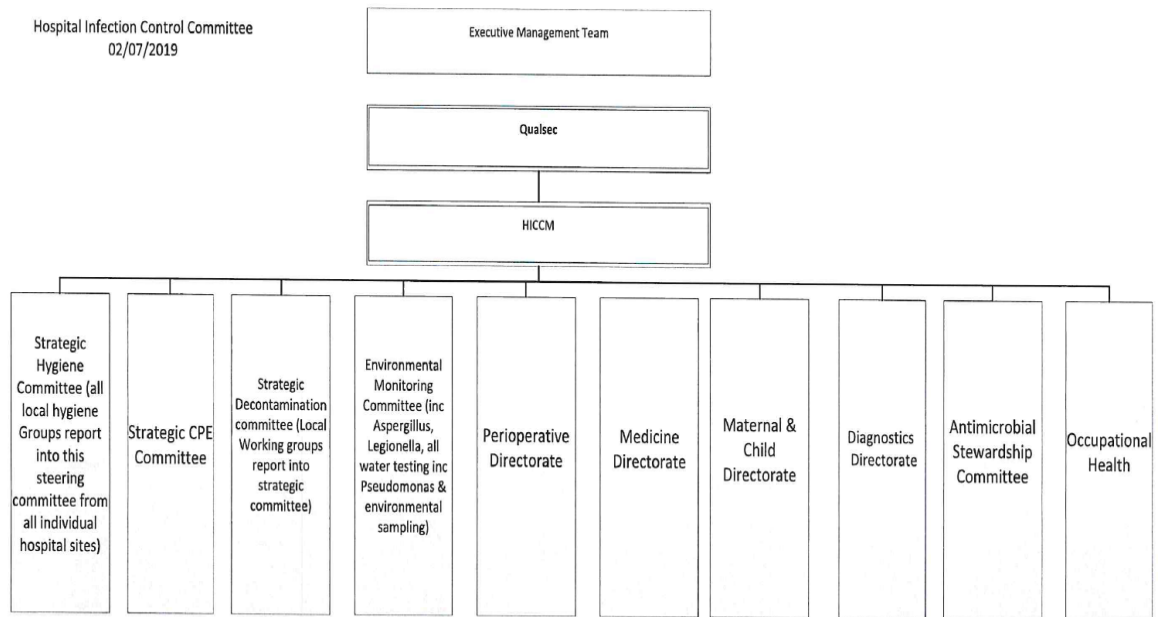
16. Health Service Executive. Integrated Risk Management Policy and Supporting Guidance. Dublin: Health Service Executive; 2017. Available online from: <https://www.hse.ie/eng/about/qavd/riskmanagement/risk-management-documentation/>

17 Health Service Executive. Incident Management Framework. Dublin: Health Service Executive; 2020. Available online from:
<https://www.hse.ie/eng/about/qavd/incident-management/hse-2020-incident-management-framework-guidance.pdf>

18 Health Information and Quality Authority. Desktop analysis of public acute hospital infection prevention and control preparedness for COVID-19. Dublin: Health Information and Quality Authority; May 2020. Available online from:
<https://www.hiqa.ie/reports-and-publications/key-reports-and-investigations/desktop-analysis-public-acute-hospital>

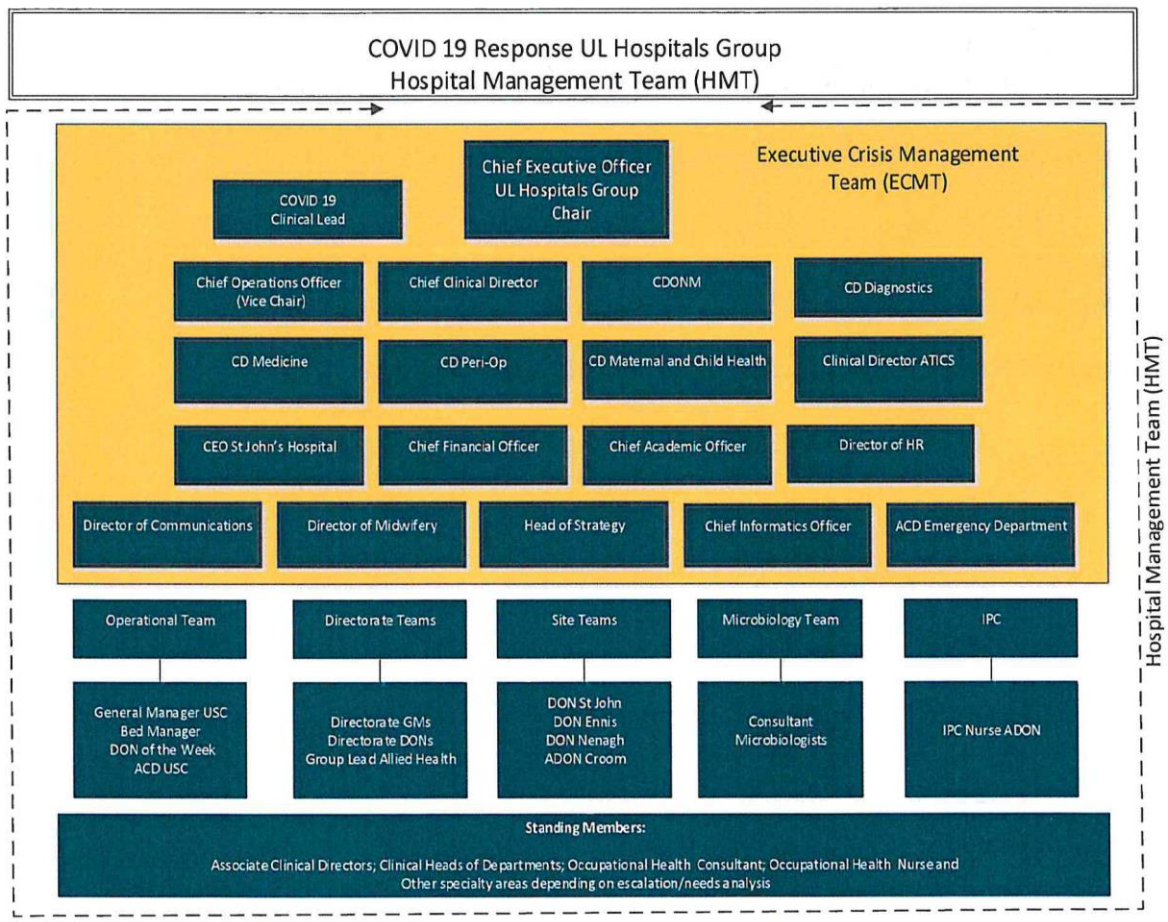
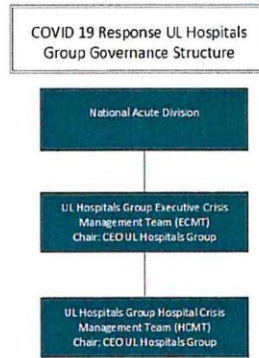
5.0 Appendix

Appendix 1: Infection prevention and control governance organogram



Appendix 2: COVID-19 Governance organogram

Overall structure



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