

Clean Care, Safe Care: Submission to Department of Health Service Capacity Review, 2017



Irish Society of Clinical Microbiologists

Clinical* Microbiologists play a crucial role by providing clinical liaison and consultation, along with expertise and clinical leadership in three key areas, namely:

1. Antimicrobial Stewardship
2. Infection Prevention and Control Stewardship
3. Laboratory Diagnostic Services Stewardship.

However, these functions require a supporting infrastructure and personnel resources, particularly in relation to reducing infections, and addressing the multiple drug-resistant organisms that are paralysing the health service. Supporting these functions will ensure improved patient care, avoidance of preventable morbidity and mortality, and financial savings to the health service.

The Irish Society of Clinical Microbiologists (ISCM) welcomes the opportunity to contribute to the Department of Health's Health Service Capacity Review. Currently the specialty of Clinical Microbiology is in crisis and severely under resourced in a number of key areas. We feel that this is an opportune time to highlight the requirement to strengthen the ability of health services to protect our patients against the twin threat of antimicrobial resistance (AMR) and healthcare-associated infection (HCAI). This is currently manifested by alarming emergence of outbreaks of carbapenemase producing *Enterobacteriaceae* (CPE) in many of our health care facilities. The HSE has recently established a national response team, overseeing the implementation of national CPE guidelines. In addition, the Department of Health and the Department of Agriculture, Food, and the Marine, have jointly completed a National Action Plan for Antimicrobial Resistance. These welcomed actions are extremely resource intensive, thus this capacity review consultation is timely and welcomed by the Society.

*Note: the terms "Clinical Microbiologist" and "Medical Microbiologist" are often used interchangeably

The Department has rightly stated that patient safety is the cornerstone of delivering quality healthcare in Ireland. For example, seven of the top ten priority patient safety strategies recommended by the Agency for Healthcare Research and Quality (AHRQ) relate directly or indirectly to prevention of infection. In addition, the World Health Organisation has identified AMR as an escalating global threat to human health. A vision of future healthcare in Ireland must include the capacity to deliver clean, safe care to our patients. To ensure we are able to do this, international experience has shown we need to address four broad areas of practice (summarised in the figure provided at the end of this document):

1. **Minimise the occurrence of preventable infections**, through vaccination, appropriate management of invasive medical devices (such as urinary catheters and intravenous lines), and improved population health
2. **Strengthen our ability to identify and monitor infection appropriately**, through access to, and appropriate application of, laboratory diagnostics (including reference laboratory services), and establishment of effective local and national infection surveillance systems
3. **Ensure infections are appropriately managed**, through rational use of antibiotics in community and hospital settings, and access to infection experts
4. **Ensure the transmission of infection in healthcare settings is minimised**, through application of infection prevention precautions (including hand hygiene, environmental hygiene and decontamination of medical devices), and providing safe environments for delivery of modern healthcare.

Delivery of these key components of patient safety requires ensuring dedicated resources are in place, specifically:

- **Human resources:** Effective prevention and control of infection, antimicrobial stewardship, diagnostic stewardship, and infection management can only be achieved through having the appropriate multi-disciplinary teams in place in all healthcare settings (including joint appointments across hospital and non-acute hospital settings, to address the critical lack of such resources outside of acute hospitals). These teams comprise medical microbiologists, infectious disease specialists, infection prevention and control nurses, antimicrobial pharmacists, surveillance scientists, and dedicated administrative and ICT support. Requirements for staffing of all of the disciplines required for such teams has been highlighted in the DoH/DAFF National AMR Action Plan (2017), and have also been included in budget submissions from HSE. Clinical Microbiologists with their multiple specialist skills in particular, are critical for providing the clinical leadership required to deliver all of these diverse elements. Their staffing levels should be in line with the Medical Workforce Planning report RCPI 2014 (Section 9 pages 100-114). which recommended 30 additional WTE Consultant Clinical Microbiologists at that time. However the landscape has vastly changed since

2014 and Ireland should attain at a minimum the European median of Clinical Microbiologists of 1.2 per 100 beds (Table 1).

- **Physical infrastructure:** Delivery of clean, safe care requires appropriate healthcare infrastructure, including moving to single room ensuite occupancy for all hospitals and long-term care facilities, reducing overcrowding and clutter, having an environment that can be kept clean, and ensuring medical devices and equipment are appropriately cleaned and decontaminated using evidence-based technologies. These requirements have long been advocated for by the society and are detailed in the Infection Prevention and Control Building Guidelines for Ireland (SARI, 2009).
- **Laboratory resources:** Rapid identification of pathogens is critical to the appropriate management of infection. Rapid typing of pathogens in adequately resourced national reference laboratories and sharing of these data, are also required to quickly identify and control outbreaks, and identify emerging infection threats. Effective use of diagnostic services is also a key component to ensuring appropriate use of antibiotics. The requirement for increased laboratory capacity for multi-drug resistant organism surveillance utilising high throughput molecular technology is urgently required at both regional and national level. Diagnostic microbiology laboratories, near to patient testing, and reference laboratory services need to be resourced, and clinical governance structures put in place to ensure they are used effectively and appropriately. All these requirements are highlighted in the DoH/DAFF National AMR Action Plan (2017).
- **ICT:** Delivery of effective infection prevention and control, antimicrobial stewardship, diagnostic stewardship, and appropriate management of infections needs to be supported with ICT resources. Much of this is reflected in the DoH/HSE eHealth Strategy for Ireland. Specific requirements in relation to delivering clean, safe care include:
 - The planned national laboratory information system
 - An integrated national electronic healthcare record (EHR)
 - Electronic prescribing systems (integrated into the EHR)
 - A national infection prevention and control electronic management system
 - A real-time national surveillance/early warning system for antibiotic-resistant pathogens
 - Strengthening of local and national electronic systems for surveillance of communicable diseases, HCAI, and antimicrobial use

In addition to the above resource requirements, it is critical that clinical governance structures are in place to ensure infection-related risks to patient safety are effectively managed, and provision of clean, safe care becomes the standard by which healthcare is delivered in all areas of the health service.

The Society welcomes the development of new clinical strategies, such as the recent ‘National Cancer Strategy 2017-2026’. Infection is a major cause of morbidity and mortality among cancer patients, in addition to delaying chemotherapy and increasing length of stay. However, recognition of the finite capacity of current Clinical Microbiology staffing levels and those of other infection-related disciplines, to deliver upon such strategies needs to be acknowledged and infection-related resource requirements accounted for in their implementation.

While the list of resources required to deliver clean, safe care may appear daunting, there are ample data to show that investment in these areas is cost-effective, leads to reduced avoidable illness and death, and improves patient flow. The Society would welcome the opportunity to provide more detailed submissions in relation to specific components of these requirements, and to be involved in further discussions around future healthcare capacity.

Table 1: Summary of Clinical Microbiologist consultant staffing requirements

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BEDS	RCPath methodology*	EUROPEAN AVERAGE Based on ESCMID survey 2015	
		Standard	Complex units**
100	0.75 WTE	1.2 WTE	
250 (Size average general hospital)	1.75 WTE	3.0 WTE	
1000 (Tertiary centre)	7.9 WTE , increased complexity sites	12 WTE	13 WTE

*Methodology used to determine staffing requirements in RCPI Medical Workforce Planning report (2014)

**Hospitals with transplant, burns, or other units with high complexity of care

Appendix: Rationale for improving the capacity to address AMR and HCAI in Ireland

Antimicrobial (antibiotic) resistance (AMR) is recognised as one of the biggest global threats to human health. Currently, about 25,000 people die per year in Europe from infections caused by antibiotic-resistant bacteria, but this figure is likely to increase considerably if rising AMR levels are not contained. In addition, at least one in every twenty people admitted to hospitals in Ireland develop healthcare-associated infection (HCAI), of which 30-70% are thought to be preventable. On any day, it is estimated that there are up to 500 patients with a hospital-acquired infection admitted to Irish hospitals. These infections are frequently caused by antibiotic-resistant bacteria. Thus, AMR and HCAI have a direct impact on our health service in terms of avoidable death, avoidable illness, and avoidable healthcare costs:

- Patients with infections caused by resistant bacteria have a 2-3 fold increased risk of dying as a result of their infection (compared to infections caused by non-resistant bacteria). Currently, there are no accurate data on the number of HCAI or AMR-related deaths in Ireland, but extrapolating from international data suggest that there are likely that at least 1,000 people per year die as a direct result of a healthcare-associated or antibiotic-resistant infection in Ireland each year (i.e. more than deaths related to breast cancer and road traffic accidents combined).
- Infections are associated with prolonged hospitalisation and increased healthcare costs (on average, a healthcare-associated infection doubles the length of hospital stay). A 2004 report estimated that the direct cost of HCAI in Ireland was €150 million, a figure which is likely to have increased since then.
- Healthcare associated infections due to resistant bacteria expose HSE to adverse publicity and rising litigation costs.
- A rapid rise in antibiotic resistance, or significant outbreaks of infection in healthcare settings, are causing major disruption in the provision of frontline healthcare services as documented by a one major Dublin Hospital, resulting in costs of millions and cancelled/delayed surgery. If AMR rates are left unchecked, the ability to deliver many aspects of healthcare (such as cancer care, neonatal care, implant surgery, etc) will be severely compromised.

International experience has shown that there are four key factors that promote the development of AMR and HCAI:

Ireland is facing a number of critical risks from increasing antimicrobial resistance:

- Bacteria carried in the large bowel, such as *E. coli*, *Klebsiella*, and *Enterococcus* are a frequent cause of HCAI in Ireland, and are becoming increasingly resistant to antibiotics. Increasing resistance among these bacteria is driven by antibiotic use, particularly in nursing homes and hospitals. Spread of these bacteria from person to person is linked to overcrowding, understaffing, poor hospital infrastructure, failure to apply infection control precautions, and contamination of medical equipment and the environment by faeces. Examples of critical issues related to these bacteria include the following:
 - A national outbreak of multidrug resistant *Klebsiella pneumoniae* (MDRKP), ongoing since 2013, with 914 cases of MDRKP colonisation or infection reported from across the country between 2014 and 2015. Most of these have occurred among inpatients in hospitals, but a significant proportion are occurring among nursing home residents and people in the community.
 - CPE are a group of almost pan-resistant bowel bacteria that can cause infections with very high mortality (up to 70% in ICU infections in some countries). There has been an outbreak of CPE involving nursing homes and hospitals in the Mid-Western region. As of mid-2015 there had been

87 cases of CPE colonisation, 22 cases of CPE infection, and at least two deaths associated with this outbreak. In 2016, there has been a different outbreak of CPE involving a community hospital in the North-West, with 10 residents identified to have CPE, two of whom have since died

- Ireland has the highest proportion of vancomycin-resistant enterococci (VRE) bloodstream infection in Europe (45.6% in 2015). Recent data show that about one in five patients with VRE bloodstream infection in Irish hospitals die as a result of their infection. In 2014, 31% of VRE bloodstream infections in Ireland were related to invasive medical devices (such as intravenous lines)
- Although the rate of bloodstream infections caused by methicillin-resistant *Staphylococcus aureus* (MRSA) has declined in recent years, Ireland still has one of the highest rates in Europe, and MRSA remains a common cause of other types of HCAI in Ireland (such as surgical site infections). Hospital-acquired methicillin-sensitive *Staph aureus* (MSSA) bloodstream infection remains common, with 26% related to invasive medical devices.
- The rate of hospital-acquired *Clostridium difficile* infection (CDI) had declined in recent years, but increased in 2015 (1,666 cases reported). CDI is closely linked to antibiotic use, particularly in hospitals, and most studies show that about 15% of patients with CDI in hospitals die within 30 days of their infection. One Dublin hospital noting the additional cost of CDI in patient care cost of €15,000 (personal communication).
- High levels of antibiotic use in the community is leading to increasing levels of resistance among *E. coli* (a frequent cause of kidney infections and bloodstream infections) and *Streptococcus pneumoniae* (the commonest bacterial cause of pneumonia and meningitis). Loss of the ability to effectively treat life-threatening infections caused by these bacteria will result in ever increasing levels of avoidable death, illness, and financial costs.

