



Policy Group on Healthcare-Associated Infection

**Healthcare-associated infection (HCAI) in patients with cancer:
Identify the risks and implement preventive measures**



F PHYSICIANS OF IRELAND

Executive Summary

Cancer is a major health issue with the number of patients affected in Ireland due to increase significantly in the years ahead. Patients with cancer are at increased risk of healthcare-associated infection (HCAI) due to impaired immune defences arising from the disease itself and anti-cancer therapy.

All healthcare workers involved in the care of patients with cancer must be familiar with national standards for the prevention and control of HCAI, such as the use of standard precautions. Surveillance of HCAI in this group of patients is essential. General measures by patients themselves and their families, such as hand hygiene and not drinking contaminated water, are also important. During periods of significant immunosuppression in hospital, all patients with cancer should be cared for in single rooms with *ensuite* shower and toilet facilities. This requirement must be included in strategic planning for cancer services in Ireland. The appropriate and prudent use of anti-infective agents will help prevent some infections and treat others effectively, while minimizing the emergence and spread of multi-drug-resistant organisms.

Finally, healthcare workers need to be aware of the concerns of patients with cancer and their families regarding infections, including HCAI, and they need to have the knowledge and skills to offer advice and care in this domain.

Healthcare-Associated Infection in Patients with Cancer: Identify the Risks and Implement Preventive Measures

Cancer is a major health issue and an important cause of morbidity and mortality. Approximately 20,000 patients in Ireland develop cancer each year and it is estimated that by 2020 there will be a 107% increase in incidence compared with 2000.¹ The National Cancer Forum produced a strategy in 2006 to reduce the incidence, morbidity and mortality in Ireland by 2015.¹ This involves the provision of improved facilities for cancer screening. A national cervical screening cancer programme has been introduced² and a similar programme is planned for colon cancer. Better and earlier diagnosis and multidisciplinary team management, with supportive/palliative care, are also important components of the national strategy.

In developing services for this group of patients, it is essential that quality and patient safety underpin all aspects. Infection, including healthcare-associated infection (HCAI), is a significant complication of cancer and can be life-threatening or fatal. The term 'healthcare-associated infection' refers to an infection that occurs as a result of contact with any aspect of the healthcare system from care provided in acute hospitals to primary care provided in GP clinics, patients' homes and in nursing homes. Between 1 in 10 and 1 in 20 patients admitted to acute hospitals will develop HCAs, not all of which are preventable. Common HCAs include infection of the urinary tract, e.g. cystitis, the lower respiratory tract, e.g. pneumonia, the skin, e.g. an infected diabetic ulcer, the blood stream (septicaemia) or any part of the body that has been operated on, i.e. a surgical site or wound infection.

We are likely to see an increasing number of cancer patients vulnerable to infection, as some malignancies and most anti-cancer chemotherapy agents impair patients' immune defences. While some of these infections may be community-associated, e.g. influenza, many will be HCAs acquired in hospital wards, day treatment centres, outpatient clinics and hospices.

Many of these cancers will occur in the elderly, an increasing proportion of the population, and there are often other co-morbid diseases such as vascular ulcers, which may complicate delivery of cancer therapy and aftercare. The interface between the acute hospital sector and other healthcare facilities such as nursing homes and long stay units becomes particularly important in this context.³

Patients with cancer are vulnerable to all the common causes of HCAs that affect other patients, e.g. norovirus, multi-drug-resistant organisms/bacteria such as methicillin-resistant *Staphylococcus aureus* (MRSA) and gram negative bacilli, and *Clostridium difficile*. Infection with these agents may result in septic shock, pneumonia, bacterial endocarditis and meningitis.

In addition, some patients with cancer are especially vulnerable to opportunistic infections caused by microbes that do not normally infect patients with intact immune systems. Examples of such opportunistic microbes include the gram-negative bacillus, *Pseudomonas aeruginosa*, the fungus *Aspergillus fumigatus* and the virus, *Cytomegalovirus* (CMV).

Consequently, while prevention and control strategies must be geared towards preventing infections in general, they must also address individual need acknowledging that some patients are at greater risk than others. An example is the use of prophylactic antimicrobials such as co-trimoxazole to prevent *Pneumocystis jirovecii* (*carinii*) infection in those with profound lymphopenia.

Major factors predisposing cancer patients to develop HCAIs are:

- The performance status (activity level) of the individual e.g. fully-active versus bed-confined
- Co-existing medical conditions e.g. chronic renal failure, diabetes mellitus.
- The type of cancer, especially one which has its origins in the blood/immune system.
- The depth and duration of immunosuppression (e.g. neutropenia and lymphopenia) associated with the cancer and/or its treatment.
- Other blood parameters such as anaemia, which affect performance status and thrombocytopenia, which may be associated with bleeding/bruising, predisposing to infection.
- The toxicity of the cancer treatment and especially mucosal damage of the gastrointestinal tract which facilitates invasion by gut microbes.
- Breaks in skin integrity whether spontaneous or iatrogenic, i.e. associated with medical interventions. These breaks in skin facilitate the entry of native and hospital-acquired organisms.
- The use of long term vascular catheters such as Hickman lines is a risk factor for catheter-associated bloodstream infection (CABSI). Prolonged venous access for the administration of chemotherapy is required in large numbers of cancer patients.
- Sub-optimal physical facilities within which care is delivered with particular reference to cross-infection and the sharing of toilet facilities.
- The level of adherence by healthcare staff to guidelines on infection prevention and control in acute hospitals and elsewhere such as hospices, while looking after such a vulnerable population.
- The availability of adequate support in areas such as transfusion, clinical nutrition, hospice care, physiotherapy and psychological support which serve to improve performance status and to keep the patient out of hospital when that is possible during cancer treatment.

Approaches to Preventing Healthcare-Associated Infection in Cancer Patients

National standards

All those involved in the care of patients with cancer should be familiar with national standards for the prevention and control of infection produced by the Health Information and Quality Authority in 2009,⁴ and which apply to all healthcare facilities. These emphasise the importance of education and the application of standard precautions to all patients, irrespective of whether it is known that they have an infection, transmissible or otherwise. The principles of standard precautions have already been highlighted by this group.³

Surveillance

Ongoing surveillance of HCAI in patients with cancer is essential because of the increased risk in this population e.g. the necessity for long term intravascular access creates a need to monitor for the emergence of multi-antibiotic resistant bacteria, e.g. MRSA. As some HCAIs are potentially preventable, e.g. *C. difficile* diarrhoea, intervention can protect patients, improve prognosis and minimise healthcare costs. Currently, in Ireland, we do not know the frequency or impact of HCAI in cancer patients in the absence of a comprehensive system for HCAI monitoring. Only certain complications such as MRSA bloodstream infections are reported nationally and for many others we do not have details of risk and outcome, e.g. *C. difficile*.

The patient and their family or carer

In addition to standard precautions, there are other general measures that can minimise HCAI and other infections in patients with cancer. These include extending hand-washing and other measures practiced by healthcare workers to patients and their families, maintaining good dental, oral and perineal hygiene, avoiding exposure to individuals with signs and symptoms of infection, e.g. shingles, not drinking potentially contaminated water and taking appropriate precautions when travelling abroad where there is risk of exposure to a broader range of illnesses including malaria and typhoid.^{5,6} Although much of this represents common sense, it is important to encourage patients and their families to be involved in minimizing their risk of developing infections, both inside and outside hospitals.

Intravascular catheter access

Specific risks of infection amongst patients with cancer should be identified and best practice implemented. For example, patients with cancer often require intravenous drugs and will require temporary peripheral or long-term, large-vein access. Consequently, these patients are vulnerable to CABSIs. Therefore, compliance with recently launched guidelines by the Health Protection Surveillance Centre is important for patients with cancer.⁷

These guidelines highlight the importance of aseptic technique during insertion, the cleaning of hub and access ports while in use with appropriate hand hygiene when any manipulations are performed, and the removal of catheters when no longer required.

Vaccination

Patients with cancer should be vaccinated with recommended vaccines⁸, which are primarily focused on preventing acquisition of community-acquired infections. However, the prevention of infections such as influenza and invasive pneumococcal disease will also reduce hospital admissions and consequently reduce the risk of HCAI.

Single rooms and the environment

The physical environment, in which patients with cancer are treated, particularly in acute hospitals, is important. This includes the provision of adequate space between patients, adequate toilet and bathroom facilities, suitable hand hygiene facilities and ultimately the provision of single rooms with *en-suite* shower and toilet facilities for all patients with cancer during periods of significant immunosuppression.^{4,9} As the number of patients with cancer increases, planning needs to commence now to meet these requirements and to comply with national standards. The strategic decision to deliver cancer care in eight centres nationally dictates that suitable physical facilities must be provided in those centres. Careful planning is essential to meet patient requirements, to minimize HCAI and to avoid the high cost of treating established infection. There must also be adequate support structures outside hospital such as in primary care centres to meet the requirements of patients in the community to minimise the need for acute hospital admission and exposure to the risk of HCAI.

When building and construction takes place on acute hospital sites appropriate precautions need to be taken to prevent the risk of invasive aspergillosis, which can enter through the respiratory tract and affect other organs such as the kidneys and central nervous system and which has a high associated mortality. Patients at particular risk include those with prolonged or severe neutropenia patients after high-dose chemotherapy and patients undergoing blood stem-cell (bone marrow) transplantation. Appropriate precautions are outlined in national recommendations and include minimising dust creation and movement, moving at-risk patients as far away as possible from construction areas and caring for patients at high risk of invasive aspergillosis where high-efficiency, particulate, air-filtration facilities are available.¹⁰

Anti-infective drugs

The use of anti-infective agents, including antibiotics, anti-virals and anti-fungal agents is critical in the prevention and treatment of infection in patients with cancer. Prophylactic anti-infectives are part of the routine care of many patients with cancer, e.g. valaciclovir to prevent serious infections related to transmission or reactivation of herpes viruses. However, the prudent use of antibiotics is also critical and should be underpinned by antibiotic stewardship to prevent HCAI. Infection with multi-drug-resistant organisms is emerging amongst patients with cancer, as recently documented in cancer patients with MRSA bloodstream infection in an Irish referral centre.¹¹ The importance of antibiotic resistance and the need for prudent and appropriate use of antibiotics by doctors has already been addressed by this group.¹²

Recommendations

1. The prevention and control of HCAI in all patients with cancer in Ireland is important in optimizing care and ensuring the best outcome from treatment. This should be a focus in the planning and provision of all services during a patient's cancer journey.
2. Patients, their families and all healthcare workers need to be educated on simple measures that can minimise infection, including standard precautions and important aspects of personal and environmental hygiene. The care of central venous lines, skin care and oral and perineal hygiene are areas of particular concern.
3. With the rationalisation and re-organisation of cancer services to eight sites, planning must cater for the current and future needs in terms of the physical environment. In particular, new units must contain single rooms for all in-patients and there should be a national strategy to quickly upgrade current facilities to meet this requirement.
4. Healthcare workers need to be aware of the questions that patients with cancer and their families may have on preventing HCAI and need to have the knowledge and skills to advise and demonstrate how infection can be avoided at home and in the health-care setting.
5. Risk factors for HCAI need to be recognized and reduced or eliminated as much as possible. In particular every effort should be made to improve the performance status of the patient prior to and during therapy. Where possible care should be delivered as an out-patient.
6. Prophylactic interventions such as the use of anti-microbials and haematopoietic growth factors as well as the therapeutic use of antimicrobials and transfusions should be tailored to the needs of individual patients and used according to international guidelines.
7. As patients with cancer are vulnerable to HCAI, national surveillance strategies are needed to collect data on HCAI such as CABS I in this population.

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RCPI Policy Group on Healthcare-Associated Infection (HCAI)

As part of The Royal College of Physicians of Ireland's (RCPI) aim to play a proactive role in the development of healthcare policy, it has convened a number of issue-focused policy groups that allows medical experts to meet and discuss healthcare matters of concern to health professionals, healthcare providers and the general public. These policy groups produce evidence-based position papers that outline the issue and propose specific steps to address the issue.

The RCPI Policy Group on Healthcare-Associated Infection was established in 2008. It publishes individual position papers on contributory factors and other topics related to HCAI.

Members:

Prof Hilary Humphreys (Chair) - Professor of Clinical Microbiology, RCSI and Consultant Microbiologist, Beaumont Hospital, Dublin.

Dr Paddy Mallon - Infectious Disease Physician, Mater Misericordiae Hospital, College Lecturer at University College Dublin.

Dr Brian O'Connell - Consultant Microbiologist, St James's Hospital, Dublin and Medical Director of the National MRSA Reference Laboratory.

Dr Ciarán Donegan - Consultant Physician in Healthcare of the Elderly, Beaumont Hospital, Dublin.

Dr Phil Jennings - Public Health Specialist, Director of Public Health, HSE.

Ms Rosena Hannify - Assistant Director of Nursing /Midwifery Infection Prevention and Control, Coombe Women and Infants University Hospital, Dublin.

For more information contact:

Joanna Holly Royal College of Physicians of Ireland
Frederick House
19 South Frederick Street
Dublin 2
Direct Ph: 01 863 9743
Mobile Ph: 087 212 0245
Main Ph: 01 863 9700
joannaholly@rcpi.ie
www.rcpi.ie



ROYAL COLLEGE OF
PHYSICIANS OF IRELAND

FREDERICK HOUSE, 19 SOUTH FREDERICK STREET, DUBLIN 2

TEL: +353 1 863 9700 FAX: +353 1 672 4707 EMAIL: COLLEGE@RCPI.IE WEB: WWW.RCPI.IE

