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Appendix A

European Curriculum for the Specialty of Infectious Diseases

European Board of Infectious Diseases

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Introduction

This document sets out a Curriculum for trainees in the Specialty of Infectious Diseases. Some elements of Infectious Diseases training are common to the training in Medical Microbiology, e.g. Infection Control. This document primarily focuses on contents of learning, while objectives of training, supervision of training, organisation and schedule of training are further described in European Training Requirements for the Specialty of Infectious Diseases. Specific competencies for an Infectious Diseases Specialist are described in this document, while generic competencies are further elaborated in European Training Requirements for the Specialty of Internal Medicine and in CanMEDS framework. Within each general heading, the competencies required are defined within the three headings of Knowledge, Skills and Professional Behaviour with Assessment Methods assigned to specific topic. The “Assessment Methods” shown are those that are appropriate as *possible* methods that could be used to assess each competence. It is not expected that all competencies will be assessed and that where they are assessed not every method will be used.

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SPECIFIC COMPETENCIES FOR AN INFECTIOUS DISEASES PHYSICIAN
OBJECTIVE 1: Community Acquired Infections (CAI)

1.1 Community Acquired Infections

Ability to diagnose, investigate and manage community acquired infections

Knowledge	Assessment Methods
Has a broad knowledge of the clinical presentations of all CAIs	CbD, KBA
Has an extensive knowledge of the core CAIs and infection syndromes (including but not exclusive to the list below) relevant to the local area of practice including their differential diagnosis and complications: • Acute viral hepatitis • Bone and joint infections including septic arthritis • Central nervous system infections, including but not limited to meningitis, encephalitis, myelitis, radiculitis, epidural empyema, brain abscess • Childhood viral infections • Community acquired pneumonia and other respiratory tract infections • Infective endocarditis • Gastroenteritis • Hepato-biliary infections • Pyrexia of unknown origin • Skin and soft tissue infections • Sepsis and septic shock • Sexually transmitted diseases • Tuberculosis • Travel related infections • Urinary tract infections • Zoonoses as appropriate to local area • Others as appropriate to location of training	KBA, mini – CEX, CbD, ACAT
Has a thorough understanding of the relevant laboratory tests including which test to use when investigating community acquired infections	KBA, mini – CEX, CbD
Skills	**Assessment Methods**
Able to assimilate information from the history, examination, and laboratory tests to diagnose community acquired infections	CbD, mini – CEX, ACAT
Able to differentiate between community acquired infections, other forms of infection and other non-infectious causes with a similar presentation	CbD, mini – CEX, ACAT

Able to manage all common community acquired infections according to best evidence-based practice	CbD, mini – CEX

Behaviours	Assessment Methods
Able to consider the impact of psychological, social, cultural, religious and gender issues on the patient and their presentation	mini – CEX, CbD
Demonstrates empathy and appreciation of a patient's anxieties and be able to explain the treatment plan in a reassuring way	mini – CEX, CbD
Demonstrates an awareness of the patient's rights including the right to refuse treatment	mini– CEX, CbD

1.2 Management of Longer Term Conditions (TB, hepatitis B and C, HIV)

1.2.1 Obtain competence in diagnosis and management of tuberculosis

Knowledge	Assessment Methods
Have a good knowledge and understanding of the epidemiology natural history and clinical management of TB, including pulmonary and extrapulmonary involvement	KBA, mini – CEX, CbD
Have a good knowledge about management of drug-resistant TB, including MDR, XDR, TDR	KBA, mini – CEX, CbD
Recognise the relevance of TB as an opportunistic infection in HIV- positive persons and other immunocompromised patients	KBA, mini – CEX, CbD
Understand the importance of multi – disciplinary team working	mini – CEX, CbD

Skills	Assessment Methods
Able to diagnose TB including atypical presentations using clinical and epidemiological skills	mini – CEX, CbD
Able to use appropriate microbiologic tests and interpret the results	mini – CEX, CbD
Able to monitor therapy and ensure compliance with treatment	mini – CEX, CbD
Able to counsel patients on matters of infection risk, transmission and infection control	mini – CEX, CbD

Behaviours	Assessment Methods
Able to demonstrate an ability to work within a multidisciplinary team, including public health authorities	MSF

Able to work with patients, their family, friends and carers and use their expertise to manage their condition collaboratively	PS, MSF, CbD
Able to recognise the potential impact of long term conditions on the patient and their family and friends	PS, MSF, CbD

1.2.2 Obtain competence in management chronic hepatitis B and C

Knowledge	**Assessment Methods**
Have a good knowledge and understanding of the epidemiology and natural history of chronic hepatitis B and C, including extrahepatic manifestations	KBA, mini – CEX, CbD
Demonstrate knowledge of use of molecular and serologic methods in diagnosis and follow up of patients with chronic hepatitis B and C	KBA, mini – CEX, CbD
Have a good knowledge of management of chronic hepatitis B and C, including: • use of direct acting antivirals (DAA) in treatment of chronic hepatitis C • potential drug-drug interactions with DAA treatment • indication for treatment of chronic hepatitis B • follow up of patients with chronic hepatitis B • follow up of patients with cirrhosis and related problems during or after antiviral therapy • knowledge on hepatocellular carcinoma • knowledge on liver transplantation indications	KBA, mini – CEX, CbD
Understand the importance of multi – disciplinary team working	mini – CEX, CbD
Demonstrate an awareness of patient support groups	mini – CEX, CbD
Skills	**Assessment Methods**
Able to monitor therapy and ensure compliance with treatment	mini – CEX, CbD
Able to counsel patients on matters of infection risk, transmission and infection control	mini – CEX, CbD
Able to develop and agree a holistic management plan with the patient and carers, ensuring awareness of alternative therapies and means of patient support	mini – CEX, CbD
Behaviours	**Assessment Methods**
Demonstrates a non-judgemental approach particularly regarding disease, race, gender, life style, sexuality and religion	MSF, CbD, PS

Able to demonstrate an ability to work within a multidisciplinary team, including liver transplant team	MSF
Able to work with patients, their family, friends and carers and use their expertise to manage their condition collaboratively	PS, MSF, CbD
Able to recognise the potential impact of long term conditions on the patient and their family and friends	PS, MSF, CbD

1.2.3 Ability to recognise and manage infection including opportunistic infections in the HIV positive patient, and to manage infection risk

Knowledge	Assessment Methods
Explain the function of the intact immune system	KBA, mini – CEX, CbD
Explain pathophysiology of HIV infection	KBA, mini – CEX, CbD
Explain epidemiology and natural history of HIV	KBA, mini – CEX, CbD
Demonstrate providing relevant counselling to patients, carers and relatives, and to individuals potentially exposed to HIV	KBA, mini – CEX, CbD
Demonstrate knowledge of therapeutic options in HIV management	KBA, mini – CEX, CbD
Demonstrate knowledge of diagnosis, treatment and prevention of opportunistic infections in HIV-positive persons	KBA, mini – CEX, CbD
Explain risk/benefit analysis of therapies for HIV and for prophylaxis against HIV and opportunistic infections	KBA, mini – CEX, CbD
Being proficient in managing HBV and HCV co-infection in HIV-positive persons	KBA, mini – CEX, CbD
Recognise the clinical features of infections and other disease processes in the HIV infected host	KBA, mini – CEX, CbD
Recognise the relevance of specific aspects of history and specific physical signs (and their absence)	KBA, mini – CEX, CbD
Explain prevention and management of co-morbidities in HIV-positive persons including: • cardiovascular disease • diabetes mellitus • dyslipidaemia • bone disease • renal disease • cancer	KBA, mini – CEX, CbD

• lung diseases	KBA, mini – CEX, CbD
Recognise the relevance of vaccination in HIV-positive persons	
Demonstrate knowledge of diagnosis, prevention and treatment of other sexually transmitted infections	KBA, mini – CEX, CbD
Explain the utility of appropriate laboratory investigations	KBA, mini – CEX, CbD
Skills	**Assessment Methods**
Demonstrate recognising clinical and laboratory manifestations of immune deficiency	mini – CEX
Demonstrate interpreting test results relating to the direct management of HIV infection and explain their significance to the patient	mini – CEX
Demonstrate advising regarding risk reduction for opportunistic infections in the HIV-infected individual, through behavioural change, chemoprophylaxis and vaccination	KBA, mini – CEX, CbD
Demonstration communication skills that allow patients, relatives/carers and others, including those at HIV risk, to participate in management decisions	KBA, mini – CEX, CbD
Demonstrate providing information on HIV transmission and strategies for risk reduction	KBA, mini – CEX, CbD
Behaviours	**Assessment Methods**
Demonstrate a consideration of the interaction of psychological and social well-being on physical symptoms	mini – CEX, CbD
Demonstrate empathy and appreciation of patient anxieties	mini – CEX, MSF, CbD
Demonstrate awareness of patient's rights (including confidentiality) and responsibilities	mini – CEX, CbD
Demonstrate non-judgemental attitude to risk activities of the patient	mini – CEX, CbD
Demonstrate the ability to work as part of a multidisciplinary team for the benefit of the patient with colleagues in, for example, sexual health, oncology, hepatology	CbD, MSF
Recognise social, cultural, sexual and religious factors that may impact on HIV management	MSF

1.2.4 Competence in the use of specific HIV diagnostics	
Knowledge	**Assessment Methods**
Explain current diagnostic techniques	KBA, mini – CEX, CbD

Skills	Assessment Methods
Demonstrate appropriate use of current diagnostic techniques	KBA, mini – CEX, CbD
Behaviours	**Assessment Methods**
Recognise and appreciate patient wishes and concerns	mini-CEX, CbD
Demonstrate communicating effectively with regard to the infection and need for treatment	mini-CEX, CbD

1.2.5 Ability to institute and manage specific therapies in HIV patients

Knowledge	Assessment Methods
Explain antiretroviral drugs including: • pharmacokinetics, modes of action, interactions, side effects of the commonly used agents • indications for and use of antiretroviral drugs in treating HIV infection • laboratory tests used in monitoring response and in informing use of certain drugs • mechanisms of resistance and cross resistance • awareness of current treatment guidelines • post-exposure prophylaxis of HIV • anti-retroviral agents in the prevention of mother-to-child transmission • pre-exposure prophylaxis of HIV • drug-drug interactions	CbD, mini-CEX
Skills	**Assessment Methods**
Demonstrate applying guidelines and recommend appropriate treatment and interventions	CbD, mini-CEX
Recognise and monitor side effects and drug interactions	CbD, mini-CEX
Demonstrate engaging patients to support adherence and facilitate treatment decisions	CbD, mini-CEX
Behaviours	**Assessment Methods**
Demonstrate appropriate application of knowledge to the clinical situation	CbD, mini-CEX, MSF

1.3 Multi-Disciplinary Team Working in the Management of Patients with Infectious Diseases Requiring Palliative and Terminal Care

Ability to work and liaise with a multi–disciplinary team in the management of patients requiring palliative and terminal care

Knowledge	**Assessment Methods**
Understands the spectrum of professional and complementary therapies available e.g. palliative medicine, nutritional support, pain relief and psychology	CbD
Skills	**Assessment Methods**
Demonstrates discernment in balancing a scientific and a caring approach to the problem and able to judge when active treatment should stop	MSF, CbD
Able to work within a multi-disciplinary team	MSF
Able to give patients effective pain relief and psychological support	MSF, CbD, mini – CEX
Behaviours	**Assessment Methods**
Demonstrates a commitment to continuity of care through physical illness to death	MSF, CbD, mini – CEX

OBJECTIVE 2: Healthcare-associated infections (HAI), Antimicrobial Stewardship (AS), Infection Control (IC), Antimicrobial Resistance (AMR)

2.1 Healthcare – Associated and Intensive Care Related Infections

Ability to recognise and manage healthcare – acquired infections (HAI), including intensive care-related infection, such as sepsis, pneumonia, urinary tract infection, bowel infection, line-related infections, endocarditis and other focal and disseminated infection

Knowledge	Assessment Methods
Has a good understanding of the presentation, patho – physiology and management strategies for common problems in HAI and ICU related infections	KBA, mini – CEX, CbD
Has a good understanding of the issues around consent and confidentiality in the unconscious patient	KBA, mini – CEX, CbD
Understands the potential outcomes and impact of HAI and ICU related infections	KBA, mini – CEX, CbD
Skills	**Assessment Methods**
Able to acquire relevant information pertinent to the specific clinical scenario	KBA, mini – CEX, CbD
Able to determine the origin of infection and develop a strategy for its containment	mini – CEX, CbD
Able to use appropriate diagnostic tests to confirm HAI and to interpret these tests	KBA, mini – CEX, CbD
Behaviours	**Assessment Methods**
Demonstrates sensitivity to patients, carers and relative's anxieties, offering counselling where appropriate	MSF, PS
Recognises the need to involve the patient regardless of the level of comprehension or consciousness	MSF, PS
Demonstrates an evidence-based approach to the management of HAI and ICU related infections	CbD

2.2 Postoperative infections/implant associated infections

Recognition and treatment of specific infections related to post-operative sepsis, including

surgical site infection, pneumonia, urinary tract infection, bowel infection, line-related infections, and other focal and disseminated infection

Knowledge	Assessment Methods
Has a good understanding of the common infections associated with particular surgical procedures	KBA, mini – CEX, CbD
Has appropriate diagnostic skills to diagnose surgical site infections (SSI)	KBA, mini – CEX, CbD
Knows appropriate empirical and targeted antimicrobial therapy for SSI, as well as indications for surgical retreatment	KBA, mini – CEX, CbD
Know appropriate diagnostic tests for implant associated infections	KBA, mini – CEX, CbD
Knows appropriate antimicrobial therapy for implant infections	KBA, mini – CEX, CbD
Knows indications for surgical treatment of implant infections	KBA, mini – CEX, CbD

Skills	Assessment Methods
Able to differentiate between colonisation and infection	KBA, CbD

Behaviours	Assessment Methods
Able to maintain good working relationships with surgical and traumatology colleagues	MSF

2.3 Antimicrobial Resistance (AMR)

Identification and management of infection and colonisation by multi – resistant organisms in the hospital setting

Knowledge	Assessment Methods
Able to demonstrate a good understanding of local / national and international antibiotic resistance patterns, clinical standards, guidelines and protocols	KBA, CbD
Explain the mechanisms by which organisms acquire antimicrobial resistance and how to use this knowledge to inform appropriate antimicrobial prescribing	KBA, mini – CEX, CbD

Skills	Assessment Methods
Demonstrates a good understanding of antibiotic resistance and the situations which can drive resistance	KBA, mini – CEX, CbD

Demonstrates an awareness of the therapeutic options available for the treatment of multi – resistant organisms	KBA, mini – CEX, CbD
Understands the interventions available to prevent the spread of multi – resistant organisms	KBA, mini – CEX

Behaviours	**Assessment Methods**
Able to work within a multidisciplinary team	MSF, CbD

2.4 Antimicrobial Stewardship

2.4.1 Competence in antimicrobial prescribing

Knowledge	**Assessment Methods**
Able to demonstrate knowledge ofthe spectrum of activity, pharmacokinetics and pharmacodynamics of antimicrobials	KBA
Able to demonstrate understanding of the role of appropriate use of antimicrobial agents for prophylaxis and treatment of infections to prevent the disruptive effects on host normal flora, which may lead to, for example, Clostridium difficile infection, Candida spp super-infection, and the development and spread of resistant microbial strains.	KBA, CbD
Able to demonstrate the knowledge and understanding of surgical and other types of antimicrobial prophylaxis	KBA, CbD
Able to demonstrate knowledge and understanding of the contraindications of antimicrobials, of side-effects, including allergy, and antimicrobial and drug/food interactions	KBA, CbD

Skills	**Assessment Methods**
Able to prescribe antimicrobial therapy in different clinical settings using the knowledge of key elements of prescribing: • the choice of agent • the route of administration • role of patients' characteristics and site of the infection • initiating prompt effective antimicrobial treatment within one hour of presentation, or as soon as possible in patients with life-threatening infections • obtaining relevant microbiological cultures or relevant tests before commencing treatment • the duration of treatment • the review dates • the stop dates	mini – CEX, CbD

• • knowing where to find information on the costs of different antimicrobial treatments	
Able to access and use local and other guidelines, and local antimicrobial susceptibility patterns.	CbD
Able to demonstrate how to monitor levels and adjust doses e.g. in the aged or renally impaired, review antibiotic therapy at 48 to 72h, switch antibiotics from intravenous to oral administration within 24h of locally agreed guidance, change antibiotics, ideally to a narrower spectrum (de-escalation) or broader (escalation), according to microbiology results and clinical condition, stop antibiotics if there is no evidence of infection.	mini – CEX, CbD
Able to prescribe antimicrobial prophylaxis in surgery.	mini – CEX, CbD
Able to use microbiological investigations, other investigations (including biomarkers), to diagnose infections and to monitor the response to treatment of infections.	mini – CEX, CbD
Able to differentiate between colonisation and infection, viral and bacterial infections, and infection from other causes of inflammation, to avoid unnecessary antimicrobial prescribing.	mini – CEX, CbD
While prescribing antimicrobials able to avoid as much as possible side effects and collateral damage e.g. their disruptive effects on host normal flora, and the development and spread of resistant microbial strains.	mini – CEX, CbD
Able to monitor and record side effects of antimicrobials.	CbD
Behaviours	**Assessment Methods**
Able to liaise with microbiology laboratory.	mini – CEX, MSF, CbD
Able to liaise with other members of the team responsible for the patient's care.	mini – CEX, MSF, CbD
Able to communicate prescribed antimicrobial therapy to patients and carers.	mini – CEX, MSF, CbD

2.4.2 Antibiotic Stewardship

Knowledge	**Assessment Methods**
Able to demonstrate understanding of the aims and objectives of antibiotic stewardship.	KBA, CbD

Able to demonstrate knowledge and understanding of stewardship practices and policies based on evidence-based guidelines.	KBA, mini – CEX, CbD
Able to demonstrate knowledge of the principles of antimicrobial use and resistance surveillance.	KBA, CbD
Able to demonstrate knowledge of the local, national and international epidemiology of resistance and where to locate it.	KBA, CbD
Skills	**Assessment Methods**
Able to work as a member and the leader of antimicrobial stewardship team in hospitals.	MSF, CbD
Able to work as part of a multidisciplinary team to provide the necessary input to an antimicrobial stewardship programmes in hospital and for other settings (primary care, long-term care facilities).	MSF, CbD
Behaviours	**Assessment Methods**
Able to work with colleagues from different disciplines to implement antimicrobial stewardship policies and practices.	MSF, CbD

2.5 Principles of infection prevention and control

2.5.1 To understand the principles and practices of infection prevention and control

Knowledge	**Assessment Methods**
Understands the basic biology of common agents implicated in HCAIs and their pathogenesis	KBA, mini – CEX, CbD
Knows about the mode of spread and optimum prevention and control strategies of HCAIs	KBA, mini – CEX, CbD
Can differentiate between infection/colonization/contamination/disease	KBA, mini – CEX, CbD
Knows about pathogenesis of HAI (respiratory tract, urinary tract, bloodstream, diarrhoea, surgical site infections, etc.)	KBA, mini – CEX, CbD
Knows about and can explain the concept of “The Chain of Infection”: Pathogen or infectious agent; Reservoir (patient, healthcare worker, environment); Portal of exit; Portal of entry; Mode of transmission;	KBA, mini – CEX, CbD

Susceptible host risk factors	
Knows the principles of HAI, including the influence on patient safety, requirements in organizational structures for HAI control, use of indicators for HAI control and antimicrobial resistance.	KBA, mini – CEX, CbD
Understands the principles of occupational health	KBA, mini – CEX, CbD
Knows the differences between HAI surveillance and clinical definitions for infectious syndromes, the role of surveillance and feedback reporting, the different surveillance systems and their validation.	KBA, mini – CEX, CbD
Understands the concept of meta-competences and European competences	KBA, mini – CEX, CbD
Understands the concepts of: • universal precautions • isolation measures • protecting healthcare workers from infection in the work place • source and protective isolation • aseptic non-touch technique (ANTT) • single use items	ACAT, ECE, mini – CEX, CbD
Knows about specific control measures employed to prevent transmission of infection to include hand hygiene, Personal Protective Equipment (PPE) and Isolation and Cohorting Strategies	ACAT, ECE, mini – CEX, CbD
Understands the basic principles of environmental control measures to include cleaning, disinfection, sterilization of patient care equipment and environmental cleaning (housekeeping).	ACAT, mini – CEX, CbD
Knows about the basics of technical hygiene, including ventilation and air-conditioning sytems, water systems, construction measures, decontamination and sterilization in healthcare systems.	ACAT, mini – CEX, CbD
Understands the role of the local authority in relation to infection control	ECE, mini – CEX, CbD
Skills	**Assessment Methods**
Recognise potential for transmission of infection in clinical settings	ACAT, ECE, mini – CEX, CbD
Demonstrate counselling patients on matters of infection risk, transmission, and control	ACAT, mini – CEX, CbD
Demonstrate following local infection prevention and control procedures	ACAT, mini – CEX
Demonstrate performing practical clinical procedures using aseptic technique	DOPs

Demonstrate undertaking of infection prevention and control practices	ECE, CbD

Behaviours	Assessment Methods
Demonstrate leading by example for all staff, patients, students and relatives to observe infection control principles	ACAT, ECE, MSF

2.5.2 The development of and execution of infection control policies in the hospital setting

Knowledge	Assessment Methods
Understands the evidence base for the effectiveness of infection control policies.	KBA, CbD
Understands the concept of development and implementation of IPC programmes, including presentation of an action plan, cost-benefit analysis, IT tools, emergency preparedness, effective outbreak investigation.	KBA, CbD
Aware of local / national and international clinical standards, guidelines and protocols	KBA, CbD

Skills	Assessment Methods
Able to assist in the formulation of appropriate local advice for HAI reduction and containment	mini – CEX, CbD
Practical ICP skills including: • elaborating, advocating and managing an IPC programme; • contributing to designing a surveillance system; • contributing to quality improvement; • implementing IPC activities	mini – CEX, CbD

Behaviours	Assessment Methods
Able to understand the importance of team working and clinical leadership	CbD, MSF
Able to motivate and encourage practice change	MSF
Able to understand the wider political and social implications of advice on HAIs as opposed to CAIs	CbD

2.6 Personal Protective Equipment for Infection Scenarios

Ability to both advise on and choose appropriate personal protective equipment for infection scenarios	
Knowledge	**Assessment Methods**
Aware of the specific categories of personal protective equipment	KBA, CbD
Skills	**Assessment Methods**
Ability to both advise on and choose appropriate personal protective equipment for infection scenarios	DOPS
Behaviours	**Assessment Methods**
Demonstrates commitment and leadership in the application of principles of hospital infection control	CbD, MSF

2.7. Outpatient Parenteral Antibiotic Therapy (OPAT)

Ability to include patients in OPAT programmes	
Knowledge	**Assessment Methods**
To know drugs that can be used in OPAT programmes and know about their stability.	KBA, mini – CEX, CbD
To understand which patients are suitable for OPAT programmes.	KBA, mini – CEX, CbD
To be able to recognize when a patient should be admitted to an OPAT programme, during the cursus of their infection.	KBA, mini – CEX, CbD
Skills	**Assessment Methods**
Able to organize treatment with other health care professionals	mini – CEX, PS
Able to organize monitoring of patients for cure, adverse events, failure	mini – CEX, PS
Able to involve General Practitioner in OPAT programmeme	mini – CEX, PS
Behaviours	**Assessment Methods**
Able to reassure patients and relatives when they are included in an OPAT programme.	mini-CEX, MSF, CbD, PS

Able to supervise and teach, if needed, health care professionals involved in the treatment and follow up of infected patients	CbD, MSF

OBJECTIVE 3: To obtain competence at consultant level in the management of non – HIV immunocompromised patients

3.1. Infection in immunocompromised patients

Ability to recognise infection in immunocompromised patients

Knowledge	Assessment Methods
Has knowledge of the pathophysiology and clinical features of infection in immunocompromised hosts	KBA, mini – CEX, CbD
Able to understand the relevance of specific aspects of the history and specific physical signs (and their absence)	KBA, mini – CEX, CbD
Able to understand the utility and limitations of laboratory investigations in immunocompromised patients	KBA, mini – CEX, CbD
Skills	**Assessment Methods**
Able to interpret test results and explain their relevance to patients	mini – CEX, PS
Behaviours	**Assessment Methods**
Able to consider interaction of psychological and social Well-being on physical symptoms	mini – CEX, CbD, PS
Able to demonstrate empathy and appreciate patients anxieties	mini-CEX, MSF, CbD, PS
Has an awareness of patient's rights and responsibilities	mini – CEX, CbD

3.2 Immune Deficiency

Ability to understand the causes and risk factors leading to immune deficiency

Knowledge	Assessment Methods
Has knowledge of both biological and iatrogenic aetiologies of immune deficiency	KBA, CbD

Skills	Assessment Methods
Able to advise patients regarding risk reduction for opportunistic infections relevant to the underlying immunosuppression	KBA, mini – CEX, CbD
Able to recognise clinical and laboratory manifestations of immune deficiency	KBA, mini – CEX, CbD

Behaviours	Assessment Methods
Able to have a non-judgemental attitude to risk activities	mini – CEX, PS
Able to maintain close liaison with other relevant medical teams (e.g. Haematology, Oncology, Renal)	CbD, MSF

3.3 Infections in immunocompromised oncologic patients

Ability to diagnose, manage and prevent infections in immunocompromised oncologic patients

Knowledge	Assessment Methods
Has a knowledge of the immunosuppressive treatments for cancer, including non-specific immunosuppressants (e.g. steroid therapy)	KBA, mini – CEX, CbD
Has a knowledge of the risk of infections in neutropenic patients	KBA, mini – CEX, CbD
Has a knowledge of the pathophysiology and clinical features of infections in immunocompromised oncologic patients	KBA, mini – CEX, CbD
Has a knowledge of the current standards in prevention, recognition and treatment of infections in immunocompromised oncologic patients	KBA, mini – CEX, CbD

Skills	Assessment Methods
Able to diagnose, manage and prevent infections in immunocompromised oncologic patients	mini – CEX, PS

Behaviours	Assessment Methods
Demonstrates sensitivity to cancer patient's, carer's and relative's anxieties, offering counselling where appropriate	MSF, PS
Able to maintain close liaison with the oncologic team	CbD, MSF
Has an awareness of patient's rights and responsibilities	mini – CEX, CbD

3.4 Infection in patients receiving immunosuppressive biological treatments

Ability to diagnose, manage and prevent infection in patients receiving immunosuppressive biological treatments

Knowledge	Assessment Methods
Has knowledge of both biological and iatrogenic aetiologies of immune deficiency in patients receiving immunosuppressive biological treatments	KBA, CbD
Has knowledge of the pathophysiology and clinical features of infection in patients receiving immunosuppressive biological treatments	KBA, mini – CEX, CbD
Has knowledge of the current standards in prevention, recognition and treatment of infections in patients receiving immunosuppressive biological treatment	KBA, mini – CEX, CbD
Skills	**Assessment Methods**
Able to diagnose, manage and prevent infections in patients on immunosuppressive biological treatments	mini – CEX, PS, CbD
Behaviours	**Assessment Methods**
Demonstrates sensitivity to patients receiving immunosuppressive biological treatments, carer's and relative's anxieties, offering counselling where appropriate	MSF, PS
Able to maintain close liaison with the team who takes care of patients receiving immunosuppressive biological treatments	CbD, MSF
Has an awareness of patient's rights and responsibilities	mini – CEX, CbD

3.5 Infections in solid organ transplant (SOT) recipients

Ability to prevent, diagnose, manage infections in SOT recipients

Knowledge	Assessment Methods
Has general knowledge of the immunosuppressive treatments for solid organ transplantation, including induction and maintenance immunosuppression	KBA, mini – CEX, CbD

Has knowledge on the specifics of immunosuppressive treatments according to the type of transplant	KBA, mini – CEX, CbD
Has knowledge of the specific infectious risks based on immunosuppression according to type of transplant	KBA, mini – CEX, CbD
Has knowledge of the infectious risks based on surgical aspects according to the type of transplant	KBA, mini – CEX, CbD
Has knowledge of the impact of local epidemiology on the risk of post-SOT infections and on the local specifics of prophylaxis	KBA, mini – CEX, CbD
Has knowledge of the current standards in prevention, recognition and treatment of infections in SOT recipients	KBA, mini – CEX, CbD
Has knowledge of antimicrobial drug toxicities and interactions with immunosuppressors used in SOT	KBA, mini – CEX, CbD
Has knowledge of the pre-transplant infectious diseases evaluation, as well as of the pre/post-transplant vaccination strategies of SOT recipients	KBA, mini – CEX, CbD
Has knowledge on the management of transplant recipients with HIV infection	KBA, mini – CEX, CbD
Has knowledge of infectious risks according to travel wishes of SOT recipients	KBA, mini – CEX, CbD

Skills	**Assessment Methods**
Able to diagnose, manage and prevent infections in SOT recipients • Treatment of multidrug resistant mycobacterial infections in lung transplant candidates and recipients • Treatment of *Bulkholderia cenocepacia* colonization/infection in lung transplant recipients • Prevention and treatment of infections associated with mechanical support devices in heart transplant candidates • Treatment of infection of MDR bacteria and the specific toxicity of their therapy in SOT recipients • Management of the HIV infected individuals who have a solid-organ transplant • Prevent the most important viral infections after transplant (such as CMV, EBV) • Counsel patients with respect to the risk of infection associated with food behaviour	KBA, mini – CEX, PS

Behaviours	**Assessment Methods**
Demonstrates sensitivity to patients with end stage organ disease	MSF, PS

and SOT recipients, carer's and relative's anxieties, offering counselling where appropriate	
Able to maintain close liaison with the transplant team	CbD, MSF
Has an awareness of patient's rights and responsibilities	mini – CEX, CbD

3.6 Infections in hematopoietic stem cell transplantation (HSCT) recipients and onco-haematological patients

Ability to prevent, diagnose, manage infections in HSCT recipients and onco-haematological patients

Knowledge	**Assessment Methods**
Has general knowledge of the immunosuppressive treatments for HSCT and onco-haematological patients, including induction, consolidation and GvHD therapies	KBA, mini – CEX, CbD
Has knowledge on the specifics of immunosuppressive treatments according to the type of HSCT, onco-haematological disease and GvHD	KBA, mini – CEX, CbD
Has knowledge of the specific infectious risks based on immunosuppression according to type of HSCT, onco-haematological disease and GvHD	KBA, mini – CEX, CbD
Has knowledge of the impact of local epidemiology on the risk of pre/post HSCT infections and on the local specifics of prophylaxis	KBA, mini – CEX, CbD
Has knowledge of the current standards in prevention, recognition and treatment of infections in HSCT recipients and onco-haematological patients	KBA, mini – CEX, CbD
Has knowledge of antimicrobial drug toxicities and interactions with immunosuppressors used in HSCT and for GvHD	KBA, mini – CEX, CbD
Has knowledge of the pre-HSCT infectious diseases evaluation, as well as of the pre/post-transplant vaccination strategies for HSCT recipients	KBA, mini – CEX, CbD
Has knowledge of infectious risks according to travel wishes of HSCT recipients	KBA, mini – CEX, CbD
Skills	**Assessment Methods**
Able to diagnose, manage and prevent infections in HSCT recipients,	mini – CEX, PS

onco-haematological patients and during GvHD	
Behaviours	**Assessment Methods**
Demonstrates sensitivity to patients with onco-haematological diseases, carer's and relative's anxieties, offering counselling where appropriate	MSF, PS
Able to maintain close liaison with the haematological transplant team	CbD, MSF
Has an awareness of patient's rights and responsibilities	mini – CEX, CbD

OBJECTIVE 4: Imported infections, Health advice for travellers, Infection Related Problems of Immigrants

4.1 Imported Infections

Recognition and treatment of imported infections

Knowledge	Assessment Methods
Has knowledge about clinical and epidemiological features of imported diseases, including severe communicable diseases such as haemorrhagic fevers	KBA, mini – CEX, CbD
Has knowledge of antimicrobial resistance patterns of imported infections and its influence on empirical prescribing for infection in travellers	KBA, CbD
Understands the availability and limitations of specialised diagnostic tests	KBA, CbD
Understands the management of malaria and other imported Infections	KBA, CbD
Participates in a network providing information on emerging infectious diseases	KBA, CbD
Skills	**Assessment Methods**
Able to elicit and record appropriate travel history and develop a differential diagnosis of imported infection	mini – CEX, CbD
Able to select and interpret appropriate diagnostic tests	mini – CEX, CbD
Able to manage malaria and other common imported infections	mini – CEX, CbD
Able to identify severe malaria	mini – CEX, CbD
Able to collaborate with health care authorities in case of emerging infectious diseases	mini – CEX, CbD
Aware of the potential for severe communicable diseases (e.g. viral haemorrhagic fevers) and their infection control issues	KBA, mini – CEX, CbD
Behaviours	**Assessment Methods**
Able to be flexible in their thinking to review and revision of the differential diagnosis	mini – CEX, CbD
Able to identify unusual clinical presentation, and epidemiological risks in order to suspect an emerging infectious disease	mini – CEX, CbD

4.2. Health Advice for Travellers

Provision of health advice for travellers

Knowledge	Assessment Methods
Able to demonstrate an understanding of the geographical patterns of disease, risk factors for their acquisition and the availability of paper, electronic and other resources (e.g. vaccination guidelines and travel health websites)	KBA, mini – CEX, CbD
Demonstrates and understands the use, availability, efficacy and safety of vaccines	KBA, mini – CEX, CbD
Demonstrates an understanding of the principles of organising a travel clinic and the medico – legal issues involved	KBA, CbD

Skills	Assessment Methods
Able to take and accurately record pre-travel medical and travel history	mini – CEX, CbD
Able to perform risk assessments appropriate to the traveller, including consideration of specific groups (e.g. the elderly, pregnant women, disabled and immuno – compromised) and the hazards of specific types of travel	mini – CEX, CbD
Able to formulate and communicate appropriate verbal and written advice for the traveller and motivates them to apply the advice	mini – CEX, CbD, PS
Able to prescribe and administer immunisations as appropriate	mini – CEX, CbD
Able to prescribe antimalarials as appropriate	mini – CEX, CbD
Able to advise on prevention and management of traveller's diarrhoea	

Behaviours	Assessment Methods
Demonstrates a commitment to maintaining up to date information	CbD
Has sufficient insight to determine when to seek further advice	CbD, MSF

4.3. Infection Related Problems of Immigrants

Infection related problems of immigrants	
Knowledge	**Assessment Methods**
Able to outline the health needs of migrant populations beliefs, culture and ethnicity in presentations of physical and psychological conditions	KBA, mini-CEX
Understand the epidemiological and clinical features of imported infections in immigrant groups	KBA, mini – CEX
Skills	**Assessment Methods**
Able to work with interpreters and patient support groups	mini – CEX, CbD, PS
Able to recognise both acute and chronic infections, including those that are asymptomatic in immigrants	KBA, mini – CEX, CbD
Behaviours	**Assessment Methods**
Able to recognise the indications for the use of a cultural mediator	mini – CEX, MSF, CbD
Able to recognise the duty of the medical professional to act as patient advocate	mini – CEX, MSF, CbD
Able to understand cultural differences that may influence the communication and adherence to treatment	mini – CEX, MSF, CbD

OBJECTIVE 5: Public Health in relation to Infection, Outbreaks and Surveillance, Vaccination

5.1 Public Health in relation to Infection

To understand the importance of control of communicable diseases and be able to evaluate effectiveness of services to prevent, diagnose and treat infection

Knowledge	Assessment Methods
Describe public health issues related to infectious diseases, including identifying and describing the key communicable disease threats: aetiology; how these diseases spread; how they are prevented	KBA, mini – CEX, ACAT, CbD
Outline modes of transmission, incubation period, period of communicability of common agents with public health importance	KBA, mini – CEX, ACAT, CbD
Describe basic epidemiological methods	KBA, mini – CEX, ACAT, CbD
Describe the requirements for statutory and 'good practice' notification of infectious disease	mini – CEX, ACAT, CbD
Explain the function of the health protection and environmental health officers (or their equivalents), and their relationship with key infection control personnel in the hospital and community	mini – CEX, ACAT, CbD
Explain the role of vaccination in vaccine-preventable communicable diseases	CbD, KBA

Skills	Assessment Methods
Notify with infectious disease (statutory requirements and 'good practice' notifications) when required	mini – CEX, ACAT, CbD
Demonstrate provision of appropriate vaccine advice	mini – CEX, ACAT, CbD

Behaviours	Assessment Methods
Demonstrate good working relationships with Consultants in Communicable Disease Control (CsCDC) and environmental health officers (or equivalents) and other colleagues who provide health protection functions	CbD

5.2 Surveillance and Outbreaks

To understand the principles of diseases outbreak detection and management

Knowledge	Assessment Methods
Describe the role of the laboratory in investigating disease outbreaks	ACAT, ECE, CbD, mini-CEX
Describe the role of the infectious diseases physician, clinical microbiologist and epidemiologist in investigating disease outbreaks	ACAT, ECE, CbD, mini – CEX
Describe the key principles underpinning outbreak detection, reporting investigation, control.	ACAT, ECE, CbD, mini – CEX
Skills	**Assessment Methods**
Demonstrate utilising laboratory and clinical resources appropriately when investigating a nosocomial outbreak	ACAT, ECE, CbD, mini – CEX
Demonstrate utilising laboratory and clinical resources appropriately when investigating an outbreak in the community	ACAT, ECE, CbD, mini – CEX
Ability to identify unusual situations that need to be reported	ACAT, ECE, CbD, mini – CEX
Behaviours	**Assessment Methods**
Demonstrate effective working within a team	ACAT, ECE, MSF
Demonstrate appreciation of roles of other health professionals	ACAT, ECE, MSF
Demonstrate an alert and vigilant mind	ACAT, ECE, MSF

5.3 Vaccination

Ability to advise on vaccination against infectious diseases

Knowledge	Assessment Methods
Explain: • the advantages and disadvantages of live attenuated, inactivated and recombinant vaccines and conjugate vaccines	KBA
• the use of licensed vaccines in prevention of disease caused by viral infection, bacterial infection and bacterial toxins	KBA, mini – CEX, CbD
• national and the WHO schedules for immunisation against infectious diseases	KBA, ECE

• recommendations for immunisation of healthcare workers	KBA, CbD, ECE
• the immunisation protocols for patients with reduced splenic function	KBA, mini – CEX, CbD
• the use of vaccines in post-exposure prophylaxis e.g. rabies, hepatitis A, hepatitis B, tetanus	KBA, CbD, MSF, ECE
• the use of vaccines to boost pre-existing immunity e.g. VZ	KBA, CbD
• the safety of vaccines and their adverse effects	
• testing for immunity pre- and post-vaccination, the methods available for measuring this and their limitations	KBA, CbD, DOPS
• the effects of vaccination on a population e.g. herd immunity, age shifts in natural infection	KBA, ECE
• how diseases can be eradicated by vaccination	KBA

Skills	**Assessment Methods**
Demonstrate ability to:	
• select and interpret laboratory tests for immunity	CbD, DOPS
• explain clearly the advantages and disadvantages of vaccination including assessment of safety profiles	CbD, ECE, mini – CEX
• advise appropriately on the use of active and passive immunisation in prevention of infection, including in the management of outbreaks	CbD, KBA, ECE, MSF
• apply national guidance on vaccination relevant to common clinical scenarios	CbD, KBA

Behaviours	**Assessment Methods**
Enthusiastic approach to learning	MSF
Enthusiastic in promoting increased uptake of vaccination	MSF
Able to deal with vaccine hesitancy	MSF
Respect for and ability to work with immunisation coordinators, nursing staff, public health colleagues and others responsible for vaccine policy and delivery	MSF

OBJECTIVE 6: Use of microbiology laboratory technique, understanding laboratory reporting and process

Applies to all the sub-disciplines of medical microbiology (bacteriology, virology, mycology and parasitology)

6.1 General Microbiology Principles

General Microbiology Principles

Knowledge	Assessment Methods
Knows the basic microbial biology (structure, genetics, taxonomy, physiology, epidemiology, classification and typing) of major bacterial, viral, fungal and parasitic agents, and methods to make diagnosis according clinical presentations	KBA, mini – CEX, CbD
Knows the basics of the immune response to infection, host defence mechanisms, the immune system and immunity to infection and immunodeficiency.	KBA
Knows the basis of different types of host−parasite relationships, e.g. symbiosis, viral latency, species evolution, etc.	KBA
Skills	**Assessment Methods**
Able to use knowledge in general Microbiology principles, to choose for each specimen type, the optimal method for collection and transport (including transport media)	KBA, mini – CEX, CbD
Behaviours	**Assessment Methods**
Able to establish close rapport and understanding with laboratory staff	MSF, CbD

6.2 Basic Microbiological Benchwork

Basic microbiological benchwork including critical interpretation of laboratory procedures in relation to laboratory diagnosis

Knowledge	Assessment Methods
Knows the principles of light, fluorescent and electron microscopy	KBA
Knows the basic diagnostic and screening methods in microbiology	KBA
Knows the basis and clinical interpretation of results of basic serological test methods and the various controls	KBA

Knows the basic understanding of current used molecular and other new techniques available to diagnostic laboratories	KBA

Skills	Assessment Methods
Able to set up a light microscope	MSF, DOPS
Able to perform routine staining techniques including fluorescent dyes	MSF, DOPS
Able to perform and interpret antibiotic susceptibility testing	MSF, DOPS

Behaviours	Assessment Methods
Able to establish close rapport and understanding with laboratory staff	MSF, CbD

6.3 Microbiological Reporting

Ability to be aware of the process and constraints around Microbiological reporting

Knowledge	Assessment Methods
Able to demonstrate a knowledge of the pathways of Microbiological reporting	KBA, mini – CEX, CbD
Able to demonstrate a knowledge of the boundaries of the use of Microbiological information in the context of clinical information	KBA, mini – CEX, CbD

Skills	Assessment Methods
Able to communicate with colleagues and other doctors in different disciplines and enable them to appreciate the relevance of the data	mini – CEX, CbD, MSF
Able to interpret laboratory data in the context of clinical information provided and when to obtain further information	mini – CEX, CbD, MSF
Able to provide appropriate antibiotic and other management advice at the bedside and over the telephone	mini – CEX, CbD
Be aware of the role of the laboratory report in antibiotic stewardship and infection control initiatives	mini – CEX, CbD, MSF

Behaviours	Assessment Methods
Able to establish a good rapport with other medical colleagues	MSF

and able to work co-operatively within multidisciplinary teams	
Able to give clear oral and written communication	CbD

OBJECTIVE 7: To obtain an understanding of research and audit methodology and the practical implementation of research, audit and quality improvement projects

To ensure that research is undertaken using relevant ethical guidelines. To make the optimal use of current best evidence in making decisions about the care of patients

Knowledge	Assessment Methods
Able to demonstrate an understanding of the principles of research governance	KBA, AA, mini – CEX, CbD
Able to outline the differences between audit and research	CbD, SCE
Able to demonstrate a knowledge of research principles	CbD, mini – CEX
Able to outline the principles of formulating a research question and designing a project	CbD, mini – CEX
Able to understand the principles of qualitative, bio – statistical and epidemiological research methods	KBA, CbD
Able to outline sources of research funding	CbD
Able to understand the difference between population – based assessment and unit based studies and able to evaluate outcomes for epidemiological work	CbD
Knows the advantages and disadvantages of different study methodologies	KBA, CbD
Able to understand the principles of critical appraisal	CbD
Able to understand the processes that result in nationally applicable guidelines	CbD
Able to understand the different methods of obtaining data for audit, including patient feedback questionnaires, hospital sources and national reference data	AA, CbD
Able to understand the role of audit in improving patient	AA, CbD

care and services as well as in risk management	
Able to understand the steps involved in completing the audit cycle	AA, CbD
Able to understand the working of and able to use national and local databases used for audit, such as specialty data collection systems etc	AA, CbD
Able to understand the working of and able to use local and national systems if available for reporting and learning from clinical incidents and near misses	AA, CbD
Skills	**Assessment Methods**
Able to use critical appraisal skills and applies these when reading literature	CbD
Able to apply for appropriate ethical research approval	CbD
Able to demonstrate the use of literature databases	CbD
Able to understand the difference between population–based assessment and unit-based studies and be able to evaluate outcomes	CbD
Able to search the medical literature including the use of PubMed, Medline, Cochrane reviews and the internet	CbD, TO
Able to appraise retrieved evidence to address a clinical question and apply conclusions	CbD
Able to contribute to the construction, review and updating of local (and national) guidelines using the principles of evidence based medicine	CbD
Able to design, implement and complete an audit cycle	AA, CbD
Able to contribute to local and national audit projects as appropriate	AA, CbD
Able to support audits performed by junior medical Trainees and other members of the multidisciplinary team	AA, CbD
Able to write scientific article, submit and review it	AA, CbD
Behaviours	**Assessment Methods**
Able to follow guidelines on ethical conduct in research and consent for research	CbD
Demonstrates a willingness to promote research	CbD

Able to recognise the need for audit in clinical practice to promote standard setting and quality assurance	AA, CbD