

SPECIALIST ACCREDITATION COMMITTEE

MEDICAL

TRAINING PROGRAMME

MICROBIOLOGY

Approved by SAC on 26th May, 2009

The Training logbook is attached



MALTA COLLEGE OF PATHOLOGISTS

CORE TRAINING PROGRAMME AND TRAINING RECORD FOR MEDICAL MICROBIOLOGY

(INCLUDES BACTERIOLOGY, VIROLOGY, MYCOLOGY, PARASITOLOGY AND INFECTION CONTROL)

INTRODUCTION

GENERAL AIM

To produce trained medical microbiologists who can provide specialist opinion in their clinical discipline and who should have developed the appropriate management skills to lead a department, if required.

The trained Medical Microbiologist should be competent to:

- *Give advice as a physician on the diagnosis, treatment and prevention of microbial diseases.*
- *provide a scientific basis for laboratory diagnosis; to set protocols and to maintain standards within the laboratory.*
- *undertake the management responsibilities required from the director of a medical microbiology laboratory.*
- *take charge of infection control in hospitals*
- *propose hospital policies on the control of antibiotic usage and on the prevention of hospital acquired infection*
- *collaborate with national surveillance organisations and public health authorities and to provide services for these organisations*
- *participate in the training programs for medical microbiologists, infection control doctors and other experts in the field of microbial diseases.*
- *undertake research and development in the specialty of microbiological biopathology*

OBJECTIVES

Over a minimum 5 year period the trainee should acquire or develop:

- a) Specialised factual knowledge, of the natural history of those diseases upon which the chosen discipline is based.
- b) Interpretative skills so that a clinically useful opinion can be derived from laboratory data. *Emphasis should be made on the importance of clinical training and multidisciplinary care together with clinical and pathological conferences.*
- c) Technical knowledge, gained from close acquaintance with laboratory technology, so that methodology appropriate to a clinical problem can be chosen, and so that quality control and quality assurance procedures can be implemented.
- d) Research and development experience Original thought and critical assessment of published work are important to allow the trainee to contribute in a team, and individually, to the development of the service.
- e) The life-long habits of reading, literature-searches, consultation with colleagues attendance at scientific meetings, and the presentation of scientific work as part of continuing medical education (CME).
- f) Data management skills to evaluate information derived from the population served and from the technical procedures applied in the laboratory. These skills should include familiarity with IT and the use of spreadsheets, databases and statistical packages etc.
- g) Management and communication skills. The trainee must gain experience, under supervision, in planning departmental policies and develop the leadership skills necessary to implement them.
- f) Familiarity with all aspects of health and safety requirements for laboratories.

SUPERVISION AND REVIEW OF PROGRESS IN TRAINING

Trainees are required to keep a training record detailing their training experience. This will be inspected on a regular basis by their Trainer and annually by the Head of Training for Microbiology, i.e. the consultant in charge of training. Trainees will be regularly informed of their progress and, in addition, trainees must be encouraged and given every opportunity to discuss any deficiencies in the training programme. The Trainer should discuss the trainee's progress with each consultant (trainer) with whom a trainee spends a period of one month or more. Trainees should agree a training programme with their allocated Trainer, soon after appointment.

The trainee should have appraisal twice a year:

- an informal meeting involving the Trainer and trainee, should be held every six months and the record of training should be signed by the Trainer;
- a formal annual appraisal by a Board nominated by the Pathology Postgraduate Training Committee, composed of a minimum of three members including the Head of Training for Microbiology,, will be held on completion of each year's training. Any reports or appraisals prepared during the year should be available to the trainee.

Trainees can only progress to the next year of the Training Programme following a successful assessment.

Trainers would be expected to have substantial experience in the specialty, to have demonstrated an interest in training, to have appropriate teaching resources, to be involved in appropriate regional training committees and to be involved in annual reviews. The Trainer will be responsible to the Specialist Training Committee and the Post-graduate Training Co-ordinator, who will liaise closely with the Specialist Accreditation Committee responsible for the accreditation of post-graduate training programmes of medical specialists

MANAGERIAL TOPICS WHICH ARE PART OF CORE TRAINING

1. Management

Aspects of management - strategic planning, preparation of a business plan, contracting processes, service level agreements, departmental and directorate budgeting etc. - should be part of training. The trainees should be encouraged to attend appropriate management courses in which the programme will be sustained by professional managers. Trainees may, as "colleagues", be permitted to sit in on departmental, directorate and other local committee meetings as observers. The aims and objectives of this should be to provide them with some experience of committee procedures, aspects of confidentiality, decision making at a local level and the importance of maintaining good inter-personal relationships.

2. Health and Safety

Irrespective of discipline, each trainee should, from the start, become fully familiar with all aspects of Health and Safety in the laboratory and should be made aware of the legal obligations and the role of the Health and Safety Executive *or equivalent national body* requirements which have to be met to obtain and retain full laboratory accreditation.

3. IT and Communication Skills

The trainee should, from the start, become familiar with fundamental aspects of computing within the laboratory - databases, spread sheets, internet etc. - and how these are used on a day to day basis.

4. Audit and Quality Assessment

All trainees must, from the start, become familiar with audit procedures and should participate in regular clinical audit. Trainees should gain understanding of quality control and quality assurance. At the end of formal training they should have a full understanding in these two areas; they should have an understanding of external quality assessment and the processing of data by these schemes.

CORE TRAINING PROGRAMMES:

This document sets out a curriculum for medical microbiologists which cover the scientific base of medical microbiology, as well as applied aspects, including related fields such as infectious diseases and communicable diseases control. Some element of medical microbiology training is common to the training of consultants in communicable diseases control and of infectious diseases physicians.

AIMS OF TRAINING

The core training programme aims to provide the trainee with both the theoretical foundation and the practical, technical, clinical and managerial skills necessary for the independent specialist practice of medical microbiology in a clinical environment and for the advancement of the subject. Although some information relating to the appropriate clinical experience is listed in section 11, it must be appreciated that laboratory work and clinical experience must be closely integrated, therefore laboratory associated clinical duties are an essential component of the training programme.

SUPERVISION

Programmes based on this curriculum should be appropriate to the needs and previous experience of the trainee and should set out educational objectives against which the trainees' progress can be assessed. The trainee should have an educational supervisor at each site of any rotation.

LOCATION OF TRAINING

The programme shall include a minimal training period of *two years* in a recognised overseas post-graduate training facility. This attachment will cover any specific areas of training not covered by the local training departments.

The first three years of training is undertaken in Malta and would involve the following rotation:

18 months	Bacteriology (including basic Mycology & Parasitology)
6 months	Virology
6 months	Infection Control
6 months	Infectious Diseases, Intensive Care and Public Health (including Public Health Laboratory)

CORE TRAINING PROGRAMME: MEDICAL MICROBIOLOGY

1. Scientific basis of medical microbiology

Trainees should have an understanding of the principles of the following, together with how they may be applied to clinical and research problems:

- a) microbial structure, physiology and genetics;
- b) microbial taxonomy, classification and typing methods;
- c) host defence mechanisms, the immune system and immunity to infection;
- d) microbial pathogenicity;
- e) epidemiology of infectious diseases - their surveillance and control;
- f) antimicrobial agents, their mode of action and mechanisms of microbial resistance.

2. Laboratory safety

Prior to any "hands on" experience of laboratory work, the trainee should be instructed in basic safety requirements including correct laboratory dress and laboratory hygiene. Instruction should also be given on the immediate handling and disposal of specimens and contaminated articles (e.g. inoculating loops, pipettes) at the laboratory bench, the dangers of aerosols and the procedure for dealing with spillages.

At the end of formal training, the microbiologist should be familiar with:

- a) local procedures for the safe transport of specimens or cultures and also with national and international postal and packaging regulations for such material;
- b) current requirements and recommendations of the National Advisory Committee on safety in microbiological laboratories.
- c) the principles and operation of microbiological safety cabinets containment level III facilities and the procedures for their safe use, decontamination and monitoring of air flow.

3. Sterilisation and Disinfection

At the end of formal training, the microbiologist should understand the principles and uses of sterilization and disinfection procedures for the preparation of media and instruments and for microbiological waste disposal. Trainees should be familiar with methods of monitoring and be capable of formulating a policy on the use of sterilization and disinfection in the laboratory, hospital or community.

4. Handling of specimens

At the end of formal training, the microbiologist should:

a) be aware, for each specimen type, of the optimal methods for collection, transport (including transport media), storage, reception, identification and documentation, including the requirements for high-risk specimens.

The trainee should develop a sense of the continuity of identification of specimens from collection, through culture and further testing to the issuing of a final report. He or she needs to be aware of critical points in processing where this continuity may fail and be able to minimise the risk of this.

b) be able to assess degrees of urgency for the processing of specimens, including the provision for an out of hours service and the communication of preliminary results as applicable;

c) be able to decide upon further testing or processing of a specimen as appropriate;

d) be aware of existing reference facilities and their appropriate use.

5. Microscopy

At the end of formal training, the microbiologist should:

a) understand the principles of light, darkground, phase contract, fluorescent and electron microscopy and be able to set up a light microscope with dark ground and phase contrast facilities;

b) be able to perform routine staining techniques including fluorescent dyes;

c) be familiar with the appearance of stained preparations and be able to recognise artefacts and their possible origin.

6. Culture methods

At the end of formal training, the microbiologist should:

a) have a basic understanding of the diversity of microbial metabolism;

b) be aware of the wide range of selective, enrichment and inhibitory media available for general and specialised use and be able to choose relevant media in common use or in medical and environmental laboratories;

c) be familiar with physical growth requirements of micro-organisms including atmosphere and optimal temperature and have an appreciation of the growth kinetics of both solid phase and broth cultures. It is important in this context to know those micro-organisms and clinical situations in which detectable growth may require prolonged incubations;

d) be familiar with the preparation of media in common use and have an understanding of internal quality control of such preparations;

e) be able to process all common specimens, recognise potential pathogens from a mixture of colonies on culture plates, separate such colonies in order to achieve the pure growth necessary for further work.

7. Further processing of cultures

At the end of formal training, the microbiologist should:

- a) be able to perform tests leading to the identification of all common pathogens including the use of commercially produced kits (e.g.. kits for enzyme assays) and rapid diagnostic kits, ELISA, latex agglutination;
- b) understand the principles of identification media and be able to use them appropriately;
- c) understand the principles behind multipoint identification technology.

8. Antimicrobial investigations

At the end of formal training, the microbiologist should:

- a) be aware of available reference facilities for further identification including serotyping and all other typing schemes both phenotypic and genotypic;
- b) be able to test the antibiotic sensitivities of an isolate using the common techniques of disc testing and break points and to be aware of the principles behind multipoint sensitivity technology;
- c) be able to perform and interpret MIC and MBC tests as appropriate;
- d) be able to perform antimicrobial assays using biological and automated techniques;
- e) have an understanding of antimicrobial assays and their relationship to the therapeutic and toxic effects on a patient and be able to advise on dosage regimens accordingly.

9. Emerging technologies

At the end of formal training, the microbiologist should:

- a) be aware of all major new technologies available in medical microbiology based on DNA techniques (e.g. PCR) and monoclonal antibodies;
- b) be aware of automated, rapid techniques available to medical microbiology;
- a. be able to evaluate critically the need for emerging techniques within the laboratory including cost effectiveness and effects on staffing levels and working practices.

10. Data handling

At the end of formal training, the microbiologist should:

- a) have a basic understanding of information technology and in particular, computerised data handling. He or she should have an appreciation of the advantages and disadvantages of such systems and a basic understanding of the need for data protection;
- b) be aware of available technologies for data broadcasting.

11. Clinical experience

At the end of formal training, the microbiologist should:

- a) have gained experience of liaison with clinical colleagues through regular ward visits *and participation in collaborative clinical activities*. In particular, a close relationship with high dependency units (e.g. ICU, NICU) and specialist units (e.g. haematology, paediatrics, transplantation *etc.*) where available;
- b) have participated in on-call rotas (including weekends) with consultant cover;
- c) have participated in postgraduate educational meetings such as Grand Rounds and lunchtime case presentations;
- d) be able to provide informed advice on vaccination and immunisation with all products normally available in the EU.

12. Infection control in hospital and community

At the end of formal training, the microbiologist should:

- a) have had first hand experience of local infection control problems, including, outbreaks of infection and their management;
- b) be familiar with the workings of infection control meetings including hospital infection control committee;
- c) be aware of those areas of hospital and community health that require infection control policies;
- d) have worked closely with the infection control nurses both in day to day duties and in the education of those involved with infection control issues;
- e) have participated in visits to clinical and non-clinical areas to advise on infection control. Relationships should be developed with key personnel in the central sterilization unit, pharmacy and laundry;
- f) have an understanding of the principles of patient isolation and their application;
- g) be familiar with all guidelines and policies relevant to infection control (e.g. MRSA, Shigella, *Clostridium difficile*);
- h) become familiar with the physical and chemical agents used in hospital infection control.

13. Antimicrobial usage

At the end of formal training, a microbiologist should have knowledge of:

- a) empiric, directed and prophylactic antimicrobial use.
- b) the means of prevention of emergence of resistance
- c) surveillance of antibiotic resistance

14. Virology

At the end of formal training, a microbiologist should have knowledge of:

- a) basic diagnostic and screening virology methodology;
- b) interpretation of results, both for clinical and infection control purposes;
- c) virology policies in relation to health care workers, pregnancy, transplantation and immunisation;
- d) when to refer to or request specialist virological expertise.

A period of six months to one year in total should be spent in a specialised virology laboratory during training.

15. Mycology

At the end of formal training, a microbiologist should have knowledge of:

- a) basic diagnostic mycology methodology;
- b) interpretation of results, both for clinical and infection control purposes;
- c) special problems associated with the immunocompromised host

16. Parasitology

At the end of formal training, a microbiologist should have knowledge of:

- a) basic diagnostic parasitology methodology;
- b) interpretation of results, both for clinical and infection control purposes;
- c) special problems associated with the immunocompromised host

17. Public Health

At the end of formal training, the microbiologist should:

- a) be aware of those areas of community health that require infection prevention & control;
- b) have participated in visits to non-clinical areas to advise on prevention of infection. These should include kitchen inspections especially those conducted by environmental health officers.
- c) gained some experience of public health microbiology and procedures adopted in a Public Health Laboratory;
- d) have had some experience of communicable disease control in the community working Environmental Health Officers.

18. Environmental Microbiology

At the end of formal training, a microbiologist should have knowledge of:

- a) existing of statutory requirements for certain food, water or milk types
- b) basic methodology to examine common types of food, water and milk for total counts, specific organism detection and special tests
- c) the principles behind interpretation of results on different food types and can advise environmental health officers and others accordingly
- d) methods for detection of important environmental pathogens e.g. *Legionella*, *Cryptosporidium sp.*
- e) methodology and interpretation of air sampling within operating theatres

19. Quality control

At the end of formal training, the microbiologist should:

- a) have an understanding of quality control and quality assurance;
- b) have had experience of the regular processing of specimens, distributed by an organisation for external quality control e.g. PHLS (UK), WHO.
- c) have an understanding of the existing external quality control schemes and the processing of data by these schemes as well as internal quality control using simulated specimens in Bacteriology.

19. Audit

At the end of formal training, the microbiologist should:

- a) have an understanding of the principles of audit;
- b) have participated in microbiological audit both in house and in the microbiological audit of clinical specialties. The trainee should have also participated in clinical audit led by other specialties.

20. Accreditation

At the end of formal training, the microbiologist should:

- a) have knowledge of the requirements of any existing laboratory accreditation schemes and the process whereby accreditation is conferred.

21. Management

At the end of formal training, the microbiologist should have:

a) achieved a basic knowledge of important aspects of laboratory management including budget control, personnel management and administration. Attendance at local or national management courses should be strongly encouraged.

CRITERIA for COMPLETION OF PROGRAMME and AWARD of SPECIALIST CERTIFICATE

Once the trainee has satisfactorily completed the Training Programme outlined above, he/she will be entitled to obtain the Certificate of Completion of Specialist Training (CCST) subject to obtaining a relevant Postgraduate Qualification, by Examination.

The College will identify the Examination and Examination Boards that it recognises for the award of a Postgraduate Qualification. Candidates are strongly encouraged to seek the advice of the College before enrolling in any examination to ensure that any qualification obtained would be suitable for CCST purposes.

The CCST will be awarded by the Specialist Accreditation Committee, on the recommendation of the College provided the College Council is satisfied of the trainee's proficiency in the discipline concerned.

QUALIFICATIONS FOR TRAINERS

A Post-Graduate Training Co-ordinator, appointed through a call for applications by the Health Division, will be responsible for implementation of the Pathology Training Programmes. The Co-ordinator will set up and chair a single Specialist Training Committee for all pathology disciplines, including Microbiology, which will be responsible for the management and administration of Training Programmes in Pathology. The Committee will be composed of Pathology trainers and will include the Chairman of Pathology.

The Post-graduate Training Co-ordinator and the trainers must be on the Specialist Register of the Medical Council and should have been practising the speciality for at least 5 years. Trainers are expected to have substantial experience in the specialty, to have demonstrated an interest in training, to have appropriate teaching resources, to be involved in annual reviews, to participate in training programmes for trainers and to liaise closely with the Post-Graduate Training Co-ordinator.

The teaching staff may include specialists in training and non medical graduates but they must be practicing pathology or any other relevant topic, e.g. information technology, molecular biology.

DUTIES OF TRAINERS

Each trainee will have a Trainer, whose main responsibility is to perform continuous assessment of the progress of the trainee, throughout the duration of the training period. The Trainer will be responsible to the Specialist Training Committee and the Post-graduate Training Co-ordinator.

In particular, the Trainer will have the following duties:

- To supervise all aspects of training
- To meet regularly with the trainee to discuss the programme, progress and deficiencies
- To perform an official appraisal every 6 months, at which the trainee is also expected to give feedback
- To liaise with individual trainers in the specialty, to assess the trainee's progress
- To acquire feedback, regarding the training programme, from both trainee and trainers.

CONTINUED PROFESSIONAL DEVELOPMENT

The trainee is expected to:

- read major microbiology & infection control journals
- keep abreast of current literature
- attend local activities accredited by the Malta College of Pathologists for CPD purposes
- attend conferences abroad.

A list of activities recognised by the Malta College of Pathologists for CPD points will be available.

TEACHING

The trainee is expected to take part in the Undergraduate Teaching of the University Pathology Department as follows:

- lectures and tutorials to Medical Students
- lectures and tutorials to BSc MLS students
- supervision of dissertations for BSc MLS students
- training to Laboratory Technical Staff.

RESEARCH

Time will be allocated for research activity, which will be encouraged and supervised. Trainees who are in possession of a postgraduate degree, at Masters level and above, in any relevant Pathology discipline (e.g. microbiology, virology, parasitology, infection control) will be exempted from one year of the proposed Training Programme.