UEMS SECTION OF MEDICAL BIOPATHOLOGY
CORE TRAINING PROGRAMME AND TRAINING RECORD FOR MEDICAL MICROBIOLOGY (*INCLUDES BACTERIOLOGY, VIROLOGY, MYCOLOGY AND PARASITOLOGY*).

INTRODUCTION

GENERAL AIM

to produce trained medical microbiologists to 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:

1. *Give advice as a physician on the diagnosis, treatment and prevention of microbial diseases.*
2. *provide a scientific basis for laboratory diagnosis; to set protocols and to maintain standards within the laboratory.*
3. *undertake the management responsibilities required from the director of a medical microbiology laboratory.*
4. *take charge of infection control in hospitals*
5. *propose hospital policies on the control of antibiotic usage and on the prevention of hospital acquired infection*
6. *collaborate with national surveillance organisations and public health authoroties and to provide services for these organisations*
7. *participate in the training programs for medical microbiologists, infection control doctors and other experts in the field of microbial diseases.*
8. *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 multidisiplinary 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 Educational Supervisor 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 Educational Supervisor 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 supervisor soon after appointment.

The trainee should have supportive appraisal twice a year:

a) an informal meeting involving the Educational Supervisor and trainee, should be held every six months and the record of training should be signed by the Educational Supervisor;

b) an *assessment by* a panel approved by the Postgraduate Dean and/or a national board or committee for the registration of medical specialists on completion of each year's training *or similar*. Any reports or appraisals prepared during the year should be available to the trainee.

Educational Supervisors 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, to be involved in annual reviews and to liaise closely with the national board or committee for the registration 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. The training programme should identify how specific areas of training not covered by the departments involved will be obtained (eg secondment for experience in virology, communicable diseases/epidemiology, public health microbiology) together with any courses deemed necessary.

A 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 (eg 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 sterilisation 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 sterilisation 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 (eg. kits for enzyme assays) and rapid diagnostic kits, ELIZA, 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 (eg PCR) and monoclonal antibodies;

b) be aware of automated, rapid techniques available to medical microbiology;

c) 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 (eg ICU, NICU) and specialist units (eg haematology, paediatrics, transplantation *etc.*) where available;

b) have gained experience of liaison with general practitioners;

c) have participated in on-call rotas (including weekends) with consultant cover;

d) have participated in postgraduate educational meetings such as Grand Rounds and lunchtime case presentations;

e) 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 local and regional infection control committees;

c) be aware of those areas of hospital and community health that require infection control policies;

d) have worked closely with the infection control nurse 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. These should include kitchen inspections especially those conducted by environmental health officers.

Relationships should be developed with key personnel in the central sterilisation unit, pharmacy and laundry;

f) have an understanding of the principles of patient isolation and their application;

g) be familiar with any national documents relevant to infection control. Also a knowledge of any existing working party recommendations (eg MRSA, Shigella, *Clostridium difficile*);

h) gained some experience of public health microbiology with secondment if necessary to a Public Health Laboratory;

i) have had some experience of communicable disease control in the community working Environmental Health Officers.

j) become familar 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. 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.

c) have an understanding of the existing external quality control schemes and the processing of data by these schemes.

18. 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.

19. Accreditation

At the end of formal training, the microbiologist should have knowledge of the requirements of any existing laboratory accreditation schemes and the process whereby accreditation is conferred.

20. Management

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

TRAINING RECORD &
TRAINING PROGRAMME

Medical Microbiology

Name……..

GMC No…….

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Table of Contents

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Scope of this manualthis manual

This manual is designed to provide a record of the training received by junior medical microbiologists during the whole of their period of training.

It is intended to assist the trainee and his/her designated supervisor in considering the whole range of skills required of a newly appointed consultant medical microbiologist in a district general hospital or in a teaching hospital. Consideration is also given to training in communicable disease control and in environmental, food and water microbiology. In view of the diverse nature of the subject, the list of techniques and points covered is not necessarily comprehensive, but is designed to provide a framework for fuller discussion of each topic.

The first section outlines the aims of the training, starting on page (1), the resources required and a suggested general structure of training. However, the suggested structure may be amended to suit local circumstances after approval of any significant changes are agreed by the Postgraduate Dean and/or any official board or committee on the registration of medical specialists.

The background and qualifications of the trainee at the commencement of training in Microbiology should be recorded.

An individual programme should be constructed for each trainee planned around the past experience, aptitudes and aspirations of the trainee. It should be designed after discussion between the trainee, the designated trainer and the Postgraduate Dean and/or any official board or committee on the registration of medical specialists. This programme is intended to outline the structure of the training and should be planned and reviewed at least annually.

Instructions for completing the training record can be found on page B18, followed by the training record. The assessments of "Stage reached" are NOT intended to be used to grade the trainee, but to provide a guide to the completion of any outstanding topics.

The completion of the training record should be complemented with Individual Performance Reviews (IPR) where appraisal of progress can be undertaken and where the trainee's opinions of the training being received should be considered.

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Training programme - *a description- a description*

1 Introduction

This document sets out a curriculum for trainee medical microbiologists.

1.2 The general outline is complemented by a training record in which specific items are listed in some detail.

2 Aims of training training

2.1The aims of training should be to develop the knowledge, skills and attitudes required of medical microbiologists and to give wide experience of the practice of medical microbiology.

The curriculum should centre on training in the following areas (the eight main tasks of the microbiologist as defined by the Microbiology Commission in Helsinki in 1996) to ensure competence to:

a) Give advice as a physician on the diagnosis, treatment and prevention of microbial diseases.

b) Provide a scientific basis for laboratory diagnosis; to set protocols and to maintain standards within the laboratory.

c) Undertake the management responsibilities required from the director of a medical microbiology laboratory.

d) Take charge of infection controls in hospitals.

e) Propose hospital policies on the control of antibiotic usage and on the prevention of hospital acquired infection.

f) Collaborate with national surveillance organisations and public health authorities and to provide laboratory services for these organisations.

g) Participate in the training programmes for medical microbiologist, infection control practitioners and other experts in the field of microbial diseases.

h) Undertake research and development in the specialty of microbiological biopathology.

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2.2The precise composition of an individual's training programme should be structured around the past experience and aspirations of each trainee. The programme should be designed, and continually reviewed, by discussion between the trainee, the trainer and, at regular intervals, the Postgraduate Dean and/or any official board or committee on the registration of medical specialists.
2.3Each trainee will have to successfully acquire skills in each of the following categories:
2.3.1specialized factual knowledge of the natural history of infection and its clinical presentation;
2.3.2technical ability, to enable the trainee to select appropriate methodology and laboratory instrumentation based on practical skills and experience derived from close acquaintance with laboratory technology acquired during training, which includes quality control procedures and quality assurance;
2.3.3data management skills, including the statistical evaluation of data referring to the populations of patients served and the technical procedures applied in the laboratory as well as familiarity with the application of information technology within the laboratory and familiarity with the use of spreadsheets, databases and statistical packages;
2.3.4management and communication skills, including experience, under supervision, in formulating departmental policies and applying the leadership and team-work skills necessary to implement them, report writing and report presentation, costing procedures, preparing budgets and acquaintance with contracting procedures;
2.3.5research and development experience, as this is important for developing skills in independent and team-driven problem solving and in the critical assessment of published work;
2.3.6presentation skills, both oral and written;
2.3.7knowledge of health and safety at work requirements for laboratories including control of substances hazardous to health regulations;
2.3.8continuing study, leading to continuing medical education (CME) beyond the training post stage. This will enhance the acquisition of life-long habits of reading, literature searches, consultation with colleagues, attendance at scientific meetings, and the presentation of scientific work as part of continuing professional development (CPD).

3Training supervision

3.1Every trainee must have a designated trainer of Consultant status at the trainee's base laboratory who will be personally responsible for the trainee's day-to-day training and who will be accountable to the Postgraduate Dean and/or any official board or committee on the registration of medical specialists.

3.2When referred to another location for training, a Consultant, or Scientist of equivalent status, should be identified as being responsible for training for the duration of the attachment.

3.3Before agreeing to become a trainer, a Consultant must be able and prepared to set aside sufficient time to undertake this demanding duty. Each trainee should anticipate a

weekly, regular, formal one hour tutorial session as a minimum. Furthermore, in addition, there should be training in benchwork and in clinical liaison/ward rounds by the trainer/another consultant or qualified SpR* (delegation of certain duties to a senior SpR does not abrogate trainer's responsibility) as well as frequent open access on an *ad hoc* basis.

3.4All trainees must have Consultant cover (preferably on-site) at all times.

3.5For more junior trainees, the trainer must be responsible for identifying publishable projects suited to the trainee's experience and interests, for arranging resources, and for overseeing the project up to publication.

3.6The progress of training should be reviewed with the trainer, and where relevant the laboratory head, and separately with the Postgraduate Dean and/or any official board or committee on the registration of medical specialists on at least an annual basis, or more frequently if requested. This review should be undertaken on a formal basis, with clear agreed goals and achievement reviews.

4Training locations

4.1Before a laboratory can be designated as a training site, the suitability of the site must be carefully considered.

4.2Each post and laboratory must have appropriate recognition.

4.3Each laboratory should ideally have the full appropriate accreditation.

4.4There should be sufficient non-training grade staff in a laboratory to carry out the routine clinical work. While trainees will often undertake routine work, they must not be relied upon for the running of the laboratory as this will interfere with the training programme.

4.5In addition to the suitability of the laboratory, consideration must be given to the scope of clinical material available. In laboratories attached to hospitals with a relatively small range of clinical services, rotation to laboratories at other hospitals will be necessary.

4.6Ideally, trainees should be based in laboratories specializing in training which will have more than one trainee. This will facilitate the suggested training structure outlined in section 0, below. In this situation, trainees can discuss cases and issues in medical microbiology with others who are also actively studying for examinations (or who have recently been doing so). This process is also of value to the more senior trainees who themselves begin to learn how to become effective trainers.

4.7Resources which must be available before a trainee is allocated to a laboratory: Reasonable quiet office space with a telephone line from where confidential clinical conversations can be carried out; sole use of a desk; filing cabinet and shelf space;

ready access to computing facilities (at least one computer between every two trainees) with appropriate software (*e.g.* wp; spreadsheet; epi-info; reference manager) and connected printer; internet access; a range of suitable up-to-date reference texts within the laboratory, *e.g.* Principles and Practice of Infectious Disease (Mandel *et al*), The Use of Antibiotics (Kucers *et al*), Principles and Practice of Clinical Virology (Zuckerman *et al*), Manson's Tropical Diseases (Manson-Bahr *et al*).

5General structure of trainingof training

5.1The structure of training needs to be flexible to allow for individual trainee and service requirements. A suggested training structure follows which may be used as a guideline to best practice. It is not intended to be prescriptive. If an alternative training schedule is already in place, this may be followed, subject to approval by the Postgraduate Dean and/or any official board or committee on the registration of medical specialists.

5.2A significant part of training should be performed on an apprenticeship basis, with the trainee shadowing the trainer, another consultant or a qualified SpR in service laboratory and clinical duties (referred to as service work).

5.3Adequate time should be allowed for non-service benchwork, private study, attending courses and research (referred to as elective work).

5.4The proportion of service to elective work should vary between 1:1 and 1:2. It is essential that time for elective work should be allocated in blocks of sufficient length to allow the trainee to make maximum use of the elective time. The elective period should not be used exclusively for annual leave or for covering colleagues' *planned* annual/study leave. A suitable arrangement could entail a rotation (say every three months) of 'first on-call' for clinical duties between three trainees on one site, allowing the other two a clear six months for elective work in every nine months.

6Qualifications of the trainee at the end of training

Required of the trainee:
6.1- Gaining knowledge and experience -

At the end of training the trainee should have gained experience in the following areas:

If there is insufficient space in any section, please continue on the blank page overleaf.

a. possess theoretical and practical knowledge , skillfulness and experience in bacteriology, virology, parasitology, mycology and serology, so that he/she is capable of independently arranging the content and organisation of a microbiological study for the benefit of patient care resulting in clinical consultation and a hospital epidemiological study;

The trainee should among other things:

b. be able to assess relevant scientific literature and to apply (adjust) it for use in diagnostical scientific research;
c. have sufficient theoretical and practical knowledge of molecular biology and immunology, to be able to assess (adjust) the developments and to use these for medical microbiological diagnostic scientific research;
d. make sure that he/she possesses sufficient knowledge of management methods, so that these can be used for organisation, management and personal policy of a medical microbiological laboratory;
e. orientate themselves to function in the field of prevention and the fight against infectious diseases;
f. acquire sufficient knowledge to be able to execute or give guidance in hospital hygiene and hospital epidemiology programmes.

6.2-Cursory education –
The trainee should through work placements and/or participating in courses have obtained insight in the parasitology, mycology, immunology, statistic/epidemiology, management and public health.

6.3 -Educational duties –
The trainee should have given information and fulfilled educational tasks to medical students, co-assistants, trainee - nurses and paramedical staff.

6.4-Participating in discussions and meetings-
The trainee should gain experience through regular attendance of clinical and pathological conferences.

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Training record Log bookbook:

Trainee details,

personal development plans,

and achievements

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Instructions for completion of numbered sectionsInstructions for completion of numbered sectionsfor completion of numbered sectionscompletion of numbered sectionscompletion of numbered sections

Appropriate sections of the logbook should be completed at intervals no less frequently than monthly. Where only part of a section has been covered at a session, the "Comments" column should be used to indicate the subject matter discussed. A number of spare sheets have been included at the end to allow trainees and trainers the opportunity to include further topics as desired.

It must be emphasized that the "Stage reached" columns should be used to record the depth to which the topic has been discussed. It is NOT intended to grade the level of knowledge of the trainee but to provide a useful checklist of any uncompleted topics at each stage of the trainee's training period.

The "Stage reached" section is divided into four columns, numbered 1 to 4. Once a topic has been discussed, the appropriate box should be completed by the trainer with his initial and date. Topics covered at outside lectures, such as at an MSc course, may be entered individually for each topic at the appropriate stage. These numbers refer to the following stages:

1. A subject has been discussed at a basic level. It would be expected that the trainee would need help and supervision most of the time in performing task/dealing with subject
2. The theory behind a subject has been discussed at a level sufficient to enable the trainee to troubleshoot the procedure or to enable him to cope with performing the task/dealing with subject under close supervision
3. The subject has been discussed comprehensively, such that the trainee should be able to cope with performing the task/dealing with subject with limited supervision
4. The subject has been discussed comprehensively and the trainee has a knowledge of the associated literature and should be competent to perform the procedure/deal with subject independently

Following the core topics, several blank lines are allowed for the completion by the trainee and the trainer for any other topics as desired.

For some topics it would be inappropriate to complete the "Stage reached" column for each entry at any particular level. In such cases, the appropriate comments line can be used. Similarly, for other topics (*e.g.* management) it may be felt inappropriate to broach the subjects until stages 3 or 4.

As an example, extracts from a Training record of a hypothetical trainee who commenced training on 01.01.90 is given on the following page.

If there is insufficient space in any section, please continue on the blank page overleaf.

Clinical experience - example of logbook entry

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has gained experience of liaison with clinical colleagues through regular ward visits, in particular with staff on high dependency units (*e.g.* ICU)	-	*1/12/90 A.B.*	*15/6/93 C.D.*	*1/2/94 E.F.*	
Understands the management of infection in various organ systems and patient types	-				*See below*
Has gained experience of dealing with clinical problems in specialist clinical areas: paediatrics including ICU	-		*30/6/93 C.D.*	*30/6/94 E.F.*	*Entries made at end of appropriate clinical attachment*
obstetrics	-		*30/6/93 C.D.*	*30/6/94 E.F.*	
orthopaedics			*20/12/92 A.B.*	*30/6/94 E.F.*	
sexually transmitted diseases, including AIDS			*2/2/93 J.K.*	*30/6/94 E.F.*	
organ transplantation			*30/6/93 C.D.*	*15/11/95 G.H.*	
haematology (profound neutropenia)			*30/6/93 C.D.*	*15/11/95 G.H.*	
Has gained experience of liaison with general practitioners, particularly by providing telephone advice when requested			*30/6/93 C.D.*	*30/6/94 E.F.*	
Has participated in on-call rotas (with consultant cover)			*30/6/93 C.D.*	*15/11/95 G.H.*	
Has participated in postgraduate educational meetings	-	*12/9/90 C.D.*	*14/4/92 C.D.*	*17/10/93 E.F.*	
Is able to provide informed advice on vaccination and immunization with all products normally available in the EC	-	-	*30/6/93 C.D.*	*15/11/95 G.H.*	
Urinary tract infection	-	*2/4/90 A.B.*	*3/8/92 A.B.*	*12/11/94 E.F.*	
Endocarditis	-	*7/12/90 A.B.*	*25/2/93 E.F.*	*11/10/94 G.H.*	
Community acquired pneumonia	-	*9/4/90 A.B.*	*2/2/92 MSc*	*10/10/92 MSc*	
Hospital acquired pneumonia	-	*1/9/90 A.B.*	*14/3/92 MSc*	*3/7/92 MSc*	
Viral haemorrhagic fever	-	-	*12/12/92 A.B.*	*17/5/94 E.F.*	

Entries in italic script are intended to indicate handwritten entries

1 Health and safety at work safety at work

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Received local laboratory safety notes					
Acquainted with local fire safety rules					
Acquainted with local accident reporting policy					
Acquainted with working of Safety Committee					
Acquainted with Safety regulations					
Acquainted with Categorization of Pathogens					
Familiar with indications for use and correct operation of Class 1, 2 and 3 safety cabinets					
Familiar with regulations relating to Category III laboratory					
Familiar with international and national postal regulations					

2 Clinical experience

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has gained experience of liaison with clinical colleagues through regular ward visits, in particular with staff on high dependency units (*e.g.* ICU)					
Understands the management of infection in various organ systems and patient types					
Has gained experience of dealing with clinical problems in specialist clinical areas: Paediatrics including ICU					
Obstetrics					
Orthopaedics					
Sexually transmitted diseases, including AIDS					
Organ transplantation					
Haematology (profound neutropenia)					
Has gained experience of liaison with general practitioners, particularly by providing telephone advice when requested					
Has participated in on-call rotas (with consultant cover)					
Has participated in postgraduate educational meetings					
Has participate in the multidisciplinary approach of patientcare					

3 Infection control in hospital and the communityin hospital and the community

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has had first hand experience of local infection control problems including outbreaks of infection and their management					
Understands the possible implications on bed management of use of side rooms and ward closures					
Is familiar with the workings of infection control meetings including local and district infection control committees					
Is aware of those areas of hospital and community health that require infection control policies					
Has worked closely with the infection control nurse both in day to day duties and in the education of others on infection control issues					
Has participated in visits to clinical and non-clinical areas to advise on infection control, including kitchen inspections conducted by environmental health officers					
Has an understanding of the principles of patient isolation and the hierarchy of isolation					
Is familiar with any documents relevant to infection control such as reports of Committees of Enquiry and with any existing working party recommendations					
Has some understanding of hospital design and engineering problems					
Understands the indications for monitoring theatre air supplies					
Is able to provide informed advice on vaccination and immunization with all products normally available in the EC					

4 Sterilization and disinfectiondisinfection

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Understands principles of sterilization using moist heat					
Understands principles of sterilization using dry heat					
Understands principles of sterilization using other methods					
Understands principles of disinfection using various chemicals in laboratory setting					
Understands principles of disinfection using various chemicals in hospital ward setting					
Understands principles of disinfection using various chemicals in special hospital settings (*e.g.* endoscopy units)					
Understands principles of disinfection using various chemicals in general practice setting					
Understands the functions and management of Central Sterilisation Unit					

5 Specimen procurement and handlingand handling

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
For each specimen type, is aware of optimal methods of collection, transportation (including transport media), storage, reception, identification and documentation					
Is able to assess degrees of urgency for the processing of specimens, including the provision of out-of-hours service and the communication of preliminary results as applicable					
Is able to decide upon further testing or processing of a specimen as appropriate					
Is aware of existing reference facilities and their appropriate use					

6 Laboratory techniques in microbiology: Specimen microscopy

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Understands the principles of light, darkground, phase contrast, fluorescent and electron microscopy, and is able to set up a light microscope with dark ground and phase contrast facilities					
Is able to perform routine staining techniques including using fluorescent dyes					
Is familiar with the appearance of stained preparations and is able to recognize artifacts and their possible origin					

7 Laboratory techniques in microbiology: Culture methods

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has a basic understanding of the diversity of microbial metabolism					
Is aware of the wide range of selective, enrichment and inhibitory media available for general and specialized use and is able to chose relevant media in common use or in medical and environmental laboratories					
Is familiar with physical growth requirements of micro-organisms including optimal temperature and has an appreciation of the growth kinetics of both solid phase and broth cultures					
Is familiar with the preparation of media in common use and has an understanding of internal quality control of such preparations					
Is able to process all common specimens, to recognize potential pathogens from mixture of colonies on culture plates, and to separate such colonies in order to achieve the pure growth necessary for further work					

8 Laboratory techniques in microbiology: Further processing of culturesof cultures

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Is able to perform tests leading to the identification of all common pathogens, including the use of commercially produced kits [identification of each genus/species may be listed separately, below. This may be particularly useful for more unusual organisms]					
Understands the principles of identification media and is able to use them appropriately					
Understands the principles behind multipoint identification technology					
Is aware off available reference facilities for finer identification including serotyping and other phenotypic and genotypic typing methods					

9 Laboratory techniques in microbiology: Susceptibility testing and antimicrobial assaysand antimicrobial assays

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Is able to test the antibiotic susceptibilities of an isolate using the common techniques of disc testing and breakpoints and understands of the principles behind multipoint susceptibility testing technology					
Is able to perform and interpret MIC and MBC tests as appropriate					
Is able to perform full and half chequerboard titrations					
Is able to carry out serum cidal levels					
Is able to perform antimicrobial assays using biological and automated techniques					
Has 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					

10 Laboratory techniques in virology for microbiology traineesin virology for microbiology trainees

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Understands principles of common serological testing methods, including complement fixation test, enzyme linked immunosorbent assay, single radial haemolysis, particle agglutination, immunoblot assay					
Understands the principles behind virus isolation using cell culture, including preparation and propagation of cell lines, choice of cell line, inoculation of clinical specimens, recognition of cytopathic effects, use of neutralization and other confirmatory tests					
Is aware of the principles of electron microscopy, including direct detection, concentration methods and more specialized uses and the indications for its use					
Understands principles behind antigen/DNA/RNA detection using *e.g.* immunofluorescence, PCR, ELISA					

11 Environmental microbiology for microbiology traineesfor microbiology trainees

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Is aware of the existence of statutory requirements for certain food, water or milk types					
Is aware of the existence of statutory standards for bacterial and viral counts in bathing waters					
Is able to examine common types of food, water and milk for total counts, specific organism detection and special tests					
Is aware of available technologies for the detection of *Cryptosporidium sp.* and viruses from food or water samples					
Understands the principles behind interpretation of results on different food types and can advise environmental health officers and others accordingly					
Is aware of methods for detection of *Legionella sp.*					

12 Parasitology for microbiology traineesmicrobiology trainees

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Is able to examine appropriate samples including faeces, urine and blood for parasites and when to refer specimens to specialist laboratories for further examination					
Is aware of the range of serological investigations and where they are performed					
Has gained experience in the clinical management of patients with parasite infection					
Is familiar with the management of ectoparasite infection, including scabies					

13 Mycology for microbiology traineesmicrobiology trainees

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Is able to examine appropriate samples for fungi and knows when to refer specimens to specialist laboratories for further identification and susceptibility					
Is aware of the range of serological investigations and where they are performed					
Has gained experience in the clinical management of patients with fungal infection					

14 Epidemiology and statisticsstatistics

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Understands the various methods of collecting data about communicable diseases, and the limitations of such data					
Understands the principles of case control and cohort studies					
Is able to construct basic data collection questionnaires using appropriate software packages, e.g. epi-info					
Understands the role of the local public health laboratory					
Has taken part in the management of community outbreaks of infection, e.g. food poisoning among guests following a function					
Understands the importance of statistics in the planning and execution of studies and knows when to seek expert assistance form a statistician					
Is aware of the statistical problems encountered in clinical trials, and of the types of statistical errors					
Can select and perform appropriate basic statistical analyses, including t-test, chi-square test, regression and correlation					

15 Data handling

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has a basic understanding of information technology and, in particular, computerized laboratory data handling					
Is familiar with standard word processor, spreadsheet, relational database, statistics and epidemiology software packages					
Is familiar with the basic methods for electronic data transfer with local and remote computer systems					
Is familiar with the requirements of data protection					
Is aware of available technologies for data broadcasting					
Understands the importance of a standardized coding system					

16 Quality Assurance

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Understands the difference between quality control and quality assurance					
Has experience of quality control using available schemes					
Understands the necessity for, and has taken part in, clinical audit, both internally within the laboratory and in the clinical setting in association with clinical colleagues					
Understands the procedures of laboratory accreditation					

17 Emerging technologies

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Is aware of all major new technologies available to medical microbiology (*e.g.* monoclonal antibodies and polymerase chain reaction)					
Is aware of all available automated, rapid techniques available to medical microbiology					
Is able to critically evaluate the need for emerging techniques within the laboratory, including cost effectiveness and effects on staffing levels and working practices					
Awareness of use of near-patient tests					

18 Research and developmentdevelopment

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has undertaken research projects appropriate to grade and training stage					
Has submitted paper(s) for publication in peer review journals					
Is aware of sources of funding for research projects and understands the processes involved in obtaining grants for research activities					
Can evaluate critically the published work of others					

19 Teaching and trainingtraining

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has had experience of teaching undergraduate medical students in tutorials groups and, if possible, formal lectures					
Has had experience of teaching doctors from other specialities (when suitably senior)					
Has had experience of teaching nurses (usually on infection control topics)					
Has had experience of training junior and Scientific staff					
When appropriately senior, has had experience of training junior medically qualified microbiologists and virologists					

20 Laboratory management and legislationand legislation

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Understands the necessity for, and has acquired the inter-personal skills necessary to deal with other members of staff both in the laboratory and outside					
Has regularly attended departmental management meetings and has been given delegated responsibility					
Has regularly attended divisional management meetings and has been given delegated responsibility					
Has regularly attended regional consultant microbiologists' meetings and has been given delegated responsibility					
Has regularly attended hospital infection control committee meetings and has been given delegated responsibility					
Has regularly attended drugs and therapeutics committee meetings (when antimicrobial/antiviral agents are discussed) and has been given delegated responsibility					
Understands the financing of a laboratory and how to allocate resources within the laboratory					
Understands the principles of personnel recruitment and selection and has joined appointments committees					
Has a clear understanding of individual performance review and has gained some experience in its application					
Has attended a suitable management course					
Understands the necessity for and the workings of the National Continuing Medical Education scheme					
Is aware of the duties of confidentiality of personal medical information					
Any other relevant legal requirements					

21 Additional topics

Topic	Stage reached (when applicable) - Trainer's initials and date				Comments
	1	2	3	4	
Has basic knowledge of the immunological response to infection and laboratory methods to study immunity					
Has experience in molecular biology technology					