



**TRAINEE HANDBOOK
SPECIFIC REQUIREMENTS
FOR MICROBIOLOGY**

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GLOSSARY

AGAR	Australian Group for Antimicrobial Resistance
AIDS	Acquired Immune Deficiency Syndrome
ASA	Australian Society for Antimicrobials
ASID	Australasian Society for Infectious Diseases
ASM	Australian (American) Society for Microbiology
BSAC	British Society for Antimicrobial Chemotherapy
CAP	College of American Pathologists
CbD	Case-based Discussion
CDC	Centers for Disease Control and Prevention (USA)
CDS	Calibrated Dichotomous Sensitivity (testing)
CLSI	Clinical and Laboratory Standards Institute
CPDP	RCPA Continuing Professional Development Program
CRBSI	Catheter related blood stream infection
CVL BSI	Central venous line blood stream associated infection
DFAT	Department of Foreign Affairs and Trade
DoHA	Department of Health and Aging
DOPS	Directly Observed Practical Skills
EAGAR	Expert Advisory Group on Antimicrobial Resistance
EUCAST	European Committee on Antimicrobial Susceptibility Testing, a standing committee of ESCMID
ESCMID	ESCMID European Society of Clinical Microbiology and Infectious Diseases
FRACP	Fellow of the Royal Australasian College of Physicians
FRCPA	Fellow of the Royal College of Pathologists of Australasia
IANZ	International Accreditation New Zealand
ISID	International Society for Infectious Diseases
ISO	International Organization for Standardization
IT	Information Technology
JSAC	Joint Specialist Advisory Committee in Infectious Diseases and Microbiology
LIS	Laboratory information system
M Epi	Master of Epidemiology
MB1(2)	RCPA Microbiology Part I (II) examination
MCQ	Multiple choice questions
MD	Doctor of Medicine
MMWR	Morbidity and Mortality Weekly Report
MPH	Master of Public Health

NAA	Nucleic acid amplification
NATA	National Association of Testing Authorities
NPAAC	National Pathology Accreditation Advisory Council
OHS	Occupational Health and Safety
PCR	Polymerase chain reaction
PhD	Doctor of Philosophy
PHLN	Public Health Laboratory Network (Australia)
POWI/SSI	Post operative wound infection/surgical site infection
QA	Quality Assurance
QAP	RCPA Quality Assurance Programs Pty Ltd
QC	Quality control
QM	Quality management
RACP	Royal Australasian College of Physicians
RCPA	Royal College of Pathologists of Australasia
RNA	Ribonucleic Acid
SOP	Standard operating procedure
SSBA	Security sensitive biological agents
TB	Tuberculosis
WHO	World Health Organization
WPBA	Workplace-based assessment

SECTION 1

INTRODUCTION

The discipline of Microbiology involves the use of laboratory techniques to diagnose infectious diseases, recommend antibiotic therapy and to advise, correlate, coordinate and educate clinicians regarding aspects of the pathogenesis, epidemiology, prevention and management of infection. Clinical microbiologists work in diagnostic medical /pathology laboratories. The work focuses on the collection, analysis, reporting and interpretation of results to aid in the diagnosis, treatment and surveillance of infectious diseases. Opportunities exist to conduct research in the subspecialties of bacteriology, virology, mycology, parasitology, serology or molecular microbiology.

PERSONAL CHARACTERISTICS NEEDED

The Clinical Microbiologist needs to have:

- ability to make sound clinical judgments;
- good computing skills and organisational ability;
- ability to lead, to work autonomously and to work well as part of a team of medical, nursing and laboratory staff as well as the wider discipline of Pathology;
- ability to be patient, inquiring, accurate, listen attentively, be persistent and self motivated;
- good observation, interpretation and report writing skills;
- an enjoyment of the scientific basis of medicine and research;
- the ability to communicate well orally and in writing;
- the ability and willingness to offer guidance and teaching to trainees in microbiology, medical, nursing and science undergraduate and postgraduate students.

GENERAL AIMS OF THE TRAINING PROGRAM

The general aims of the training program are set out below and are elaborated as specific training outcomes and activities in **Section 2**.

By the time Trainees complete the requirements for Fellowship, they should be able to:

- competently use a microscope to examine specimens, troubleshoot problems, identify artefacts and staining problems and to ensure accurate and high quality material is available for the formulation of diagnostic opinions, as well as to be able to talk to scientific staff about the laboratory and its problems, and write a relevant report;
- competently examine cultures, recognise contaminants, interpret antimicrobial susceptibility results and write a relevant report;
- competently perform and interpret serological and molecular microbiology techniques and write a relevant report;
- apply and interpret laboratory information relevant to clinical care;
- apply clinical information to cost effective laboratory practice;
- participate in and advise as part of the infection control team;
- function effectively as a team member;
- demonstrate sufficient knowledge and personal communication skills to regularly participate in microbiology review meetings and clinical rounds;
- have a working knowledge of laboratory management procedures including budgeting and financial probity, safety and human resources;
- understand the need for, and principles of, continuing education and participation in the Continuing Professional Development Program (CPDP);
- be prepared and able to offer guidance and teaching to trainees in Microbiology; junior medical staff and undergraduate students;
- be open to research opportunities and applications;
- demonstrate commitment to professional and ethical values in the workplace and in clinical practice.

TRAINING REQUIREMENTS

Training in Microbiology is of five years duration. Trainees must spend a minimum of four years under the supervision of a medical microbiologist in a laboratory accredited by the RCPA. The fifth year of training may involve clinical practice in infectious diseases or in another pathology discipline. Trainees are not permitted to spend more than four years in one institution.

Research Stream

Trainees who complete the Part I examination may opt to take a research stream for Part II training. They need to apply prospectively to the Board of Censors for approval of their application, project, laboratory and supervisor, and the research plan must be relevant and lead to a Doctorate by thesis. During the years spent on the thesis, Trainees are expected to maintain competence in clinical general Microbiology. Granting of Fellowship is conditional upon being awarded the degree. Research stream trainees must complete the required workplace based assessment tasks and submit a Portfolio of evidence that they have completed general clinical microbiology activities.

Joint Training in Microbiology and Infectious Diseases

A joint training program is available with the Royal Australasian College of Physicians (RACP). Joint training is a five-year training program combining two (2) years advanced infectious diseases training and three (3) years laboratory training in Microbiology. Candidates may enter the joint program when they have completed all the requirements of Basic Physician Training. Joint trainees must be registered with and supervised by the Joint Specialist Advisory Committee in Microbiology and Infectious Diseases (JSAC) and registered with the RCPA.

Joint trainees are required to sit the same examinations as RCPA trainees in Microbiology and to attain the same standard. Joint trainees who have passed the FRACP Part I examinations should apply to the Board of Censors for exemption from the examination in Basic Pathological Sciences.

On completion of the 5-year joint training program, trainees will be eligible for FRCPA and FRACP.

Components of Joint Training

The training period of 5 years is expected to encompass 2 years of core training in Infectious Diseases and 3 years in Laboratory Microbiology. These years can be undertaken in any order or, in some cases trainees may occupy joint laboratory/clinical positions. In this case trainees will be required to nominate the breakdown of time sought for approval for each of the core Infectious Diseases or Microbiology training.

- Core training in infectious diseases (2 years): The two required clinical years must be a comprehensive and structured program, prospectively approved by the Joint Specialist Advisory Committee. Exposure to inpatients and outpatients with a broad range of infectious diseases is required. There is a requirement to undertake two clinical projects while in advanced Infectious Diseases training. These must be commenced and relate to work undertaken in the two core clinical years of training. This is a requirement of the RACP and is separate and additional to the RCPA project requirements.
- Laboratory training in microbiology (3 years): Training in Microbiology may only be undertaken in laboratories accredited with the RCPA Board of Censors and under approved supervision. It is expected that only a small proportion of time (approximately 10%) would be spent in direct patient care during this time.

Trainees will be expected to develop comprehensive knowledge and practical skills in all facets of Microbiology and to be proficient at collection and handling of specimens and identifying the range of organisms expected to be encountered in a tertiary care hospital, with attention to safety and quality assurance.

Policies and Procedures for Joint Training

The Joint Training Program is managed by the Joint Specialist Advisory Committee in Infectious Diseases and Microbiology (JSAC), which is a Joint Subcommittee of the Infectious Diseases Specialist Advisory Committee, comprising representatives of the RCPA and RACP. Training is monitored through annual training program approval and accreditation after submission of the supervisor's report each year. Please refer to *RCPA Trainee Handbook – General Requirements* (on the RCPA website) regarding the submission of forms to the JSAC and the RCPA.

RCPA policy is that Trainees must spend at least one year of their five year program in a separate institution. Please refer to *RCPA Trainee Handbook – General Requirements* (on the RCPA website) regarding the training limitations. Joint Trainees may not complete both their clinical and laboratory training entirely within one service of an institution. Alternative employment may occur either in the laboratory or the clinical component of joint training.

For regulations applying to training with the RACP, Trainees who commenced training before 2011 should consult the *Requirements for Physician Training Adult Internal Medicine* (the “Mango Book”) <http://www.racp.edu.au/page/educational-and-professional-development/advanced-training/advanced-training-requirements>. Trainees who commenced training in 2011 and subsequently are advised to consult the PREP Program requirements for Infectious Diseases/Microbiology <http://www.racp.edu.au/download.cfm?downloadfile=FE7197DC-C7C8-7821-51B4592F4BCE3AF0&typename=dmFile&fieldname=filename>

Trainees are strongly advised to consult the Handbook produced by the Royal Australasian College of Physicians (RACP) "Requirements for Physician Training" for regulations governing retrospective accreditation of training and other information concerning the Joint Training Program.

SUPERVISION

All training must be supervised. Trainees may nominate their own supervisor. More than one supervisor can be nominated if Trainees divide the year between two or more unrelated laboratories. The College recommends that any one supervisor be responsible for no more than two Trainees.

Who can be a supervisor?

The supervisor will normally be a Fellow of the RCPA; however non-Fellows may be approved by the Board of Censors if no Fellow is available. Normally, only one supervisor is nominated, but joint Trainees may have an additional RACP supervisor. If the Trainee spends significant periods working in an area where the supervisor has no personal involvement, the supervisor must certify that suitable supervision is being provided. The supervisor must also ensure that adequate supervision is arranged in their absence.

In some circumstances shared supervision may be necessary, but there must be a nominated primary supervisor with overall responsibility. Trainees working towards higher academic degrees (e.g. PhD), who find that their research supervisor is not suitable to be the RCPA training supervisor, should nominate an alternative.

While it is not appropriate for supervision to be delegated largely to a non-pathologist, it is appropriate for senior scientific staff with relevant experience to sign off some workplace-based assessment forms.

The role of the supervisor

Supervisors should devise a prospective training (or research) program, on initial registration and annually. This should be devised in collaboration with the Trainee and submitted to the RCPA.

Supervisors should also ensure that the Trainee has sufficient time and opportunities to carry out the required training activities.

Supervisors, and others to whom aspects of training have been delegated, are expected to monitor and provide regular feedback on the development of the Trainee's competence. They should meet regularly with the Trainee; observe their laboratory performance and interaction with scientists, peers and clinicians; and review result reporting. This may be delegated to other trainers where appropriate, eg, when the Trainee is on secondment to another laboratory for a segment of training.

The formal duties of Supervisors, such as requirements to report the Trainee's progress to the Board of Censors, are described in the RCPA Induction Manual for Supervisors and the RCPA policy on the Role of the Supervisor. Please refer to these documents for detailed information

ASSESSMENT

Assessment is by formal examination, workplace-based assessment, a Portfolio of evidence of the trainee's achievements during training and the annual supervisor's reports. The requirements are summarised below. **Please refer to the Appendices for detailed requirements.**

Formal Examinations

- Basic Pathological Sciences examination. Usually taken before or during the first year of training. All Trainees are required to undertake or apply for exemption from the Basic Pathological Sciences examination. Whilst JSAC Trainees are exempt, they must formally apply for exemption. See **Appendix 1** for detailed requirements.
- Microbiology Part I Examination: emphasises the theoretical, practical and interpretative aspects of investigations in all fields of clinical Microbiology. The Part I examination is taken after at least 18 months of training in diagnostic and clinical microbiology. There are no automatic exemptions given to any Trainee for any component of the examinations. See **Appendix 2** for detailed requirements.
- Microbiology Part II Examination. Trainees who pass Part I are eligible to sit for the Part II examination, which is ordinarily sat in the final year of Microbiology training. There are no automatic exemptions given for any component of the examination. See **Appendix 3** for detailed requirements.

All durations refer to full-time training or part-time equivalent in an accredited laboratory.

Projects

A major project and a minor project must be submitted before sitting for the Part II examination. See Appendix 3 for detailed requirements.

The Portfolio and Workplace-based Assessment

The Portfolio is a physical collection of assessment forms and other documents that provide evidence that trainees have successfully completed a range of activities that form part of their daily work in the laboratory. The portfolio records the Trainee's progress in developing technical skills and professional values, attitudes and behaviours that are not readily assessed by formal examinations.

Trainees have the responsibility of initiating the workplace-based assessments and ensuring that they have completed the required number by the required dates. They should identify suitable opportunities to have their competence assessed, negotiate a suitable time for the assessment

with a suitably qualified assessor and provide the appropriate form. Assessments should be able to be done regularly without significant disruption to workplace productivity. It is important to refer to the detailed portfolio requirements in **Appendix 7**.

Supervisors' reports

Trainees must submit to the College a Supervisor's report for each year of training, including periods of rotation. A copy of each reports should be kept in the Portfolio.

RESOURCES

These lists are not exhaustive and the publications are suggestions only. Trainees are not expected to refer to all.

Journals

- Antimicrobial Agents and Chemotherapy
- Clinical Infectious Diseases
- Clinical Microbiology and Infection
- Clinical Microbiology Newsletter
- Clinical Microbiology Reviews
- Communicable Diseases Intelligence
- Infectious Diseases Clinics of North America
- Internal Medicine Journal
- Journal of the American Medical Association
- Journal of Antimicrobial Chemotherapy
- Journal of Clinical Microbiology
- Journal of Hospital Infection
- Journal of Infectious Diseases
- Journal of Virology
- Medical Journal of Australia
- Nature
- Nature Reviews Microbiology
- Reviews of Medical Virology
- Science
- The Lancet
- The Lancet Infectious Diseases
- The New England Journal of Medicine
- Virology

Suggested Microbiology Texts

Please refer to the current edition of these texts:

- Black, J (2008) Microbiology: Principles and Explorations, 7th Edition. John Wiley and Sons Ltd.
- Winn WC, Allen SD, Janda WM, Koneman EW, Schreckenberger PC, Procop GW and Woods GL (2006) Koneman's Color Atlas and Textbook of Diagnostic Microbiology, 6th Edition. AACC.
- Murray, P (ed) (2007) Manual of Clinical Microbiology, 9th Edition. American Society of Microbiology.
- Topley and Wilson's Microbiology and Microbial Infections, 10th Edition. Wiley-Blackwell.
- Mayhall, C Glen (no date) Hospital Epidemiology and Infection Control, 3rd Edition. Culinary and Hospitality Industry Publications Services (CHIPS).

- Therapeutic Guidelines: Antibiotic
<http://www.australianprescriber.com/magazine/30/3/artid/887>
- Mandell GL, Bennett, JE and Dolin R (2010) Mandell, Douglas and Bennett's Principles and Practice of Infectious Diseases, 7th Edition. Churchill Livingstone.
- Christie AB (1987) Infectious Diseases: Epidemiology and Clinical Practice, 4th edition. Churchill Livingstone, New York.

Conferences/Workshops

- RCPA Pathology Update, Annual Scientific Meeting www.rcpa.edu.au
- Australian Society for Microbiology. Annual Scientific Meeting <http://www.asm.org/>
- Australasian Society for Infectious Diseases, Annual Scientific Meeting
<http://www.asid.net.au/>
- Australian Society for Parasitology Annual Conference
<http://www.parasite.org.au/Conference.html>
- Viruses in May Annual workshop <http://www.rcpa.edu.au/Continuing/VIM2010.htm>
- Mycology Master Class: Contact the convenor: dellis@adelaide.edu.au
- Virology Master Class <http://sapmea.asn.au/conventions/virology2009/index.html>
- Advertised events in Pathology Today <http://www.rcpa.edu.au/Publications.htm>

Microbiology Websites

- National Pathology Accreditation Advisory Council, www.health.gov.au/npaac
- Australian Society for Antimicrobials <http://www.asainc.net.au/>
- Expert Advisory Group on Antimicrobial Resistance (EAGAR)
<http://www.nhmrc.gov.au/about/committees/expert/eagar/index.htm>
- Australasian Society for Infectious Diseases <http://www.asid.net.au/>
- Australian Society for Microbiology <http://www.theasm.com.au/>
- International Society for Infectious Diseases <http://www.isid.org/>
- The Australian Society for Parasitology <http://www.parasite.org.au/>
- WHO International Travel and Health <http://www.who.int/ith/updates/en/index.html>

Other resources

- Electronic version of Infection Control Guidelines www.icg.health.gov.au
- MIMS <http://www.mims.com>
- The Sanford Guides <http://www.sanfordguide.com/>
- Morbidity and Mortality Weekly Report (MMWR) from Centers for Disease Control and Prevention <http://www.cdc.gov/mmwr/>
- Global Program for Monitoring Emerging Diseases (ProMED) <http://www.fas.org/promed/>
- Ozbug discussion group, hosted by Australasian Society for Infectious Diseases (ASID)
<http://www.asid.net.au/members/asidozbug.asp>
- Travel Advice from the Australian Department of Foreign Affairs and Trade www.dfat.gov.au
- Security Sensitive Biological Agents (SSBA) Regulatory Scheme (Australian Government site) <http://www.health.gov.au/SSBA>
- The Australian Immunisation Handbook (current edition)
<http://www.health.gov.au/internet/immunise/publishing.nsf/Content/Handbook-home>

If you have ideas about additional resources, please inform RCPA (rcpa@rcpa.edu.au) so these can be added to future editions of this handbook.

SECTION 2

LEARNING OUTCOMES & RECOMMENDED TRAINING ACTIVITIES

In Section 2, the four broad functions of Microbiologists are elaborated as a list of training outcomes and activities.

Where possible, learning outcomes are denoted as needing to be achieved early in training [E] or at a more advanced stage [A]. Competence in outcomes achieved early in training should be maintained throughout.

Trainees are not expected to do every activity in the list. They should use their judgment to select those that are most likely to achieve the outcomes, being mindful of the range of learning opportunities offered by their particular laboratory.

1 Discipline specific functions as a medical specialist in the laboratory

- 1.1 Foundation knowledge and skills in microbiological science
- 1.2 Public health and preventive medicine
- 1.3 Use of Antimicrobial Agents
- 1.4 Infection Control
- 1.5 Pre-analytic phase: specimen selection, collection and transport
- 1.6 Pre-analytic phase: selection of tests
- 1.7 Analytic phase: microscopy
- 1.8 Analytic phase: culture
- 1.9 Analytic phase: identification of microorganisms to species level
- 1.10 Analytic phase: non-culture detection of microorganisms (excluding microscopy)
- 1.11 Analytic phase: susceptibility testing
- 1.12 Analytic phase: management of specimens, laboratory equipment & laboratory data
- 1.13 Post-analytic phase: report generation (Also see 4.3)

2 Functions as a manager in the laboratory

- 2.1 Quality Management
- 2.2 Laboratory Safety
- 2.3 Compliance with Legislation
- 2.4 Managing People
- 2.5 Managing resources

3 Other professional functions of microbiologists

- 3.1 Research and critical appraisal
- 3.2 Undertaking Self-Education and Continuing Professional Development
- 3.3 Educating Colleagues, Staff, Patients and Families
- 3.4 Providing Data for Planning and Evaluation

4 Generic processes employed by microbiologists

- 4.1 Patient Safety
- 4.2 Ethics and Confidentiality
- 4.3 Communication
- 4.4 Collaboration and teamwork

1 DISCIPLINE-SPECIFIC FUNCTIONS AS MEDICAL SPECIALIST IN THE LABORATORY

Central to the role of the medical microbiologist is the interaction with the laboratory scientist who processes requests and the clinician who has requested the test or advice on behalf of the patient. Experienced medical microbiologists demonstrate a range of knowledge, skills and abilities, including:

- Synthesise laboratory and microbiological knowledge with clinical information to formulate and convey a plan of specimen management, reporting and result interpretation;
- Apply technical expertise in carrying out processing and reporting of sample results involving bacteria, fungi, viruses, parasites, infection control, serology, public health, antibiotic use and stewardship and use of molecular tests;
- Devise and conduct an effective system of laboratory management to ensure quality processing and reporting of samples;
- Coordinate laboratory and clinical information including the appropriate and cost effective collection of samples for further investigation and management of microbial treatment-related problems and participate in antibiotic stewardship activities;
- Advise clinicians regarding test selection, interpretation and clinical application of microbiological test results;
- Participate in infection control and public health activities to promote the well-being of patients and the community, including advocacy for the appropriate use of vaccinations to control spread of disease;
- Facilitate and initiate clinic pathological research activities;
- Show antibiotic stewardship by supporting, developing, teaching, participation in and implementation of antimicrobial control policy in the training institution.

By the end of training, trainees are not expected to have developed expertise in all these areas. However, they should be technically fully knowledgeable and competent in the routine aspects of the investigation and management of microbial treatment-related problems. They should also have observed and reflected on the way senior microbiologists fulfil the role of medical specialist in the laboratory and have participated in the more demanding aspects of the role as appropriate for the stage of training, assuming increasing levels of responsibility as they progress. They also should know how to access experts in all these areas and consider where their own interests lie and need to be developed to provide a value added clinical service in their areas of practice

The following lists of learning outcomes and activities are a guide as to what trainees should have achieved by the end of training.

1.1 Foundation knowledge and skills in microbiological science

Learning outcomes

- [E] Taxonomy and biology of recognized, new and potential human pathogens, including ecology, evolution, metabolism (identification) and replication and treatment;
- [E] Principles of diagnostic medical laboratory identification to the species level of pathogens causing clinical disease, using relevant methods, including bacteria, fungi, viruses and parasites and any other microorganisms found to be associated with human disease;
- [E] Principles of the use of classical and phenotypic, manual, automated and other techniques for identifying human pathogens;
- [E] Pathogenesis of infectious diseases, including host susceptibility and host responses;
- [E] Virulence mechanisms of human pathogens;

- [E] Antimicrobial resistance emergence, detection and reporting, including an understanding of the nature and mechanisms of antibiotic resistance and the implications of these findings on treatment, infection control antibiotic stewardship and public health, veterinary, and horticultural practices and the environment;
- [E] Principles of pharmacokinetics and pharmacodynamics and their application to the use of antimicrobial agents;
- [E] Effect of microbial biology and pathogenesis on the selection, sampling and testing of human tissue for diagnosis of microbial infections eg interaction of microbes and tissue (morphological changes) as well as the optimal phenotypic or molecular identification of infectious agents;
- [E] Theory and practice associated with the selection, operation and maintenance of equipment used in the microbiology laboratory.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Attend relevant lectures, conferences, training weekends and web-based resources;
- Study authoritative texts and laboratory manuals;
- Review model answers with supervisors;
- Develop training notes on the above areas in conjunction with experts in the fields;
- Under technical supervision, operate equipment used in the microbiological laboratory including that used for monitoring blood cultures, antimicrobial susceptibility testing and detection of nucleic acids, antigens and antibodies, autoclaves, equipment used for the detection and measuring of blood levels of antibiotics and other relevant equipment;
- Prepare and undertake quality control of media;

1.2 Public health and preventive medicine

Learning outcomes

- [E] Notify the detection of infectious agents in accordance with local statutes;
- [A] Advise on detection, surveillance and intervention with respect to infectious diseases of public health importance;
- [A] Formulate strategies to investigate and manage outbreaks of infectious disease as part of a team of public health, infection control, infectious diseases and microbiologists;
- [A] Ensure laboratory compliance with notification requirements;
- [A] Advise on immunisation of staff, patients and other relevant groups;
- [A] Maintain up to date knowledge of public health activities and emergence of diseases of public health importance.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Regular interaction with Public Health Units (or equivalent) to learn about procedures for outbreak investigation ;
- Attend OHS committees, infection control/public health committees;
- Retrieve statistical information on notifiable diseases and resistant organisms from laboratory database, using CLSI or other appropriate guidelines, including rationale for selection and reporting of these;
- Reading current relevant journals and data notifications, eg, by subscribing to ProMED, Ozbug, travel advice from the Australian Department of Foreign Affairs and Trade or other relevant data bases and journals (eg MMWR) as well as regular national and local public health reports of notifiable diseases (see Resources section for web links);
- Read current relevant local, national and international standards relating to microbiology, sterilisation and infection control;

- Formal, academic study, such as MPH, MEpi, which can be credited towards RCPA training time. JSAC trainees should note that the RACP does not accredit courses undertaken prior to completing basic RACP training.

1.3 Use of Antimicrobial Agents

Learning outcomes

- [E] Understand mechanisms of action of all classes of antimicrobial agents;
- [E] Maintain up to date knowledge of resistance mechanisms and implications for antibiotic use, especially in relation to enterobacteriaceae, pneumococci, staphylococci, enterococci, TB, gonococci, streptococci, fungi, viruses and Plasmodium spp;
- [E] Apply principles of pharmacokinetics and pharmacodynamics to the use of antimicrobial agents;
- [E] Advise on selection, use and duration of treatment with antimicrobial agents to patients, colleagues and institutional bodies;
- [A] Participate in institutional drug committee activities, eg, audits and meetings;
- [A] Show antibiotic stewardship by supporting, developing, teaching, participation in and implementation of antimicrobial control policy in the training institution.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Read relevant and up to date articles and attend relevant meetings on the use and development of antibiotics and the emergence of antimicrobial resistance;
- Access relevant drug policies in training institution;
- Supervised clinical liaison, eg, telephone consultations or ward rounds;
- Provide clinical advice on appropriate antibiotic use;
- Seek involvement in drug committee activities;
- Audit antibiotic use in collaboration with a pharmacist;
- Attend relevant sessions of RCPA update and access relevant RCPA on-line resources;
- Participate in, initiate and teach about local antibiotic stewardship practices;
- Review laboratory antibiotic reporting policies and liaise with supervisors regarding suggested changes;
- Undertake laboratory audits on antimicrobial sensitivity testing and provide reports on trends in local and institutional antimicrobial sensitivity results linked with institutional and individual patient antibiotic use;
- Seek to participate in studies on new antibiotics either laboratory based or combined with clinical colleagues while maintaining awareness of the role and influence of the pharmaceutical companies in the process and declare any possible conflicts of interest.

1.4 Infection Control

Learning outcomes

- [E] Understand mechanisms of transmission of microbiological agents;
- [E] Understand the difference in purpose and methods of sterilisation and disinfection;
- [A] Advise on infection control measures to patients, colleagues and institutional bodies as part of the infection control team, including hand hygiene, central venous line blood stream infections (CVLBSI) and postoperative wound infection/surgical site infection, (POWI/SSI);
- [A] Ensure laboratory compliance with legislative and regulatory framework in geographic area of practice;
- [A] Implement, support and develop infection control policies in training institution;

- [A] Liaise between laboratory practice and infection control requirements, eg, outbreak surveillance, phenotypic or molecular typing

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant infection control policies in training institution;
- Access state and national guidelines, regulations and legislation;
- Observe, understand principles and prepare articles for sterilisation by various methods;
- Understand principles, observe the operation and monitoring of heat-sterilising apparatus and understand the safe and effective use of this equipment;
- Practise safe handling and disposal of biohazardous materials, chemicals and radioactive materials and other laboratory waste;
- Participate in institutional infection control committee activities, eg, audits and meetings;
- Participate in infection control rounds, investigation of outbreaks or case reviews/audits of hospital acquired investigations;
- Prepare reports of institutional infection outbreaks and forward to relevant personnel after discussion with supervisor and infection control team.
- Maintain knowledge of current literature and innovations in infection control;

1.5 Pre-analytic phase: specimen selection, collection & transport

Learning outcomes

- [E] Understand how the biology of microorganisms and pathogenesis of infection influences the optimal sampling of human tissue for diagnosis;
- [E] Advise on and review methods for the selection, collection and transport of specimens so as to optimize diagnostic yield, based on up to date knowledge of developments in this area and knowledge of the regulatory framework;
- [E] Review samples designated as “not for testing” to ensure that rejecting these samples is justifiable and communicate with the relevant requestor to educate and inform them as to why the samples were so designated and confirm that the decision is acceptable to the treating clinicians;
- [E] Triage, examine and set up specimens;
- [E] Resolve uncertainty in situations not addressed by the laboratory manual;
- [E] Participate in the RCPA QAP or similar external QAP activities undertaken by the laboratory.
- [A] Prepare standard operating procedure (SOP) documents to fill any gaps identified in the laboratory manual in consultation with supervisor and in line with the current laboratory SOPs;

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Supervised clinical liaison;
- Access relevant sections of the laboratory manual;
- Ensure appropriate collection and transport of specimens and clinical advice by reviewing specimens designated “not for processing” and samples of tissue for microbiology processing;
- Write relevant referral letters to accompany selected important samples referred to a reference laboratory;
- Maintain up to date knowledge of the literature, regulations and innovations in methods of specimen selection, collection and transport;
- Participate in RCPA QAP or similar external QAP activities undertaken by the laboratory.

1.6 Pre-analytic phase: selection of tests

Learning outcomes

- [E] Advise on the optimal diagnostic algorithm (eg samples to be collected, tests to be undertaken, time for a result to be available, costs) for a given clinical problem;
- [E] Resolve uncertainty in situations not addressed by the laboratory manual;
- [E] Contribute to the evaluation and implementation of new and existing tests and new equipment.
- [E] Participate in the RCPA QAP or similar external QAP activities undertaken by the laboratory.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Supervised clinical liaison;
- Access relevant sections of the laboratory manual;
- Execute tests and participate in other relevant laboratory activities;
- Maintain up to date knowledge of the literature and innovations in microbiological testing;
- Compile reports on participation and resolution of uncertainties to assist laboratory to improve standard operating procedures and quality manuals in consultation with supervisor;
- Participate in RCPA QAP or similar external QAP activities undertaken by the laboratory.

1.7 Analytic phase: microscopy

Learning outcomes

- [E] Prepare and use routine stains appropriately, demonstrating awareness of pitfalls and the limitations of the technique;
- [E] Prepare specimens for microscopy;
- [E] Use a light microscope for bright field, phase contrast, dark field and fluorescence microscopy, where possible;
- [E] Interpret microscopy findings appropriately;
- [E] Understand the principles, theory and, where possible, the practice of Kohler illumination;
- [E] Participate in the RCPA QAP or similar external QAP activities undertaken by the laboratory.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant sections of the laboratory manual;
- Participate in laboratory activities including, but not limited to:
 - prepare faecal and other parasite stains and concentrates
 - identify ova cysts and parasites;
 - prepare and examine skin scrapings and other tissues for fungal examination;
 - prepare and examine specimens by Gram's, acidfast, toluidine blue, India ink, Giemsa, fluorescent antibody stains, and other stains which may be relevant to local practice;
 - prepare and examine blood films for blood-borne parasites;
 - attend, observe and undertake the above activities with the relevant laboratory section responsible for any of the above activities if not part of the routine microbiology laboratory activities;
- Participate in RCPA QAP or similar external QAP activities undertaken by the laboratory.

1.8 Analytic phase: culture

Learning outcomes

- [E] Understand the principles and practice of media preparation and supply and ideally to participate in media preparation;
- [E] Select media appropriately for specimen inoculation according to laboratory protocols;
- [E] Select appropriate atmosphere, temperature and duration of culture;
- [E] Process specimens appropriately;
- [E] Resolve uncertainty in situations not addressed by the manual;
- [E] Participate in the RCPA QAP or similar external QAP activities undertaken by the laboratory.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant sections of the laboratory manual;
- Participate in laboratory activities, including but not limited to:
 - Observe and prepare culture media and agar plates;
 - Review the regular and boutique media available in the laboratory, the media quality control and test organisms especially for bulk media purchased from outside the training institution;
 - Plate out clinical specimens;
 - Set up anaerobic cultures;
 - Set up pure cultures from mixed growth on a primary plate;
 - Maintain and inoculate tissue culture for virus isolation;
 - Detect viral replication in tissue culture;
 - Prepare mycological slide cultures;
- Maintain up to date knowledge of the literature and innovations in culture methods;
- Participate in RCPA QAP or similar external QAP activities undertaken by the laboratory.

1.9 Analytic phase: identification of microorganisms to species level

Learning outcomes

- [E] Correctly select significant organisms and identify them by culture, Gram stain and biochemical tests both manual and automated;
- [E] Be able to explain and justify the role of molecular identification of microbes;
- [E] Understand the strengths, limitations and applications of current methods and emergent methods for microbial identification;
- [E] Resolve uncertainty in situations not addressed by the laboratory manual.
- [E] Participate in the RCPA QAP or similar external QAP activities undertaken by the laboratory.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant sections of the laboratory manual.
- Access relevant text books, journals and internet to assist with organism identification;
- Attend meetings, seminars, symposia, etc, dealing with current and emerging methods in microbiology;

- Participate in laboratory activities, including but not limited to:
 - Recognise the colonial and microscopic appearance of commonly encountered or medically important organisms (ie, phenotypic methods of identification);
 - Perform and interpret tests commonly used to identify microorganisms;
 - Determine viable counts in bacterial suspensions;
 - Use automated apparatus to detect bacteraemia and identify microbes;
 - Identify medically important fungi;
 - Use molecular methods to identify organisms unable to be identified by phenotypic methods;
- Undertake audits of selected isolates and methods of detection, and suggest updates if relevant;
- Participate in RCPA QAP or similar external QAP activities undertaken by the laboratory.

1.10 Analytic phase: non-culture detection of microorganisms (excluding microscopy)

Learning outcomes

- [E] Execute serologic assays, demonstrating familiarity with automated systems;
- [E] Execute molecular biologic assays, demonstrating familiarity with automated systems;
- [E] Resolve uncertainty in situations not covered by laboratory manual.
- [E] Participate in the RCPA QAP or similar external QAP activities undertaken by the laboratory.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant sections of the laboratory manual;
- Participate in laboratory activities, including but not limited to preparing, reading and interpreting assays for the detection of antigens and antibodies, including manual and automated methods such as:
 - agglutination
 - precipitation
 - immunoassay
 - complement fixation
 - immunofluorescence
 - immunoblotting
 - Rapid, eg, strip tests
- Review literature related to historical development of serological tests, automation and manual tests;
- Appraise the role of near patient /point of care tests and the microbiology laboratory
- Participate in laboratory activities, including but not limited to:
 - Extract nucleic acids from specimens;
 - Set-up a polymerase chain reaction (PCR) assay;
 - Interpret real time polymerase chain reaction (PCR) graphs;
 - Prepare and read gels;
 - Nucleic acid sequencing of microbes;

- Understand the requirements for detection of 16s rRNA, 18s rRNA etc in relevant samples and the use and limitations of these and other relevant microbial molecular tests.
- Participate in laboratory activities, including but not limited to:
 - Extract nucleic acids from specimens;
 - Set-up a polymerase chain reaction (PCR) assay;
 - Interpret real time polymerase chain reaction (PCR) graphs;
 - Prepare and read gels;
 - Nucleic acid sequencing of microbes;
 - Understand the requirements for detection of 16S rRNA, 18S rRNA etc in relevant samples and the use and limitations of these and other relevant microbial molecular tests.
- Participate in RCPA Quality Assurance Programs Pty Ltd (QAP) or similar external quality assurance activities undertaken by the laboratory.

1.11 Analytic phase: susceptibility testing

Learning outcomes

- [E] Understand principles and theory of susceptibility testing and observe and execute (where possible) manual, molecular, automated and other relevant methods in relation to:
- Antibiotic susceptibility testing;
 - Antifungal susceptibility testing;
 - Antiviral susceptibility testing;
 - Including detection of resistance mechanisms and their role in guiding antimicrobial therapy, and prevention of nosocomial transmission
- [E] Understand principles of measuring patient antibiotic levels including role, relevance, methods, and appropriate levels for therapeutic and non-toxic outcomes.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant sections of the laboratory manual
- Participate in laboratory activities, including but not limited to:
 - Prepare and interpret antibiotic susceptibility tests;
 - detect beta-lactamases and other bacterial enzymes;
 - determine the bactericidal activity of antibiotics or antibiotic-containing serum;
 - determine the synergy between combinations of antibiotics;
 - perform antimicrobial assays on blood and body fluids by bioassay or other methods;
- Participate in laboratory activities, including but not limited to:
 - Prepare and interpret antifungal susceptibility tests;
 - Determine synergy between combinations of antifungal agents;
 - Undertake and interpret antiviral susceptibility testing.
- Determine relevant test methodology including but not limited to:
 - Automated testing;

- Disc testing, eg, Clinical and Laboratory Standards Institute (CLSI), Calibrated Dichotomous Sensitivity testing (CDS www.med.unsw.edu.au/pathology-cds/), British Society for Antimicrobial Chemotherapy (BSAC);
- eTest;
- microbroth dilution tests;
- molecular detection of resistance factors;
- utilise relevant quality control/quality assurance methods to validate all results.

1.12 Analytic phase: management of specimens, laboratory equipment and laboratory data (Also see Section 2)

Learning outcomes

- [E] Prepare specimens, bacterial, fungal and viral isolates and mammalian cells for retention and preservation;
- [E] Execute quality controls for common tests, reagents and media;
- [E] Recognise when quality controls have failed and institute remedial action
- [A] Use laboratory data for cost-efficient laboratory management and generation of statistics;
- [A] Understand the role of the National Association of Testing Authorities (NATA) or International Accreditation New Zealand (IANZ), ISO 900, ISO 15189 and other relevant local, national and international laboratory accreditation and registration requirements.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant sections of the laboratory manual;
- Maintain current knowledge by reading relevant journals and text books; to supplement laboratory manuals;
- Participate in relevant sections of the laboratory;
- Use and maintain (under supervision) laboratory equipment, including but not limited to:
 - incubators
 - centrifuges
 - safety cabinets
 - refrigerators
 - freezers (-20°C, -80°C)
 - liquid nitrogen
 - autoclaves
 - hot air ovens
 - microscopes
 - anaerobic cabinets
 - Gram staining equipment
 - microwaves
 - water baths
 - heating blocks
 - automated equipment used in serology, NAA testing, bacterial/fungal ID and sensitivity testing

- Participate in National Association of Testing Authorities (NATA) or International Accreditation New Zealand (IANZ) or similar accreditation process;
- Review laboratory audits and participate in relevant laboratory audits, under supervision.

1.13 Post-analytic phase: report generation (Also see 4.3)

Learning outcomes

- [E] Communicate and interpret results to clinicians,(initially under supervision pre part 1) including urgent results;
- [A] When reporting, comply with principles involved in the formulation of an opinion and generation of a laboratory report, including review, synthesis and interpretation of all relevant clinical and laboratory information (including quality control data) pt 2;
- [A] Report in accordance with the relevant regulatory framework;
- [A] Resolve uncertainty in situations not covered by laboratory manual;
- [A] Prepare audits and reviews of cases, microbes and test methods, relevant to the laboratory scope of practice.
- [A] Utilize concepts of selective reporting and antibiotic stewardship, including reasons for testing and instances where special tests are needed or indicated.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access relevant sections of the laboratory manual;
- Maintain current knowledge by reading relevant journals and text books to supplement laboratory manuals;
- Participate in laboratory activities, including but not limited to:
 - record, verify and interpret laboratory test results
 - Identify parameters of measurement uncertainty
 - develop and apply action limits
 - notify abnormal results to pathologists and clinicians
 - appraise quality control relevant to result;
 - assess relevance of the result in conjunction with previous laboratory data, clinical history and response to therapy prior to finalization of the microbiology laboratory result;
- Develop computer knowledge (undertake courses) and use this knowledge to assist with effective teaching, audits, reviews;
- Understand the functions, limits and potential of LIS in enhancing efficient management and providing better reporting and decision support for an effective laboratory;
- Participate in teaching, grand rounds, clinical rounds and contribute effectively to these;
- Review relevant reports from RCPA Quality Assurance Programs Pty Ltd (QAP) .

2 FUNCTIONS OF THE MICROBIOLOGIST AS MANAGER IN THE LABORATORY

With growing experience, medical microbiologists are expected to assume managerial responsibilities in the laboratory. In this role they are expected to:

- Apply clinical information to cost effective laboratory practice;
- Supervise and manage the microbiology laboratory safely and effectively in the context of finite resources;
- Ensure effective work practices through staffing and by developing policies and procedures based on appropriate use of information and evidence;
- Demonstrate leadership in an organisation to promote safe patient care.

By the end of training, trainees are not expected to be fully competent in all these areas, however they are expected to have become familiar with managerial tasks by observing and reflecting on the duties of senior microbiologists and to have participated in managerial activities that are appropriate for their stage of training, assuming increasing levels of responsibility as they progress.

The following lists of learning outcomes and suggested activities are a guide as to what Trainees should have achieved by the end of training.

2.1 Quality Management

Learning outcomes

- [E] Understand practices related to quality control required in the laboratory;
- [E] Understand accreditation requirements and participation in these;
- [A] Apply, review and plan quality assurance strategies for monitoring processes and outputs in the microbiology laboratory
- [A] Participate in evaluating the cost-effectiveness of current and proposed laboratory procedures and equipment in the context of limited resources;
- [A] Participate in auditor training and practice.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Review summaries of relevant requirements for lab accreditation and performance, for example the NATA Checklist for Laboratory Accreditation or equivalent checklists in other jurisdictions;
- Participate in case/slide/laboratory/clinical rounds, peer review meetings, external quality assurance (e.g. RCPA QAP) and continuing professional development activities;
- Read current literature on QA strategies, risk management, informatics and evidence based medicine in microbiology laboratories.
- Participate in workflow checks to ensure effective and efficient laboratory function;
- Recognise, report and analyse quality problems when they arise in the laboratory;
- Participate in implementing plans for testing and evaluating measures to improve the quality of laboratory practice and patient care;
- Clinical or case audit, including reviews of methods, and present to the laboratory;
- Attend NATA training courses;
- (after 2012) complete the Quality Management module in the RCPA Education Portal. Log in, click on the "All Trainees" tab which reveals the General Curriculum Resources section;
- Participate in RCPA committees or represent RCPA on institutional committees.

2.2 Laboratory Safety

Learning outcomes

- [E] Understand laboratory safety procedures, to protect self and staff against infection, radiation, toxic, gas, chemical, electrical and fire hazards;
- [E] Be familiar with safety manual and action plans;
- [E] Be familiar with actions for exposures and their currency;
- [E] Apply biosafety training and management when handling all microbial samples especially those deemed to be biosafety threats;
- [A] Analyse incident reports and near misses to identify opportunities for improvements in practice;
- [A] Contribute to the management of staff needs in the event of an adverse event in the laboratory;
- [A] Evaluate processes for assessing risk, investigating and reporting hazards, in accordance with legal aspects of investigation and disclosure after an event;

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Complete the Safety checklist in Appendix 8 of this Handbook (mandatory activity)
- Participate in biosafety training immediately upon commencing work in the laboratory;
- Participate in orientation program for new staff members as soon as practicable after commencing appointment;
- Schedule meeting with workplace occupational health and safety (OHS) Officer early in appointment;
- Participate in regular occupational health and safety drills and meetings, especially fire safety according to institutional requirements usually annually and update as required by the institution;
- Participate in training to use equipment for biological, chemical and fire safety, first aid and resuscitation;
- Prepare or review incident reports and explore improvements if relevant;
- Report incidents and accidents as required by local protocol;
- Follow relevant infection control processes and reporting in the laboratory;
- Wear appropriate safety (personal protective) equipment when in the laboratory;
- Ensure relevant personal vaccinations are completed prior to commencement of duties;
- Report breaches in laboratory safety protocols;
- Complete the Laboratory Safety module in the RCPA Education Portal. Log in, click on the "All Trainees" tab which reveals the General Curriculum Resources section;
- Be familiar with Security Sensitive Biological Agents (SSBA) Regulatory Scheme (Australian Government site) <http://www.health.gov.au/SSBA>

2.3 Compliance with Legislation and Institutional Requirements

Learning outcomes

- [A] Demonstrate basic knowledge of requirements of Approved Pathology Provider (Australia) legislation or relevant undertakings in other jurisdictions;
- [A] Demonstrate basic knowledge of funding mechanisms in the public and private sectors in the jurisdiction of practice;
- [A] Operate with awareness of the potential for medical litigation and the role of pathologists as defendants or consultants, and apply appropriate risk management strategies;

- [A] Ensure laboratory compliance with current requirements for notifiable diseases;
- [A] Identify acceptable standards of billing practice appropriate to the work setting;
- [A] Comply with current requirements for notifiable diseases;
- [A] Demonstrate knowledge of local, national and international regulatory frameworks surrounding the collection, packaging, transport, storage, and disposal of microbial specimens and microbiological materials;

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Review reports and seek advice from appropriate senior staff;
- Locate sources of pathology financing information, e.g. Medicare Benefits Schedule, Health Insurance Act or other documentation relevant to your jurisdiction;
- Document incidents and discussions with medicolegal implications and discuss with supervisor or a senior colleague;
- Review laboratory manuals and State/Territory/country legislation regarding notifiable diseases;
- Maintain currency with the relevant requirements for notifiable diseases;
- (after 2012) complete the Quality Management module in the RCPA Education Portal. Log in, then click on the “All Trainees” tab which reveals the General Curriculum Resources section.

2.4 Managing People

Learning outcomes

- [E] Be familiar with orientation and training protocols for new staff;
- [E] Display skills in avoiding, managing and resolving conflict in the workplace;
- [E] Behave in accordance with equal opportunity and anti-discrimination practices in the workplace;
- [E] Understand and practice the role of working in teams and the importance of valuing all staff.
- [A] Develop the skills needed to mentor, supervise and provide constructive feedback to staff;

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Participate in staff and business meetings in the Department;
- Observe administrative procedures in relation to selection and appointment of staff;
- Observe administrative procedures concerned with rosters;
- Participate in training on giving and receiving feedback and/or read articles on the subject;
- Participate in a conflict resolution course and/or read articles on the subject;
- Reflect on observations of interactions in the workplace, especially those concerned with biosafety and those with the potential to involve conflict;
- Assist in the orientation and mentoring of junior colleagues;
- Take opportunities to participate as trainee representative on College and State/regional committees;
- (after 2012) complete the Ethics module in the RCPA Education Portal. Log in, then click on the “All Trainees” tab which reveals the General Curriculum Resources section
- Attend local courses where available and funded including but not limited to:
 - staff appraisal;
 - staff selection and review;
 - the exit interview;

- conflict management;
- equal opportunity processes;
- anti-discrimination.

2.5 Managing resources

Learning outcomes

- [A] Describe budgetary considerations in an established microbiology laboratory;
- [A] Describe issues concerned with the assessment, procurement, installation, maintenance and use of laboratory equipment and electronic information systems;
- [A] Be aware of sources of funding for laboratory testing;
- [A] Demonstrate ability to read a balance sheet;
- [A] Describe ways to reduce expenditure without reducing quality;
- [A] Observe processes for formulating plans to ensure budget integrity.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Review laboratory budget reports including income, expenditure, salary, overtime, annual leave and sick leave costs, maintenance and consumables costs and discuss with senior staff any discrepancies noted or ideas to ensure budget integrity;
- Participate as an observer in committees concerned with resource management;
- Teach colleagues to use new laboratory equipment and IT software and hardware;
- Attend training sessions concerned with implementing new technology, noting costs and benefits of the technology;
- Attend local courses where available and funded including but not limited to reading financial statements and budgeting.

3 OTHER PROFESSIONAL FUNCTIONS OF MICROBIOLOGISTS

Professional microbiologists have responsibilities with regard to the processes of scientific inquiry, research and education. They are expected to:

- Maintain professional competence throughout their careers, by keeping up to date with new knowledge in technical aspects of microbiology and other aspects of the roles of medical microbiology professionals, and integrating this knowledge in their practice;
- Contribute to advancing knowledge and/or enhancing practice in microbiology;
- Critically appraise scientific literature and research;
- Contribute to the collection, analysis and interpretation of data relating to the quality of health care;
- Contribute to the education of peers, trainees, other health care providers and to the understanding of microbiology by the general community.

By the end of training, trainees should be able to critically appraise scientific literature and research in microbiology and be sufficiently skilled in scientific inquiry to conduct a small scale laboratory investigation or participate in a larger-scale research study. They should have developed the self-discipline to support the habit of lifelong self-education. Through personal experience and observation they should have sufficient understanding of teaching and learning to be able to mentor and supervise junior staff and to conduct educational sessions for colleagues and for the general community .

The following lists of learning outcomes and suggested activities are a guide as to what Trainees should have achieved by the end of training.

3.1 Research and critical appraisal

Learning outcomes

- [E] Critically appraise sources of medical information, discriminating between them in terms of their currency, format, authority and relevance;
- [E] Develop the ability to ask research questions, plan and perform research; and be familiar with research tools and approaches used by basic laboratory scientists;
- [E] Apply and interpret basic statistical and epidemiological concepts and data;
- [E] Collaborate with and acknowledge clinical colleagues.
- [A] Develop a personal strategy, using IT software where appropriate, to discover, store, access and share information resources;
- [A] Demonstrate skill in developing a research proposal, conducting appropriate research activities and writing up for peer review/publication;
- [A] Comply with the requirements of relevant bodies concerned with ethics in human and animal research;
- [A] Prepare reports and papers for publication that comply with the conventions and guidelines for reporting biomedical research;
- [A] Contribute to data analysis and publication in the department.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- During training undertake at one major and one minor project under supervision post completion of Microbiology part I assessment (MB1). These should be of publishable quality and written up for submission for publication;
- Participate in and present cases, reviews, original work, to peers at grand rounds, specialist meetings, journal club, etc;
- Attend research meetings;
- Contribute to writing research proposals and ethics submissions post MB1;
- Use clinical and laboratory databases for research for collecting, organizing and analysing data;
- Use a standard bibliographic application (e.g. EndNote) to download citations from a literature search and organise them into a personal database;
- Read reference material on basic statistical concepts including distribution, mean, median, standard deviation, statistical significance, confidence intervals, correlation, sensitivity, specificity, predictive values, incidence and prevalence;
- Consult a medical librarian, statistician or researcher;
- Prepare articles for publication;
- Give oral and poster presentations at scientific meetings.

3.2 Undertaking Self-Education and Continuing Professional Development

Learning outcomes

- [E] As part of a personal continuing education strategy, practice the habit of identifying and documenting own learning needs, planning educational strategies to meet them, monitoring achievements through self-assessment and reflecting on the outcomes;
- [E] Identify personal learning preferences and reflect on how effective they are in developing competence;
- [A] Demonstrate up to date knowledge of and ability to appraise medical and pathological literature and innovations in areas relevant to microbiology.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Formulate a personal learning plan;
- Complete an online learning style inventory and explore a variety of ways to learn;
- Apply various computer-based instructional tools, such as electronic tutorials for confirming or updating knowledge and skills;
- Review RCPA CPDP documentation to identify and apply activities and recording strategies that may be applicable;
- Select relevant mentors to guide professional activities;
- Regularly review journals relevant to microbiology and participate in or lead discussions on contemporary issues;
- Participate in and present personal work at clinical and pathology educational meetings and journal clubs.

3.3 Educating Colleagues, Staff, Patients and Families

Learning outcomes

- [E] Prepare and deliver educational sessions, incorporating the principles of adult learning, using effective oral, visual or written modes, and reflect on their effectiveness;
- [E] Contribute to the informal education of laboratory personnel, peers, medical students and other health professionals;

- [E] Translate and convey microbiology-related concepts and information in an understandable manner to non-microbiologists.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Participate in and contribute to departmental teaching sessions, clinicopathological meetings, conference presentations;
- Prepare posters or educational articles of scientific investigations in pathology and present to peers and other health professionals;
- Develop assessment or educational modules for RCPA;
- Review or develop educational materials for non-pathologists, eg, Lab Tests Online
- Facilitate patient education if relevant to discipline;
- Mentor students and other trainees and advise on effective preparation for examinations;
- Read and discuss articles on effective teaching strategies;
- Participate in training on the effective teaching and supervision of adult learners in laboratory and clinical settings, such as the “Teaching on the Run” program;
- Seek evidence of own teaching effectiveness.

3.4 Providing Data for Planning and Evaluation

Learning outcomes

- [A] Identify requirements for reporting and costing of clinical and laboratory information and requirements in the provision of new or outbreak services;

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Assemble costing and test selection and possible test numbers information to assist in health service planning;

4 GENERIC PROCESSES EMPLOYED BY MICROBIOLOGISTS

Medical microbiologists are required to uphold the legal and ethical responsibilities of the profession and to behave with diligence, integrity and compassion. Their concern for patient safety and the reputation of the profession should be evident in their daily practice. They should:

- Maintain their professional competence throughout their career;
- Act with honesty, trustworthiness, diligence and integrity at all times.
- Conduct respectful communications with colleagues, patients and others;
- Be skilled in a variety of modes of communication and able to use them appropriately depending on the circumstances;
- Establish and maintain co-operative relationships with colleagues, patients and others in health services;

During training, trainees should reflect on and strive to adopt the attitudes and values that underpin professional practice and take advantage of opportunities to extend themselves in these areas so that by the end of training, they are fully able to assume their professional responsibilities.

The following lists of learning outcomes and suggested activities are a guide as to what Trainees should have achieved by the end of training.

4.1 Patient Safety

Learning outcomes

- [E] Advocate for, and protect, patient rights;
- [E] Promote understanding of health and disease, including relevant epidemiology and public health issues, to patients, clinicians and the community;
- [E] Promote timely and appropriate use of pathology investigations;
- [E] Apply risk management strategies to minimise errors.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Access and read relevant sections of the National Patient Safety Education Framework document or similar local documents;

4.2 Ethics and Confidentiality

Learning outcomes

- [E] Practice ethically, which includes:
 - promptness of reporting;
 - interacting appropriately with clinicians, laboratory staff and other health professionals;
 - knowing when to seek opinion from others;
 - financial probity;
- [E] Comply with legal, ethical and medical requirements relating to patient records and documentation, including confidentiality, informed consent and data security;
- [E] Differentiate between ethically appropriate and ethically inappropriate procedures and actions;

- [E] Identify appropriate courses of action in regard to unprofessional conduct by or ill health in a colleague;
- [E] Comply with copyright and intellectual property rules;
- [E] Recognise and respect cultural and religious factors impacting on professional practice;
- [E] Describe strategies to ensure equity of access to pathology testing for patients.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Review appropriate literature and guidelines including the National Patient Safety Education Framework;
- Read the most recent Australian Medical Association Code of Ethics;
- Access and read documents relating to cultural competence, including those concerning indigenous people, such as Aboriginal and Torres Strait Islander and Maori people;
- Reflect on professional behaviour of self and others, identifying potential for ethical dilemmas and strategies to deal with them;
- (after 2012) complete the Ethics module in the RCPA Education Portal. Log in, click on the "All Trainees" tab which reveals the General Curriculum Resources section;
- Complete the Monash University Clinical Ethics Resource (<http://mnhs-teaching1b.med.monash.edu.au/Public/Clinical%20Ethics/>)

4.3 Communication

Learning outcomes

- [E] Employ effective oral, written and electronic communication strategies, including the production of concise, grammatically correct written reports;
- [E] Use appropriate language in all communications, showing awareness of cultural and linguistic diversity;
- [E] Demonstrate good interpersonal communication skills such as active listening and accepting and offering appraisal;
- [E] Comply with guidelines for handling sensitive information;
- [E] Advise laboratory staff about testing methodologies, quality assurance techniques and delineating protocols for the issuing of results;
- [E] Communicate appropriately with scientific staff in the laboratory;
- [E] Advise clinicians on the choice and performance of laboratory procedures and the interpretation and relevance of pathological findings, taking into account clinicians' and patients' needs;
- [E] Consult with clinical specialists and pathologists on issues of patient care and professional practice and in seeking and providing referral opinion on difficult cases.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Participate in training sessions on communications, cross-cultural communications, presentation skills, etc;
- Compose written reports at an appropriate level of responsibility and seek feedback from supervisor, colleagues and clinicians;
- Document telephone communication of pathological findings, interpretations, clarification of requests and complaints where appropriate, seeking feedback from supervisors and colleagues;
- Read documents relating to etiquette and proper use of electronic communications such as email;
- Consult style guides for correct use of grammar and terminology for written communications;

- When making oral presentations, take advantage of opportunities to raise the level of challenge by making formal presentations to people you don't know well.

4.4 Collaboration and teamwork

Learning outcomes

- [E] Contribute effectively to the activities of laboratory and health care teams, recognizing responsibilities and limitations of own role;
- [E] Consult and collaborate with laboratory scientists, other laboratory colleagues, other medical practitioners and health care professionals;
- [E] Contribute effectively to inter-disciplinary team activities, such as peer review sessions and other education and quality activities, recognizing responsibilities and limitations of own role;
- [E] Promote the role of pathologists and microbiologists as vital contributors to patient care.

Select activities that are appropriate to your training environment and, if relevant, keep a record for your Portfolio, eg,

- Identify the elements of an effective team and reflect on your observations of teams in your work place and others with which you interact;
- Network and share information with colleagues, using available technologies;
- Plan, organize and review teaching activities, together with supervisor, peers and laboratory staff;
- Participate in mentoring programs;
- Participate in College activities and meetings;
- Participate in departmental and multidisciplinary meetings;
- Participate in collaborative research and prepare collaborative publications.

PART 3

Appendices

Appendix 1	Basic Pathological Sciences examination
Appendix 2	Part I assessment
Appendix 3	Part II assessment
Appendix 4	Supervisor's report form
Appendix 5	DOPS form (direct observation of practical skills) form
Appendix 6	CbD form (case-based discussion)
Appendix 7	Portfolio guidelines
Appendix 8	Major project cover sheet and other forms

Appendix 1

Basic Pathological Sciences Examination

All Trainees, regardless of discipline, must pass or be exempted from the Basic Pathological Sciences examination. JSAC Trainees are exempt from the BPS exam but are required to apply for an exemption from the exam. The examination may be taken before commencement of training and is open to any intern, medical or dental student in their final year as well as registered trainees.

A pass in Basic Pathological Sciences is not a prerequisite for Part I examinations, but a pass or exemption must be achieved before proceeding to sit the Part II examination in any discipline.

The purpose of the Basic Pathological Sciences Examination is to assess the candidate's familiarity with the most important pathological processes and biological principles of disease that form essential knowledge for any medical graduate who considers a career in the pathological disciplines if not any medical specialty.

The examination has become necessary because of recent changes in the curricula of many if not all medical schools in Australia and New Zealand where a shift away from pathology as a 'core discipline' has occurred. Hence an understanding of basic patho-biological processes is no longer guaranteed in many medical graduates. However, such 'core knowledge' is essential for a successful start in the training program and satisfactory progress.

The Basic Pathological Sciences examination assesses:

- scientific knowledge that can be found in undergraduate, up-to-date textbooks of pathology;
- the principles of scientific methodology that underpin the daily diagnostic work of pathologists, including antibody technology, molecular biology and cytogenetics;
- factual knowledge of what was once described as "general pathology", comprising mechanisms of cellular injury, cellular growth and cell death, inflammation and tissue repair, haemodynamic disorders, genetic disorders, immunity, environmental hazards, neoplasia and infectious diseases;
- (a basic, general understanding of) newer scientific methods that have led to advances in understanding of the mechanisms of disease, such as molecular cloning, adult and embryonic stem cells, molecular and cytogenetic methods in the diagnosis of disease and prediction of disease outcome, etc.

Examination Format and Content

The examination is a single 2.5 hour paper of 100 multiple choice questions.

Candidates are expected to know base subjects in pathology disciplines other than that in which they are primarily training, so they can make intelligent assessment of results, at least equal to that of their clinical colleagues.

The exam will **concentrate** on the following general subjects (please note that the list of examples is not exhaustive):

- Cellular pathology (cell growth and ageing, cell injury and death)
- Acute and chronic inflammation, healing and repair
- Immunity (building blocks of the immune system, hypersensitivity reactions, autoimmune diseases, AIDS, amyloidosis)
- Haemodynamic disorders (oedema, thrombosis, embolism, infarction, shock)
- Genetic basis of disease (genetic mechanisms of disease; basic knowledge of the more common genetic diseases as well as an understanding of commonly-used genetic tests)
- Microbiology (general principles of microbial pathogenesis, common viral and bacterial infections, the most common parasitic infections)
- Neoplasia (biology of benign and malignant tumours, epidemiology of cancer, molecular and cellular oncogenesis)
- Occupational and environmental pathology (common toxins and manifestations in the human body, such as asbestos, smoking, industrial toxins)
- Nutrition, metabolism (common nutritional deficiencies, obesity)
- Acid-base balance and fluid/electrolyte disturbances (basic physiological and pathophysiological mechanisms).

In each of these subjects, emphasis will be placed on:

- Nomenclature and definitions of disease
- Classification of diseases
- Disease processes/pathogenesis
- Causation/aetiology
- Scientific methodology and new diagnostic methods
- Ethics, social and political aspects of pathology and disease
- Analysis of data (e.g. incidence, prevalence, accuracy, precision, predictive value, correlation).

Appendix 2

Part I assessment

Assessment in Part I is by

- Formal examinations;
- Workplace-based assessment - successful completion of the required number of DOPS and CbD forms;
- Portfolio - evidence of having participated in a sufficient number and type of activities;
- Satisfactory supervisors' reports.

The assessment requirements apply to RCPA single discipline and Joint RCPA/RACP trainees.

Part I formal examinations

The Part I examination has an emphasis on the theoretical, practical and interpretative aspects of investigations in all fields of clinical Microbiology. It is taken after at least 18 months of training in diagnostic and clinical microbiology. There are no automatic exemptions given to any Trainee for any component of the examinations

The Part I examination has three phases and addresses issues including but not limited to:

- epidemiology, pathogenesis and prevention of infectious diseases;
- sterilisation and disinfection, media production, QC and laboratory safety;
- basic microbial structure and metabolism and genetics;
- host-pathogen relationships;
- specimen collection, processing, identification and further testing (e.g. antimicrobial susceptibility) of the full range of likely samples and pathogens to be experienced at the tertiary care level hospital, including bacteriology, mycology, virology and parasitology;
- contemporary issues in Microbiology, including for example, emerging pathogens, bioterrorism;
- molecular biology techniques relevant to diagnostic Microbiology, Microbiology research and molecular epidemiology.

Phase 1:

- a 3 hour 15 minute written paper, consisting of short answer questions, generally held midyear;
- 2 x 105 minute multiple choice question papers, held in conjunction with the written paper.

Phase 2:

- a 'wet' practical examination, testing practical ability to identify up to 10 unknown organisms such as those in the RCPA QAP. Antibiotic susceptibility testing may be required on some of them. This is held in the Trainee's own laboratory.

Phase 3 (only offered to those who pass the Phase 1 written and MCQ papers)

- a 'dry' practical examination, with up to 20 unknown 'spots';
- an oral examination, in which candidates rotate through up to eight (8) structured interview stations, each of approximately 9 minutes duration. Reading time is allowed between stations. A pass is required in every station. A repeat examination later in the same year may be offered to unsuccessful candidates, at the discretion of the Board of Censors.

Provisional (borderline) pass in the examinations

Based on their performance in the oral examinations, some Trainees may receive a provisional pass in the Part I examination. These trainees should continue to study general Microbiology during training and the Part II examination may cover information normally tested only in Part I.

Partial pass in the examinations

Each component of the examination stands alone and candidates can be credited with an exemption from that component, carried over for a maximum of one year.

Portfolio for Part I

The Portfolio is a hard copy record of activities associated with the Trainee's daily work. Trainees are advised to commence these activities at the earliest possible time after commencing training.

The Portfolio should include:

- **Personal safety checklist:** to be completed as soon as practicable after commencing training.
- Direct Observation of Practical Skills (**DOPS**) forms, which assess competence in a range of essential laboratory and bench tasks. Four (4) general benches per year must be completed, to a total of nine (9) before the Part I examination. Special benches may be completed before or after the Part I exam. Please refer to **Appendix 5**.
- Case-based discussions (**CbD**) which assess the Trainee's overall laboratory and clinical judgment and ability to present and discuss a clinical case. A minimum of two (2) CbD forms to be completed per year for different types of cases (low to medium level of complexity) to a total of five (5) before the Part I examination. Please refer to **Appendix 6** for guidance.
- **Incident reports:** reflections on 2 significant events per year
- **Clinical meetings:** At least 3 meetings per year (see Appendix 7, category 2)
- **Research and scholarly activities:** at least 3 different activities per year (see Appendix 7, category 3)
- **Quality activities:** at least 2 different activities per year (see Appendix 7, category 4)
- **Management, ethics and safety:** 1 activity per year (see Appendix 7, category 5)
- **Infection control and public health:** at least 2 different activities per year (see Appendix 7, category 6)
- **Antibiotic stewardship:** 1 activity per year (see Appendix 7, category 7)
- **Supervisors' reports:** end of rotation, annual and pre-examination reports.
- Up-to date portfolio summary spread sheet (download from the RCPA website).

The portfolio summary spreadsheet should be continuously updated and a print-out must be included as the front page of the portfolio. An e-version of the spread sheet can be downloaded from the College website.

The portfolio should be made available to the supervisor to check for completeness at the time of the rotation, annual and pre-examination supervisor's report.

A print-out of the portfolio summary spreadsheet should be appended to the pre-examination supervisor's report which is sent to the College. The spreadsheet will be reviewed by the Chief Examiner and the Registrar of the Board of Censors and the signatories and trainee may be contacted to confirm evidence of satisfactory completion. **NOTE:** The portfolio itself should not be sent to the College unless requested for audit.

Supervisor's Reports

Trainees must submit a Supervisor's report for each year of training, including periods of rotation. Trainees who are sitting the Part I examination must submit an additional pre-examination Supervisor's report in the year of the examination. Please refer to *RCPA Trainee Handbook – General Requirements* (on the RCPA website) for the due dates for these reports.

It is the Trainee's responsibility to ensure that the pre-examination Supervisor's report is completed and submitted by the due date. Failure to do so may jeopardise the accreditation of training time or finalisation of examination results. The report form can be downloaded from the website:

<http://www.rcpa.edu.au/Careers/Training/SupervisorReports.htm>

Summary of assessment requirements for Part I

Item	Completion	Assessed by	Comments
Written exams consisting of short answer and multiple choice questions	Before oral exam	Chief Examiner. Short answer questions are double marked by microbiology examiners.	Questions set by the examinations subcommittee of the Microbiology Advisory Committee See Appendix 2
Wet practical exam	Before oral exam	Marked by QAP representative. Results reviewed by Chief Examiner.	Samples prepared by QAP Held in own laboratory
Dry practical exam	At the time of the oral exam	Chief Examiner	Exam organised by Chief Examiner in Microbiology Exam must be passed to obtain pass in MB1
Oral examination: multi-station set of structured interviews	After passing written and MCQ exams.	Appropriately trained examiners with at least 5 years post-Fellowship experience	Set by panel of independent examiners and subcommittee of Microbiology Advisory Committee
Directly Observed Practical Skills (DOPS): minimum 4 per year	9 general benches before the written MB I exams	The Portfolio summary spreadsheet is checked for completeness by BOC Registrar.	Completed DOPS and CbD forms and other items in the trainee's Portfolio should be reviewed by the supervisor when preparing the supervisor's report
Case-based discussions (CbD): minimum 2 per year	5 before the oral MB I exam	If not satisfactory, the candidate may be required to undertake further activities.	See Appendices 5, 6, 7
Portfolio of evidence of having completed the other workplace activities specified in Appendix 7.	Before the oral MB1 exam.		The portfolio itself should not be sent to the College unless requested for audit
Supervisor(s) Reports (end of rotation, annual and pre-exam report).	See RCPA web site for submission dates	Reviewed by registrar of the RCPA Board of Censors and Chief examiner.	See Appendix 4

Assessment calendar

Please refer to the *RCPA Trainee Handbook – General Requirement* (on the RCPA website) for key assessment dates.

Appendix 3

Part II assessment

This more advanced training encourages diversity, specialisation and investigation within fields of Microbiology and trainees will have sufficient choice to be assessed in an area of sub-specialisation (e.g. Virology). However, knowledge of the wide field of Microbiology and in particular, recent issues in Microbiology is still expected.

Assessment in Part II is by:

- Formal structured oral examination;
- A major project
- A minor project:
- Workplace-based assessment - successful completion of the required number of DOPS and CbD forms;
- Portfolio - evidence of having participated in a sufficient number and type of activities;
- Satisfactory supervisors' reports.

The same requirements apply to RCPA-only trainees, Joint RCPA/RACP trainees and research stream trainees, **except** that research stream candidates complete a PhD or MD thesis instead of the major project.

Structured oral examination

Candidates rotate through a multi-station set of structured interviews (up to 8 stations) each of approximately 9 minutes duration. Reading time is allowed between stations. The topics examined may include quality assurance, safety, management, medico-legal issues, communication and teamwork and well as technical aspects of microbiology. The issues are those which it is likely that a recently qualified Fellow would have to deal with.

A pass is required in every station. A repeat examination later in the same year may be offered to unsuccessful candidates, at the discretion of the Board of Censors.

Major project

The report of the major project is due in the year the Trainee sits the Part II examination. Please refer to the *RCPA Trainee Handbook – General Requirements* (on the RCPA website) for the due date.

It should demonstrate the Trainee's ability to plan, perform and present the results of a scientific investigation in medical Microbiology. As evidence of this Trainees must submit one of the following:

- the manuscript of a research project written in a style suitable for publication; or
- a paper of which the Trainee is senior or sole author, published in a refereed medical journal;
- a completed and accepted thesis for a higher degree.

The project should be a significant piece of laboratory based research work related to the pathogenesis, antimicrobial therapy or diagnosis of infectious diseases.

Reports, including theses from candidates undertaking the research stream, must be submitted in triplicate for perusal by the Chief Examiner and two other examiners. If, in the opinion of the examiners, the project work is inadequate, the Trainee will be asked to revise and resubmit the work.

A solely clinical project is not appropriate for satisfying this component of the joint training program. Project planning may begin at any stage of training. The project must be completed after the Part I examination and submitted on the due date, prior to the Part II oral examination. Please attach the completed cover sheet (**Appendix 8**) before submitting the major project for examination.

Minor project

The minor project is a written report demonstrating the Trainee's understanding of laboratory practice. The report should be 1000 – 3000 words long, plus references. It must be the work of the candidate alone and must not have been submitted for assessment previously, eg, to satisfy the ID project requirements of joint training program candidates.

Suitable projects may include, but are not restricted to:

- case based report focusing on the laboratory issues of diagnosis and testing;
- literature review of a relevant topic;
- audit of a specific test, with recommendations for change if appropriate, including cost, turnaround times, sensitivity, specificity and measurement of uncertainty

The project can be completed at any time after the Part 1 examination. Please refer to the *RCPA Trainee Handbook – General Requirements* (on the RCPA website) for the due date. The project will be graded by a member of the Microbiology Examiners Panel as either *satisfactory* or *not satisfactory*. Candidates whose projects are *not satisfactory* will be given the chance to re-submit. The award of Fellowship will be delayed until the project has been graded as satisfactory.

Portfolio for Part II

The Portfolio is a hard copy record of activities associated with the Trainee's daily work. Trainees are advised to commence these activities at the earliest possible time after commencing training.

The Portfolio should include

- Direct Observation of Practical Skills (**DOPS**) forms, which assess competence in a range of essential laboratory and bench tasks. If DOPS forms for the four (4) special benches were not completed before Part I, they must be completed before the Part II examination. Please refer to **Appendix 5**.
- Case-based discussions (**CbD**) which assess the Trainee's overall laboratory and clinical judgment and ability to present and discuss a complex clinical case. A minimum of four (4) high complexity cases should be completed between Part I and Part II examinations. Please refer to **Appendix 6**.
- **Incident reports**: reflections on 2 significant events per year
- **Clinical meetings**: At least 3 meetings per year (see Appendix 7, category 2)
- **Research and scholarly activities**: at least 3 different activities per year (see Appendix 7, category 3)
- **Quality activities**: at least 2 different activities per year (see Appendix 7, category 4)
- **Management, ethics and safety**: 1 activity per year (see Appendix 7, category 5)
- **Infection control and public health**: at least 2 different activities per year (see Appendix 7, category 6)
- **Antibiotic stewardship**: 1 activity per year (see Appendix 7, category 7)
- **Supervisors' reports**: end of rotation, annual and pre-examination reports.
- Up-to date **portfolio summary spreadsheet** (download from the RCPA website).

The portfolio summary spreadsheet should be continuously updated and a print-out must be included as the front page of the portfolio.

The portfolio should be made available to the supervisor to check for completeness at the time of the rotation, annual and pre-examination supervisor's report. A print-out of the portfolio summary spreadsheet should be appended to the pre-examination supervisor's report which is sent to the College. The spreadsheet will be reviewed by the Chief Examiner and the Registrar of the Board of Censors and the signatories and trainee may be contacted to confirm evidence of satisfactory completion. **NOTE:** The portfolio itself should not be sent to the College unless requested for audit.

Supervisor's Reports

Trainees must submit a Supervisor's report for each year of training, including periods of rotation. Trainees who are sitting the Part II examination must submit an additional pre-examination Supervisor's report with the appended print-out of the portfolio summary spreadsheet. Please refer to the *Trainee Handbook – General Requirements* for key dates for submitting these reports.

It is the Trainee's responsibility to ensure that the pre-examination Supervisor's report is completed and submitted by the due date. Failure to do so may jeopardise the accreditation of training time or finalisation of examination results.

Summary of assessment requirements for Part II for RCPA (single discipline) and Joint RCPA/RACP trainees

A pass or exemption in the BPS is required before enrolling for the Part II examination.

<i>Item</i>	<i>Completion</i>	<i>Assessed by</i>	<i>Comments</i>
Major project	In the year of sitting the MB II oral exam	Chief examiner and two additional examiners	3 copies to be submitted.
Minor project	Before the MB II oral exam	Member of Microbiology Examiners Panel	
Directly Observed Practical Skills (DOPS)	4 special benches before the oral exam	The Portfolio summary spreadsheet is checked for completeness by BOC Registrar.	Completed DOPS and Cbd forms and other items in the Portfolio are to be reviewed by the supervisor when preparing the supervisor's report.
Case-based discussions (CbD)	4 high complexity cases before the oral exam		See Appendices 5, 6, 7
Portfolio of evidence of having completed the other workplace activities specified in Appendix 7.	Before the oral MB1 exam.		If not satisfactory, the candidate may be required to undertake further activities.
Supervisor(s) Reports (end of rotation, annual and pre-exam report).	See RCPA web site for submission dates	Reviewed by registrar of RCPA Board of Censors and Chief Examiner or delegate	See Appendix 4
Oral examination: multi-station set of structured interviews	After submission of projects and Portfolio	Appropriately trained examiners with at least 5 years post-Fellowship experience	Questions set by panel of independent examiners and compiled by sub-committee of the Microbiology Advisory Committee

Assessment requirements for Research Stream candidates:

Research stream candidates must

- satisfy the DOPS, CbD and supervisor report requirements specified in the Table above;
- provide evidence that they have participated in a sufficient number and type of activities specified in the Portfolio;
- submit formal confirmation that the PhD thesis or MD thesis has been accepted;
- achieve a pass in the structured oral examination;

Assessment calendar

Please refer to the RCPA *Trainee Handbook – General Requirements* (on the RCPA website) for key assessment dates.

Appendix 4

Guidelines for completing the Supervisor's Report

The role and responsibilities of supervisors are outlined in the following documents which are available on the RCPA website:

- RCPA Induction manual for Supervisors
- Policy on the Role of the Supervisor

The Supervisor's Report Form can be downloaded from the RCPA website:

<http://www.rcpa.edu.au/Careers/Training/SupervisorReports.htm>

The form should be completed by the supervisor in consultation with other laboratory staff who have a significant role in the Trainee's training program and with reference to the Trainee's Portfolio.

Trainees must make their up-to-date Portfolio available to the supervisor for the annual rotation and pre-examination reviews. For the pre-examination review, a print-out of the portfolio summary spread sheet must also be made available

The Portfolio should include

- all completed forms for Direct Observation of Practical Skills (DOPS)
- all completed forms for Case-based Discussions (CbD)
- evidence that the Trainee has completed the minimum number of required other activities
- copies of all previous Supervisors' report(s).

Trainees are responsible for the safe keeping of all these records and should **not** contact the College for the previous year's Supervisor's report.

Submitting the Supervisor's Report

It is the Trainee's responsibility to ensure that the form is completed and submitted by the due date. At least one Supervisor's Report is due annually and may be submitted with the annual registration for the subsequent year. For Trainees who participate in rotational programs, one report is required to be submitted on completion of each period of rotation at a different institution.

For Trainees sitting for Part I and Part II examinations, the additional pre-examination Supervisor's report is due by the date specified in the *RCPA Trainee Handbook – General Requirements* (on the RCPA website). Reports must be available for consideration at the oral examinations.

Joint RCPA/RACP Trainees must also comply with the Supervisor's Report requirements of the Royal Australasian College of Physicians

Please post this form by the due date to
The Royal College of Pathologists of Australasia
207 Albion Street
Surry Hills NSW 2010 AUSTRALIA

Faxed reports will not be accepted.

Appendix 5

DOPS (Direct Observation of Practical Skills) Assessment

The purpose of the Direct Observation of Practical Skills (DOPS) assessment is to indicate Trainees' acquisition of practical laboratory skills; to show that they can work safely in the laboratory; and to provide feedback on progress by highlighting strengths and areas for improvement, thereby encouraging their professional development. A minimum of four (4) DOPS per year are required; nine (9) general bench DOPS are required before Part 1. The four (4) specialist bench DOPS can be done prior to Part 1 but must be completed by the Part 2 exams.

It is important to observe the Trainee doing the activity. Observations can be made by the supervisor and also by suitably qualified scientific staff. Assessors who are RCPA Fellows can note this as a quality activity in their annual CPDP submission.

Trainees should initiate the DOPS assessment by requesting an appropriate assessor to observe them when they are confident they can complete it satisfactorily. The time taken will vary according to the skill.

All stages of multi-part skills should be observed. For example, to assess competence at the urine bench, the assessor should tick "urine bench" (Section A), and as many of the Section B boxes as have been observed, eg, accession, microscopy/staining, culture, reading, microbial identification, susceptibility testing. Observations might take place intermittently over the course of 2-3 days.

Over time the assessments should cover each general and special bench and all the skills of accession, microscopy, staining, culture, reading, microbial identification, susceptibility testing, molecular techniques and antigen testing. If a laboratory is unable to provide all 9 specified general benches, one (1) unspecified bench may be substituted.

The assessor should complete the DOPS form while the Trainee is present and spend 5-10 minutes providing immediate feedback.

Grading, standards and outcome of assessment


Each aspect of the Trainee's performance should be graded as either Satisfactory or Not Satisfactory. The "n/a" option should be used if the assessor has not observed that aspect or is otherwise unable to comment.

The Trainee's strengths as well as areas for improvement should be discussed with the Trainee. Feedback should be given sensitively, in a suitable environment. Areas for development should be identified, agreed and recorded on the DOPS form.

The final outcome should only be graded Satisfactory if all aspects have been performed to the standard expected of a Trainee at that stage. A Trainee whose performance is Not Satisfactory will be able to repeat the assessment with no penalty.

Record keeping

The DOPS forms must be fully completed, signed and dated by the trainee and the assessor. The forms must be retained by the trainee in his/her Portfolio. Only Satisfactory DOPS need to be recorded in the Portfolio.

 <h1 style="margin: 0;">RCPA</h1> <p style="font-size: small; margin: 0;">The Royal College of Pathologists of Australasia</p>	<h2 style="margin: 0;">Microbiology DOPS (Direct Observation of Practical Skills) Assessment Form</h2>				
Trainee name	Trainee ID (RCPA)	Stage of training Y1 Y2 Y3 Y4 Y5 if >Y5, please specify			
Assessor name	Assessor position <input type="checkbox"/> Pathologist <input type="checkbox"/> Scientist <input type="checkbox"/> Snr Trainee <input type="checkbox"/> Other (pls specify)				
USE ONE FORM PER BENCH. If using Section A , tick as many from Section B as apply. If using Section C , tick the bench being observed.					
Section A: General Benches (tick box that applies) <input type="checkbox"/> Specimen reception <input type="checkbox"/> Urine bench <input type="checkbox"/> Faeces bench <input type="checkbox"/> Respiratory: ear, nose, throat bench <input type="checkbox"/> Tips & swabs – pus, genital, eye bench <input type="checkbox"/> Sterile site – tissue & fluid, including CSF, bone, joint bench <input type="checkbox"/> Nosocomial & environmental bench <input type="checkbox"/> Blood culture bench <input type="checkbox"/> Mycology bench <input type="checkbox"/> Other (please specify)		Section B (tick as many as apply) <input type="checkbox"/> Accession <input type="checkbox"/> Microscopy/staining <input type="checkbox"/> Culture set up (eg media, atmosphere, etc) <input type="checkbox"/> Culture reading <input type="checkbox"/> Microbial identification <input type="checkbox"/> Susceptibility testing <input type="checkbox"/> Molecular techniques <input type="checkbox"/> Antigen testing <input type="checkbox"/> Other (please specify)			
Section C - Special processes (tick box that applies) <input type="checkbox"/> Quality control <input type="checkbox"/> Molecular <input type="checkbox"/> Serology <input type="checkbox"/> Media <input type="checkbox"/> Other (please specify)					
Brief description of procedure to be observed and assessed 					
Please comment on whether these aspects of the trainee’s performance are satisfactory for the stage of training			Satis- factory	Not Satis- factory	n/a
Specimen handling, preparation, laboratory information system requirements					
Select appropriate media/equipment;use according to standard operating procedures					
Interpret and discuss findings, with reference to specimen, test and patient type					
Discuss anomalies and resolve uncertainties					
Perform and record quality control information relevant to the bench					
Safe handling and observes appropriate occupational health and safety requirements					
Final written report					
Timely, efficient, cooperative performance					
Please comment on other relevant aspects, especially on aspects for improvement 					
Final outcome (circle one) Satisfactory Not Satisfactory	Date of DOPS	Time taken for DOPS	Time taken for feedback		
Signature of assessor		Signature of trainee			

Appendix 6

CbD (Case-based Discussion) Assessment Form

Throughout training, Trainees should seek opportunities to present and discuss cases with experienced colleagues and receive feedback. The CbD form should be used to formally record at least 2 of these sessions per year. At least five (5) low-to-medium complexity CbD forms should be signed off as satisfactory before the Part I examination. These should be for routine situations and those with frequently occurring, manageable complications. A minimum of four (4) high complexity cases should be signed off as satisfactory between the Part I and Part II examinations. These should be for difficult or unusual situations in which the level of complexity may relate to the organism itself, and specialised technical procedures required to identify it; to clinical complexity where there is a wide differential diagnosis and hence a range of investigation needed; or complexity in terms of implications e.g. public health significance.

CbD assessments in Microbiology indicate the Trainee's ability to interpret and relate pathological results to clinical findings; to plan appropriate investigations, and make decisions in relation to patient care, including decisions with ethical and legal dimensions. The purpose of the CbD assessment is also to provide feedback to trainees about their progress by highlighting strengths and areas for improvement, thereby encouraging their professional development.

The Trainee should initiate each CbD assessment. The Trainee should select two (2) recent cases of patient infections in which s/he has been involved clinically or through laboratory tests. The assessor should select one (1) of these for the Trainee to present and discuss. The assessor, who should be an RCPA Fellow but not necessarily the listed supervisor, can note this as a quality activity in their annual CPDP submission. The Trainee should request a mutually convenient time for a 30 minute discussion, which allows 15-20 minutes for the presentation/discussion and 5-10 minutes for the assessor to give immediate feedback and complete the CbD form.

Each CbD topic should be chosen from a **different** site of infection, as listed on the CbD form and can focus on one or more of the following aspects:


- medical record keeping;
- clinical/microbiological assessment;
- clinical management, ie, selection of investigation(s), interpreting and reporting results, advice regarding antimicrobial therapy, prophylaxis or immunisation;
- infection control and health protection/public health;
- quality improvement;
- professionalism, eg ethical/legal aspects, teamwork

Grading, standards and outcome of assessment

Assessors should grade each aspect of performance as either Satisfactory or Not Satisfactory. The "n/a" option should be used if the assessor has not observed that aspect or is otherwise unable to comment. Feedback should be given sensitively in a suitable environment and should include strengths and areas for development which should be identified agreed and recorded on the CbD form. The **final outcome** should only be graded Satisfactory if all aspects have been performed to the standard expected of a Trainee at that stage. A Trainee whose performance is Not Satisfactory will be able to repeat the assessment with no penalty.

Record keeping

The CbD forms must be fully completed, signed and dated by the trainee and the assessor. The forms must be retained by the trainee in his/her Portfolio. Only Satisfactory CbD forms need to be recorded in the Portfolio.

 <h1 style="margin: 0;">RCPA</h1> <p style="font-size: small; margin: 0;">The Royal College of Pathologists of Australasia</p>	<h2 style="margin: 0;">Microbiology</h2> <h3 style="margin: 0;">Case-based Discussion (CbD)</h3> <h3 style="margin: 0;">Assessment Form</h3>			
Trainee name	Trainee ID (RCPA)	Stage of training Year1 Yr2 Yr3 Yr4 Yr5 if more than Yr5, please specify		
Assessor name	Assessor position <input type="checkbox"/> Pathologist <input type="checkbox"/> Senior registrar <input type="checkbox"/> other(specify)			
Site of Infection (tick box) <input type="checkbox"/> blood stream <input type="checkbox"/> cardiovascular <input type="checkbox"/> respiratory <input type="checkbox"/> bone/joint <input type="checkbox"/> wound/soft tissue <input type="checkbox"/> gastrointestinal <input type="checkbox"/> central nervous system <input type="checkbox"/> intra-abdominal <input type="checkbox"/> urinary tract <input type="checkbox"/> burns/plastics <input type="checkbox"/> sexually transmitted infections <input type="checkbox"/> other (please specify)	Technique <input type="checkbox"/> microscopy <input type="checkbox"/> culture <input type="checkbox"/> serologic diagnosis <input type="checkbox"/> molecular <input type="checkbox"/> other (please specify)			
Complexity of case (tick box) <input type="checkbox"/> low <input type="checkbox"/> medium <input type="checkbox"/> high				
Brief description of case presented, discussed and assessed				
Please comment on whether these aspects of the trainee's performance are satisfactory for the stage of training		Satis- factory	Not Satis- factory	n/a
Initial assessment of clinical, pathological, microbiological aspects of case				
Appropriate initial and follow up investigation/s selected				
Interpretation of findings				
Clinical management advice (eg, regarding therapy, prophylaxis, immunisation)				
Infection control/public health advice				
Overall laboratory and clinical judgment				
Reporting of findings				
Ability to present and discuss case				
Please comment on other relevant aspects, especially on aspects for improvement				
Final outcome (please circle) Satisfactory Not Satisfactory	Date of CbD	Time taken for CbD	Time taken for feedback	
Signature of assessor		Signature of trainee		

Appendix 7

Portfolio

Guidelines for Trainees and Supervisors

The Portfolio is a record of activities undertaken by the Trainee associated with their daily work and provides evidence that the Trainee is developing the desired technical skills and professional values, attitudes and behaviours.

Trainees should start accumulating evidence for the Portfolio from early in Year 1 and keep it until they complete training.

This document contains guidelines to assist Trainees to compile the

- (a) Hard copy Portfolio
- (b) Soft copy Portfolio Summary

Participation in seven categories (7) of activities is required.

- Category 1: Mandatory items: safety checklist, DOPS, Cbd, incident reports, supervisors' reports
- Category 2: Meetings
- Category 3: Research and scholarly activities
- Category 4: Quality activities
- Category 5: Management, ethics, safety
- Category 6: Infection control & public health
- Category 7: Antibiotic stewardship

Category 1 activities are mandatory. Trainees may **select** activities from each of the other six categories, provided they complete the minimum required each year and fulfil requirements for Part I and Part II examinations. Activities should be selected according to what is feasible in the training institution. **It is not necessary to do every activity.**

Hard copy of the evidence should be filed in a **Portfolio folder**. Keep separate sections for each category. Label each item of evidence with the correct code, using the Tables of Activity Codes below. It is important to read the descriptions of the possible activities carefully **BEFORE** you start choosing your Portfolio activities so that you can be sure that you meet the requirements.

A soft copy **Portfolio Summary** (Excel spread sheet) must also be compiled. The spreadsheet can be downloaded from the RCPA website.

It is the Trainee's responsibility to keep Portfolio and Portfolio Summary **up-to-date**. Both must be provided to the Supervisor for review when they are preparing the annual Supervisor's report

The Portfolio summary spreadsheet should be submitted to the RCPA prior to the oral examination at a time determined by the RCPA. The summary will be reviewed by the Chief Examiner and the RCPA. The signatories and Trainees may be contacted to confirm evidence of satisfactory completion. NOTE: The actual portfolio should not be sent unless requested for audit.

 The Royal College of Pathologists of Australasia	Microbiology Examples of items that may be included in the Portfolio
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Apart from the mandatory items, Trainees are not required to participate in every activity. They should select items that are feasible in their workplace.

Read the descriptions of the activities carefully so that you will be able to assign the correct code to each activity when you assemble your Portfolio evidence and when you complete your Portfolio summary (Excel spreadsheet).

Code	Category 1: Mandatory inclusions	Evidence
1.1	Personal safety checklist; to be completed within 3 months of starting (Appendix 8)	Attach checklist. One only is required during training.
1.2	DOPS forms : all nine (9) general microbiology benches to be completed before sitting Part I. Special benches may be completed before or after sitting Part I.	Attach all forms that have been signed as satisfactory.
1.3	CbD forms: from five (5) different sites of infection before sitting Part I. An additional four (4) to be completed before sitting Part II. These should be high complexity cases.	Attach all forms that have been signed as satisfactory.
1.4	Incident reports, reflections on significant events – 2 per year	Attach reports
1.5	Supervisor's report/s for each year and/or rotation	Attach reports and a brief reflection (maximum 1 page) on the supervisor's comments.

Code	Category 2: Clinical meetings At least 3 different activities per year Record only CLINICAL meetings here. Record meetings concerned with management, QA, ethics, infection control, etc, in categories 4, 5, 6	Evidence
2.1	Multidisciplinary clinical meetings, grand rounds, ward rounds, clinic-pathological correlation (CPC) meetings, morbidity and mortality meetings, etc	Statement from chair of committee. Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the meeting
2.2	Conferences, courses, seminars, workshops, forums	Registration receipt or other evidence of attendance. Program. Brief reflection (maximum 1 page) on what you gained from participating.
2.3	Journal club, small group learning sessions	Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the meeting
2.4	Other	

Code	Category 3: Research & Scholarly At least 3 different activities per year	Evidence
3.1	Literature review and preparation of materials (eg slides) to support teaching or conference presentation.	Record topic and list the references reviewed. Include only the actual period of reading and preparation of materials.
3.2	Teaching sessions (lecture, seminar) for medical students, lab staff, GPs, etc.	Record topic, date, duration, brief (maximum 1 page) reflection on what you gained from the activity.
3.3	Oral or poster presentation at scientific meeting.	Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the activity
3.4	Publications, journal articles, book chapter, monograph, published or written to a standard suitable for publication.	Cite the reference for published works. Attach the manuscript for unpublished works.
3.5	Developing assessment or educational modules for RCPA.	Copy of, or synopsis of, module
3.6	Reviewing or developing educational materials for non-pathologists, eg, Lab Tests Online	Copy of, or synopsis of, material
3.7	Self-assessment activities	Record topic, date, duration, and reference to materials used
3.8	Formal self education study, eg, on-line educational modules (eg College of American Pathologists (CAP) modules), journal review of cases you have worked up.	Record topic/activity, date, duration and brief reflection (maximum 1 page) on what you gained from the activity
3.9	Academic award courses	Copy of official transcript of assessment results
3.10	Other	

Code	Category 4: Quality activities At least 2 different activities per year	Evidence
4.1	Participation in external and internal quality management, processing external QA samples, review of documents/manuals, etc	Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the activity
4.2	Attendance at NATA training courses	Registration or other evidence of attendance, date, duration, brief reflection (maximum 1 page) on what you gained from the activity
4.3	Clinical or case audit, including reviews of methods	Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the activity
4.4	Participation in and contribution to meetings concerned with introducing new tests/instruments, altered work flows, etc	Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the meeting
4.5	Participation in RCPA committees; representing RCPA on other committees, eg, regulatory or institutional bodies	Letter from RCPA confirming representation. Dates, duration of meetings, brief reflection (max 1 page) on what you gained from participation
4.6	(after 2012) complete the Quality Management module in the RCPA Education Portal. Log in, click on the "All Trainees" tab which reveals the General Curriculum Resources section	Reflection on what you gained from completing the module
4.7	Other	

Code	Category 5: Management, Ethics, Safety Choose at least 1 different activity per year	Evidence
5.1	Attend departmental management committees, budget meetings, other management-related meetings, ethics review committees.	Statement from chair of committee. Record committee name, date, duration, brief reflection (maximum 1 page) on what you gained from the meetings
5.2	Undertake significant management roles, eg, chairperson, secretary, treasurer of microbiology-related committees	Record committee name, date, duration, brief reflection (maximum 1 page) on what you gained from carrying out the role
5.3	(after 2012) complete the Ethics module in the RCPA Education Portal. Log in, click on the "All Trainees" tab which reveals the General Curriculum Resources section.	Reflection on what you gained from completing the module
5.4	Complete the Laboratory Safety module in the RCPA Education Portal. Log in, click on the "All Trainees" tab which reveals the General Curriculum Resources section.	Reflection on what you gained from completing the module
5.5	Other	


Code	Category 6: Infection control/public health Choose at least 2 different activities per year	Evidence
6.1	Attend OHS committees, infection control/public health committees	Statement from committee chair. Record committee name, date, duration reflection on what you gained from the meetings
6.2	Participate in infection control rounds, investigation of outbreaks or case reviews/audits of hospital acquired infection	Date, duration, brief reflection (maximum 1 page) on what you gained from the activity
6.3	Visit public health laboratory to learn about procedures for outbreak investigation	Date, duration, brief reflection (maximum 1 page) on what you gained from the activity
6.4	Retrieve statistical information on notifiable diseases & resistant organisms from lab database, using CLSI or other guidelines, including rationale for selection/reporting.	Brief reflection (maximum 1 page) on what you gained from the activity
6.5	Discuss procedures for notification of infectious diseases	Date, duration, brief reflection (maximum 1 page) on what you gained from the activity
6.6	Other	

Code	Category 7: Antibiotic stewardship Choose at least 1 activity per year	Evidence
7.1	Participate in drug committee meetings.	Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the activity
7.2	Audit antibiotic use in collaboration with a pharmacist	Record topic, date, duration, brief reflection (maximum 1 page) on what you gained from the activity
7.3	Read papers on drug resistance, etc	Record topic, date, brief reflection on what you gained from the activity
7.4	Provide clinical advice on appropriate antibiotic use, keeping a diary of advice and outcomes on up to 10 patients	Diary which records deidentified patient history, date, advice given and a brief reflection on what you gained from the activity.
7.5	Other	

Appendix 8

Miscellaneous forms

Personal safety checklist.....	54
Major project cover sheet.....	56

	Personal safety checklist
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- I have participated in a laboratory safety induction program or educational session
- I have reviewed the laboratory safety manual
- I know where to find the laboratory safety equipment and how to use it
- I have known immunity to hepatitis B (natural or vaccine)
- I have been vaccinated and/or screened for other infectious diseases as required by my laboratory
- I know how and when to wash my hands and carry this out
- I wear enclosed shoes in the laboratory and tie back long hair if applicable
- I wear appropriate protective clothing (gown, gloves, goggles, mask as needed) and always remove it before leaving the laboratory
- I cover any cuts or wounds before working in the laboratory
- I never eat or put anything in my mouth whilst in the laboratory
- I know how to handle blood and other body substances and tissues to avoid transmission of infection to myself and others
- I know how to prevent sharps injury
- I am aware of electrical, chemical, radiation and biological hazards and how to prevent them
- I know what to do in an emergency
- I know the procedure for reporting safety-related incidents
- I know where to find information about legislative requirements for laboratory safety
- I know where to find detailed information about laboratory hazards such as dangerous chemicals
- I always clean up after myself
- I set up my workspace and ensure correct posture and lifting technique so as to avoid strain and injury

Name:

Sign:

Witness (supervisor or senior pathologist):

Date:



**Microbiology Part II
Cover page for the MAJOR
PROJECT**

Please complete and attach this cover page to the major project when submitting for examination.

Name of Trainee.....

Name of Supervisor.....

Laboratory.....Date submitted.....

Title of major project.....

.....

Who conceived of this project? If not you alone, please describe your involvement.

Was ethical approval required for the project? No Yes
Give details

Were patient samples used in this project? No Yes

If yes, who collected the samples?

Who stored the samples?

Who tested the samples?

Who entered the data?

Who analysed the data?

How was the project funded? (eg Laboratory budget, research grant, commercial grant, other?)

Please state any potential or actual conflict of interest associated with the project

Has the work been, or will it be, submitted for publication? No Yes

Who assisted you with the project? (name, position)

Your signature and date.....

Supervisor signature and date.....