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JOHANNESBURG OFFICE
EXAMINATIONS & CREDENTIALS

June 2023

R E G U L A T I O N S

FOR ADMISSION TO THE FELLOWSHIP OF THE

COLLEGE OF PATHOLOGISTS OF SOUTH AFRICA

IN MICROBIOLOGICAL PATHOLOGY

FC Path(SA) Micro

1.0 EXAMINATION COMPONENTS

The examination comprises part I and part II.

2.0 PURPOSE OF ASSESSMENT

The aim of this assessment is to evaluate if the candidate who has completed the minimum training period, has acquired the appropriate professional knowledge, skills and attitude stipulated by the Health Professions Council of South Africa (HPCSA) training requirements and standards in order to be licensed by the HPCSA as a practitioner of Medical Microbiology at specialist level.

3.0 ADMISSION TO THE EXAMINATION

3.1 PART I EXAMINATION

3.1.1 A candidate must hold a post-internship qualification to practise medicine which has been registered with the Health Professions Council of South Africa

3.1.2 For admission to the Part I examination, a candidate must have completed a minimum of twelve (12) months of approved training in Microbiology including virology and immunology, at the time of sitting for the examination.

3.1.3 The candidate will be required to submit an official letter / certificate from the head of the department(s) where he/she has been working proving that he/she has completed the required training,

3.2 PART II EXAMINATION

3.2.1 For admission to the Part II examination a candidate must have completed a minimum of forty-two (42) months of approved training in Microbiology at the time of sitting for the written examination.

3.2.2 At least thirty-six (36) months of this period must have been spent in a Department of Microbiological Pathology.

3.2.3 In addition, at least six (6) months must have been spent in an approved Medical Virology laboratory/department; this is outside the thirty-six (36) months period spent in the Department of Microbiological Pathology.

3.2.4…/

3.2.4 The candidate will be required to submit an official letter / certificate from the head of the department(s) where he/she has been working proving that he/she has completed the required training, ie an adequate rotation through the bacteriology, mycology, parasitology, serology/immunology and molecular diagnostic sections of the diagnostic laboratory.

3.2.5 It is compulsory for all candidates to submit their Portfolio at the time of making an application. It is recommended that all candidates entering into their registrar training from 1 January 2019 use the LogBox online portfolio. This is a free service and the app is available in both Apple and Android format. Please register at www.logbox.co.za.[1]

4.0 SYLLABUS

There is one syllabus or core training programme, with two examinations: Part I and Part II examinations.

[See appendix A below, for syllabus/ core training programme.]

5.0 CONDUCT OF THE EXAMINATION[2]

5.1 PART I EXAMINATION

The Part 1 examination consists of a written paper/component only with no practical component.

Refer to Part I blueprint on the CMSA website for format/ content of examination.

https://www.cmsa.co.za/view_exam.aspx?QualificationID=25

5.2 PART II EXAMINATION

The Part II examination consists of two components: a written and a practical component.

Only candidates that have met the written paper subminimum requirements are invited to the practical examination.

Refer to Part II Written and Practical blueprints on the CMSA website for format / content of examination.

https://www.cmsa.co.za/view_exam.aspx?QualificationID=25

JOHANNESBURG
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[1] LogBox recommendation effective for new Registrars – 1 January 2019
[2] Examination format – effective FS 2021

6.0 ADMISSION AS A FELLOW

6.1 Only candidates who have completed training in a CMSA recognised registrar post may be awarded a fellowship if successful in the examination.

6.2 Candidates who have written the examination as a prerequisite from the HPCSA for inclusion on the specialist register are not eligible to be awarded a Fellowship but will be sent a letter confirming their success in the examinations

All other candidates will be asked to sign a declaration as below:

I, the undersigned …….do solemnly and sincerely declare that while a member of the CMSA 1 will at all times do all within my power to promote the objectives of the CMSA and uphold the dignity of the CMSA and its members

that I will observe the provisions of the Memorandum and Articles of Association, By-laws, Regulations and Code of Ethics of the CMSA as in force from time to time

that I will obey every lawful summons issued by order of the Senate of the said CMSA, having no reasonable excuse to the contrary

and I make this solemn declaration faithfully promising to adhere to its terms

Signed at …… this …….....……..day

……..of ……. 20…….

Signature...…….....

Witness .....
(who must be a Founder, Associate Founder, Fellow, Member, Diplomate or Commissioner of Oaths)

6.2 A two-thirds majority of members of the CMSA Senate present at the relevant meeting shall be necessary for the award to any candidate of a Fellowship

6.3 A Fellow shall be entitled to the appropriate form of certificate under the seal of the CMSA

6.4 In the event of a candidate not being awarded the Fellowship (after having passed the examination) the examination fee shall be refunded in full

6.5 The first annual subscription is due one year after registration (statements are rendered annually).

A P P E N D I X A

1.0 GENERAL AIM:

To produce trained clinical microbiologists competent at providing specialist opinion in their clinical discipline and who should have developed the appropriate management skills to lead a department/laboratory, if required.

2.0 OBJECTIVES:

Over the training period the candidate should acquire or develop:

2.1 Specialised factual knowledge of the natural history of those diseases upon which the chosen discipline (microbiology) is based.

2.2 Interpretative skills so that a clinically useful opinion can be derived from laboratory data.

2.3 Technical knowledge, gained from close acquaintance with laboratory technology, so that methodology appropriate to a clinical problem can be chosen, and so that quality control and quality assurance procedures can be implemented.

2.4 An in-depth understanding of all aspects of health and safety requirements for medical laboratories.

2.5 Management and communication skills including experience, under supervision, in planning departmental policies and developing the leadership skills necessary to implement them.

2.6 Data management and analysis skills to evaluate information derived from the population served and from the technical procedures applied in the laboratory, which includes expertise with information technology and the use of spreadsheets, databases, statistical packages, etc.

2.7 The lifelong habits of scientific reading, literature searches, consultation with colleagues, attendance at scientific meetings, and the presentation of scientific work as part of continuing professional development (CPD).

2.8 Research and development experience, acknowledging that original thought and critical assessment of published work are important to allow the trainee to contribute in a team, and individually, to the improvement of service.

2.9 An understanding of the importance of resource management within the laboratory.

2.10 An in-depth understanding of the applications of molecular diagnostics, and the role of the microbiome in disease.

2.11 An in-depth knowledge of the fundamental principles of virology and immunology, the technical aspects and application of diagnostic assays and the interpretation of these results in the clinical context.

3.0 A CORE TRAINING PROGRAMME: MICROBIOLOGICAL PATHOLOGY

3.1 Fundamentals of microbiology

Scientific basis of microbiological pathology covering bacteriology, mycobacteriology, parasitology, mycology and virology.

Trainees should have an understanding of the principles, clinical and research applications of the following and must be competent at applying these concepts in the clinical setting:

- Microbial structure, physiology and genetics
- Microbial taxonomy, classification and typing methods
- Host defense mechanisms and immunity to infection
- Microbial pathogenicity and virulence determinants
- Principles of vaccine development and use

Antimicrobial agents, their mode of action, mechanisms of microbial resistance and application for therapy.

3.2 Clinical syndromes

Trainees must develop a broad knowledge of infectious diseases and clinical syndromes related to infection, with regard to the following:

Aetiology
Epidemiology
Clinical presentation
Diagnostic approaches including the role of biomarkers
Management
Surveillance
Control and prevention
Considerations for specific population groups

Trainees must develop competence and experience with applying this knowledge in various clinical settings.

Trainees must keep updated with current advances in the field, developments in diagnostic approaches and emerging/re-emerging infectious diseases.

3.3 **Laboratory safety**

At the end of formal training, the trainee should be competent at:

- Performing local, national and international procedures for the safe transport of specimens or cultures, including postal and packaging regulations for such material.
- Applying recommended practices for the handling of pathogens with specific biosafety requirements (e.g. *Mycobacterium tuberculosis, Bacillus anthracis*) to reduce the risk of laboratory-acquired infections.
- Implementing and applying Good Laboratory Practice principles in a medical laboratory.
- Detecting, investigating and addressing laboratory contamination and should gain experience in developing policies to reduce laboratory contamination under supervision.

Trainees must develop an in-depth understanding of:

- Biosafety levels in medical laboratories including the principles and operation of microbiological safety cabinets and the procedures for their decontamination and monitoring of air flow.
- Safety requirements regarding laboratory design.

3.4 **Sterilisation and disinfection**

At the end of formal training, the trainee should understand the principles and uses of sterilisation and disinfection procedures for the preparation of media and instruments and for microbiological waste disposal.

Trainees must understand the methods of monitoring efficacy and be capable of formulating a policy on the use of sterilisation and disinfection in the laboratory, hospital or community.

3.5 **Handling of specimens**

At the end of formal training, the trainee must:

- Be aware, for each specimen type, of the optimal methods for collection, transport (including transport media), storage, receipt, identification and documentation, including the requirements for high-risk specimens.
- Have developed a sense of the continuity of identification of specimens from collection through culture/isolation and further testing to the issuing of a final report, and must be aware of critical points when this continuity may fail and be able to minimise the risk of this happening.
- Be able to assess degrees of urgency for the processing of specimens, including the provision for an after-hours service and the communication of preliminary results as applicable.
- Be able to direct further testing or processing of specimens as appropriate.
- Have knowledge of existing reference facilities, their test repertoires and their appropriate use.

3.6 **Microscopy**

At the end of formal training, the trainee must:

- Understand the principles of light, dark ground, phase contrast, fluorescent and electron microscopy and be competent in the use of a light microscope, including dark ground and phase contrast facilities.
- Be able to perform routine staining techniques including fluorescent dyes.
- Be competent at recognising the appearance of micro-organisms on stained preparations and be able to recognise artefacts and their possible origin.

3.7 **Culture methods**

At the end of formal training, the trainee must:

- Be able to process specimens, recognise potential pathogens from a mixture of colonies on culture plates, and separate such colonies in order to achieve the pure growth necessary for further workup.
- Be aware of the wide range of selective, enrichment and inhibitory media available for general and specialised use and be able to choose relevant media in common use in medical and environmental laboratories.
- Have an understanding of the preparation of media in common use and of internal quality control requirements of such preparations.
- Have a basic understanding of the diversity of microbial metabolism.

- Have an understanding of the physical growth requirements of micro-organisms including atmosphere and optimal temperature, and the growth kinetics of both solid phase and broth cultures.
- Have an in-depth understanding of those micro-organisms and clinical situations in which detectable growth may require specialized incubation conditions including anaerobic conditions.
- Have formulated a rational approach to uncultivatable micro-organisms.

3.8 **Identification methods**

At the end of formal training, the trainee must:

- Understand the principles of identification media and be able to use them appropriately.
- Be able to perform tests leading to the identification of all common pathogens including the use of commercially produced kits (e.g. enzyme assays), latex agglutination and rapid diagnostic kits.
- Have developed an in-depth understanding of the use of direct identification techniques on samples.
- Understand the principles behind automated identification technology, be competent at its use, be able to interpret the relevant reports and troubleshoot deviations.
- Be able to identify and refer samples/isolates to available reference facilities for further identification including serotyping and all other typing schemes, both phenotypic and genotypic.

3.9 **Antimicrobial investigations**

At the end of formal training, the trainee must:

- Be able to test the antimicrobial susceptibilities of an isolate using the common techniques of disc diffusion testing, gradient diffusion testing and automated testing, together with application of clinical breakpoints.
- Have an in-depth understanding of the principles behind manual susceptibility testing, the associated quality control procedures and troubleshooting of deviations.
- Have an in-depth understanding of the principles behind automated susceptibility testing technology, be competent at its use and be competent at interpreting and troubleshooting the relevant reports.
- Have an in-depth understanding of how clinical breakpoints are determined and the role of Epidemiological Cutoff Values (ECOFFs).
- Be able to perform and interpret minimum inhibitory concentration and minimum bactericidal concentration tests as appropriate.
- Be competent at advising on treatment using pharmacokinetic/pharmacodynamic principles and taking into account the clinical context, and be able to advise on dosage regimens/dosing accordingly.
- Understand principles of antimicrobial stewardship, participate in such activities and understand the process of development of antimicrobial guidelines and policies.

3.10 **New and emerging technologies**

At the end of formal training, the trainee must:

- Be able to evaluate critically the need for emerging techniques within the laboratory including cost effectiveness and effects on staffing levels and working practices/ workflow.
- Have a detailed understanding of the evaluation and implementation of new diagnostic tests in the clinical microbiology laboratory.
- Be up to date with recent advancements in the field.
- Understand the role and principles of point of care testing in clinical microbiology.

3.11 **Molecular diagnostic technologies**

At the end of formal training, the trainee must:

- Be competent with the use and limitations of molecular diagnostics in the microbiology laboratory, including PCR, quantitative real-time PCR, nucleic acid hybridisation and sequencing.
- Be able to identify applications for the use of specific molecular technologies in a diagnostic laboratory based on the needs of the population and available resources.
- Have an understanding of the use and limitations of sequencing and metagenomics in research and diagnostic microbiology.
- Be competent at the use of these techniques in strain relatedness assessment, including the limitations and advantages of different strategies e.g. pulse field gel electrophoresis, whole genome sequencing, targeted sequencing, etc.
- Have an understanding of the advantages and disadvantages of using commercial assays compared with in-house assays.

3.12 **Laboratory data**

At the end of formal training, the trainee must:

- Have a basic understanding of information technology and in particular, computerised data handling.
- Understand the advantages and disadvantages of such systems and develop a basic understanding of the need for data protection, medico-legal requirements for storage and legislation related to patient confidentiality.
- Be competent at antibiogram generation and interpretation and have an understanding of the use of surveillance in guiding diagnostic practices or therapy.
- Have an understanding of the importance of robust data management systems in the microbiology laboratory for traceability and optimal patient management and laboratory functioning.

3.13 **Clinical interface**

At the end of formal training, the trainee must:

- Have gained experience of liaison with clinical colleagues through regular ward visits and in particular, have developed a close relationship with high dependency units (e.g. intensive care units) and highly specialised units (e.g. haematology, transplantation).
- Have gained experience of liaison with primary healthcare providers, e.g. general practitioners.
- Have participated in on-call rosters (including weekends) with consultant supervision.
- Have participated in postgraduate educational meetings such as Grand Rounds, journal clubs and case presentations.
- Be able to provide informed advice on immunisation with all products available in South Africa.
- Be able to advise on the rational use of diagnostic tests (diagnostic stewardship) and antimicrobial agents (antimicrobial stewardship) at an institutional/regional level and on an individual patient basis.
- Be able to troubleshoot unexpected test results and interpret test results in the clinical context.
- Be able to suggest alternative methods to confirm/exclude a diagnosis where applicable.
- Have knowledge of the contribution of a clinical microbiologist to community based outbreaks.
- Have participated in antimicrobial stewardship programmes and have developed an understanding of the workings of antimicrobial stewardship committees.

3.14 **Infection prevention and control (IPC)**

At the end of formal training, the trainee must:

- Have a detailed understanding of the principles of IPC and relevant international guidelines as they relate to transmission of micro-organisms.
- Have had firsthand experience of local IPC issues, including the investigation and management of outbreaks.
- Have an understanding of the workings of IPC meetings including local and regional IPC committees.
- Be aware of those areas of hospitals and community health that require customised IPC policies.
- Have a working relationship with the IPC unit and be involved in the education of those involved with IPC issues with regard to patient management.
- Have participated in visits to clinical and non-clinical areas to advise on IPC, including kitchen inspections (especially those conducted by environmental health officers), CSSD, pharmacy and laundry.
- Have an understanding of available pathogen- or situation-specific IPC documents and any existing working party recommendations.
- Be exposed to a public health microbiology laboratory with secondment if possible to a public health laboratory.
- Have had an experience of communicable disease control in the community working with public health specialists and Environmental Health officers.
- Have an in-depth understanding of the rationale behind notifiable medical conditions, the implications for public health and the management of these conditions, in line with recommendations from advisory bodies such as the National Institute for Communicable Diseases, the South African Department of Health and the World Health Organisation.

3.15 **Virology:**

At the end of formal training, a trainee must:

- Have a basic understanding of the fundamentals of virology, such as virus structure and replication, virus-host interactions.
- Understand the pathogenesis of viral infections, including modes of transmission, viral cell tropism, persistent viral infections and latency, etc.
- Have a basic understanding of viral immunology including currently available vaccines, concepts such as herd immunity, the use of immunoglobulins and pre- and post-exposure prophylaxis of viral infections.
- Have an in-depth understanding of the principles underlying diagnostic virology including appropriate specimen collection methods, virus isolation, antigen detection, serological and molecular methods and the limitations of these methods.
- Be competent at interpreting laboratory reports for viral illnesses in the clinical context including limitations, both for clinical and infection control purposes.
- Understand the principles of available antiviral treatments and their indications for use.
- Have an understanding of the clinical syndromes in viral diseases, compiling differential diagnoses and establishing aetiology, including for special populations e.g. organ transplantation recipients.
- Be competent with the procedures to be followed for high-risk viral infections, such as viral haemorrhagic fever, rabies, prion diseases.
- Understand the rationale behind viral pathogens of public health importance, such as SARS CoV-2.
- Have an understanding of virology policies in relation to health care workers, pregnancy, transplantation, immunisation, notification and IPC.
- Develop an understanding of the quality control practices in place in a diagnostic virology laboratory.
- Develop an understanding of when to refer to or request specialist virological expertise.

3.16 **Quality Assurance**

At the end of formal training, the trainee must:

- Have an understanding of quality control and quality assurance and how it is measured and monitored in a diagnostic laboratory.
- Have gained experience, under supervision, in the evaluation of diagnostic assays and establishing criteria of acceptance.
- Have an in-depth understanding of criteria used to determine test performance (e.g. sensitivity, specificity, negative predictive value, positive predictive value), how to generate and interpret these values taking into account the local context and the target condition of these assays.
- Have participated in the development or review of standard operating procedures.
- Be competent in detecting and reporting non-conformances and performing root cause analyses, including procedures for corrective actions and re-training.
- Have gained experience of the regular processing of the quality assurance distributed specimens.
- Have an understanding of the external proficiency testing schemes and the processing of data by these schemes.
- Have developed competence in the analysis of the reports generated from laboratory participation in these schemes.

With regard to audits, the trainee must:

- Have participated in clinical and/or microbiological audits and have developed an understanding of risk assessment.

With regard to accreditation, the trainee must:

- Have an understanding of the principles of an accreditation audit/surveillance.
- Have knowledge of the requirements of any existing laboratory accreditation schemes and the process/standards whereby accreditation is conferred e.g. South African National Accreditation System, ISO 15189.

3.17 **Management**

At the end of formal training, the trainee must:

- Have achieved a basic knowledge of important aspects of laboratory management including budget control, personnel management and administration, with attendance at local/national management courses strongly encouraged.
- Develop an understanding of the pros and cons of decentralized microbiology testing.
- Have an understanding of the criteria to be considered in the placement of a diagnostic laboratory.

3.18 **Research**

At the end of formal training, the trainee must:

- Understand the strengths and limitations of different study designs and be able to apply these to a research question.
- Have practiced critical appraisal in scientific articles.
- Have developed an understanding of how research shapes diagnostic practices in clinical microbiology.
- Be competent with understanding and interpreting study results, including assessing external applicability of the findings.
- Understand the roles and differences between basic research and applied/operational/translational research.

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