



**JOHANNESBURG  
ACADEMIC OFFICE**

# CMSA

The Colleges of Medicine of South Africa NPC

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**December 2018**

## **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 CLINICAL VIROLOGY**

### **FC Path(SA) Viro**

#### **1.0 ADMISSION TO THE EXAMINATION**

- 1.1 Candidates must hold a post-internship qualification to practise medicine which has been registered or is registrable with the Health Professions Council of South Africa
- 1.2 A candidates must have completed a minimum of three and a half (3<sup>1/2</sup>) years of approved training in pathology by the time of applying for the written examination
- 1.3 At least two and a half (2<sup>1/2</sup>) of the three and a half years must have been spent in a Department of Clinical Virology
- 1.4 From the second semester 2014 the submission of your Portfolio at the time of making your application is compulsory for all candidates who entered into their Registrar post from 1 January 2011. 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](http://www.logbox.co.za)<sup>1</sup>

#### **2.0 SYLLABUS**

See Appendix A

5.0.../

<sup>1</sup> LogBox recommendation effective for new Registrars – 1 January 2019

**3.0 CONDUCT OF THE EXAMINATION**

- 3.1 The final examination, with an overall pass mark of 50%, comprises:
- 3.1.1 Two 3-hour closed-book written examination papers, each with a sub-minimum of 50%
  - 3.1.2 The format of the examination will include the following:
    - Answer all questions
    - A mixture of essay questions to demonstrate integrative skills and short answer questions
  - 3.1.3 A 3-day practical examination, with a sub-minimum of 50%, which tests candidates' abilities to process specimens with a view to providing a provisional diagnosis, leading to a definitive diagnosis and advising on patient management
  - 3.1.4 An oral examination of not less than 30 minutes with all examiners with a sub-minimal of 50%
  - 3.1.5 The weighting for virology will be
    - Written Papers 50%
    - Practical 40%
    - Oral 10%

**4.0 ADMISSION AS A FELLOW**

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

4.2 **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 I will at all times do all within my power to promote the objects 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)

4.3 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

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

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

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

## APPENDIX A

### 1.0 SYLLABUS

#### 1.1 Overall Outcomes

1.1.1 At the end of formal training, the virologist should have gained knowledge, expertise, skill and a certain degree of experience in the:

- inter-disciplinary clinical consultation with clinicians (general practitioners and specialists), other pathologists, scientists, technologists and health care workers and the ability to provide independent clinical advice in relation to the practice of clinical virology
- undergraduate and postgraduate teaching and learning
- basic science and clinical research
- performance of all laboratory methods related to clinical virology
- administration and management of a laboratory and the service in general
- application of ethical principles, good clinical practice and good laboratory practice in the practice of clinical virology.

#### 1.2 Basic Virology

1.2.1 At the end of formal training, the virologist should have gained knowledge of the following details for all medically important viruses:

- viral classification, structure and replication
- criteria used for virus classification, and the terms virus orders, families/subfamilies, genera and species
- international Committee on Taxonomy of Viruses
- structure of viruses eg electron microscopy, X-ray crystallography, virus morphology
- functions of virally-encoded proteins (structural and non-structural)
- baltimore classification of virus replication
- viral genome organisation
- basic replication strategies of DNA viruses and RNA viruses
- basis for genetic variation in viruses
- emerging viral infections and factors responsible for this.

#### 1.3 Pathogenesis

1.3.1 At the end of formal training, the virologist must have knowledge and understanding of the following for all viruses of medical importance:

- modes of transmission of virus infections
- pathogenesis being determined by multiple characteristics of host and virus
- basic principles underlying productive and non-productive, cytotoxic and non-cytotoxic infection
- factors determining the different outcomes of virus infection
- viral cell tropism, virus-host interactions, host immune responses and immunopathology, and shedding of virus from the host
- factors responsible for persistent viral infections in the host
- mechanisms underlying the establishment and maintenance of viral latency
- mechanisms underlying viral oncogenesis.

**1.4 Viral Immunology**

1.4.1 At the end of formal training, the virologist must have knowledge and understanding of:

- components and functions of the innate and adaptive immune systems, particularly in relation to virus infections
- mechanisms of antigen processing and recognition by the humoral and cellular immune response
- effector pathways triggered by antigen recognition including induction of antibodies, cytokines and cellular mediated immunity
- innate immune defences against viruses (type 1 interferons, Toll like receptors)
- virus strategies to evade the host immune response
- common causes and consequences of primary and secondary immunodeficiency disorders.

**1.5 Antiviral Agents**

1.5.1 At the end of formal training, the virologist must have knowledge and understanding of :

- mechanisms of action of currently licensed anti-viral agents
- anti-viral drug resistance, including mechanisms of resistance, monitoring for development of drug resistance and the use of alternative drugs
- current clinical guidelines on optimum treatment of viral infections in immunocompetent and immuno-compromised patients, indications, contra-indications, drug dosages, routes of administration, duration of treatment
- role of anti-virals in prophylaxis of viral infections in immuno-competent and immuno-compromised patients
- role of anti-virals for prophylaxis of infection for outbreak control
- recent advances in antiviral drug development and gene therapy.

**1.6 Viral Vaccines and Immunoglobulins**

1.6.1 At the end of formal training, the virologist must have knowledge and understanding of :

- different types of vaccines in both prophylactic and therapeutic use
- indications and contra-indications and differences between the types of vaccines ie attenuated, inactivated, recombinant, sub-unit, DNA vaccines etc
- concepts of herd immunity, protective efficacy, vaccine coverage rates required to control infections
- mechanisms underlying vaccine induced immunity
- research and development of a vaccine against HIV infection
- prophylaxis for travel related infections
- role of monoclonal and polyclonal human immunoglobulins for treatment, prevention and post-exposure prophylaxis of viral infections.

**1.7 Clinical Virology**

1.7.1 At the end of formal training, the virologist must have knowledge and understanding of:

1.7.1.1 The pathogenesis, clinical features, epidemiology, laboratory investigation of clinical conditions related to viral diseases, the treatment and prevention of human viral diseases – all of which include:

- HIV/AIDS infection
- Sexually transmitted infections
- Viral Hepatitis
- Viral zoonoses: Viral Hemorrhagic Fevers, arboviruses and rabies
- Viral diseases of the CNS, including Prion diseases
- Viral infections of the respiratory tract
- Viral infections of the gastro-intestinal tract
- Childhood viral infections and their complications
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- Viral infections.../

- Viral infections of the skin and mucous membranes
  - Viral infections in pregnancy, the fetus and neonate
  - Virus infection of the kidney and urinary tract
  - Viruses and the heart
  - Viruses and the eye
  - Role of viruses in transfusion medicine
- 1.7.1.2 Viral infections in immuno-compromised host:
- organ transplantation recipients
  - patients with congenital immunodeficiencies
  - HIV infection
  - patients in Intensive Care Units.

## 1.8 **Medico-Legal Aspects**

- 1.8.1 At the end of formal training, the virologist must have knowledge and understanding of :
- the HPCSA guidelines which cover such concepts like responsibility, accountability
  - consent, confidentiality and disclosure in terms of professional conduct and patient care including reasonable practice and practicing in good faith
  - the relevant Acts such as OHSA, COIDA, National Health Act including the regulations of the HPCSA, NHLS, Labor Relations Act especially the aspects regarding HIV/AIDS, Human Tissue Act
  - the various processes of jurisprudence such as Criminal, Civil proceedings and application of common law.

## 1.9 **Research Methodology**

- 1.9.1 At the end of formal training, the virologist must have knowledge and understanding of:
- basic biostatistics which includes concepts of sampling and sample size
  - normal distribution ie mean, median and mode, risk, relative risk and odds ratio
  - probability values and confidence intervals as applied to categorical and continuous variables
  - different types of study design and applications to clinical virology
  - validation of assays including concepts of specificity, sensitivity and predictive value
  - application of ethical principles, good clinical practice and good laboratory practice in the practice of research.

## 1.10 **Laboratory Aspects**

- 1.10.1 Laboratory safety.  
Prior to any "hands on" experience of laboratory work, the Registrar must be instructed in basic laboratory health and safety issues including correct laboratory attire, immediate handling and disposal of specimens, contaminated items, the dangers of aerosols and the procedure for dealing with spillages.
- 1.10.2 At the end of formal training, the virologist must have knowledge and understanding of:
- laboratory bio-safety level criteria
  - safe transport of specimens including national and international transport of infectious biological material ie current requirements for specific diseases eg viral hepatitis, HIV, prion diseases, haemorrhagic fevers
  - principles and operation of microbiological safety cabinets and the procedures for their decontamination and monitoring of air flow
  - sterilisation and disinfection which relate to viruses (and prions), including procedures for medical, surgical instruments and virological waste disposal.

**1.11 Laboratory Methods**

- 1.11.1 At the end of formal training, the virologist must have knowledge and understanding of:
- the collection, transport and reception of all specimen types
  - the importance of confirmatory assays
  - the advantages and limitations of different diagnostic techniques
  - the testing algorithms and selection of the most appropriate investigations
  - appropriate use of reference facilities
  - degrees of urgency for the processing of specimens
  - recent advances in viral diagnostic techniques, such as real time PCR, sequence independent nucleic acid amplification, micro-arrays.
- 1.11.2 At the end of formal training, the virologist must have the ability to:
- critically evaluate the need for advancing techniques including cost effectiveness, impact on human resources and work flow
  - function as an independent worker at the bench which includes manual dexterity
  - organisation of work, time management and the use of laboratory protocols.

**1.12 Interpretation of Results**

- 1.12.1 At the end of formal training, the virologist must have the ability to:
- interpret and authorise the release of laboratory results
  - scrutinise the technical process involved in testing
  - distinguish significant positive and negative results
  - correlate the clinical information with the result
  - recognise self-limitation and to seek advice from appropriate sources
  - direct specimens to appropriate reference laboratories in situations where a higher level of virological expertise is required
  - adapt and change working practices according to best latest practice or new guidelines
  - implement quality control programmes.

**1.13 Virus Isolation**

- 1.13.1 At the end of formal training, the virologist must have knowledge and understanding of:
- principles of cell culture and the selection of cell lines for virus isolation
  - principles and practice of all the viral isolation techniques
  - principles of light and fluorescent light microscopy
  - quality control and contamination control in the virus isolation laboratory
  - principles of electron microscopy and ability to recognise negative stained images of medically important viruses.
- 1.13.2 At the end of formal training, the virologist must have the ability to:
- recognise the appearance of healthy unstained cells compared to cells with common cytopathic and toxic effects (light microscope), of immuno-stained preparations (fluorescent light microscope) and negatively stained preparations (electron microscope) and recognise artifacts and its possible causes
  - perform the techniques of virus isolation using cell culture.

**1.14 Viral Serology**

- 1.14.1 At the end of formal training, the virologist must have knowledge and understanding of:
- principles of serological methods
  - composition of solid phase, conjugate, substrate, optical density (cut-off values, ratios), assay format (direct/indirect, competitive, capture), advantages and limitations of each, sources of antigen (eg viral lysate, recombinant, synthetic peptide)
  - specific problems with IgM and IgG assays including role of rheumatoid factor
  - parameters of assays, ie sensitivity, specificity.

**1.15 Assay Validation**

1.15.1 At the end of formal training, the virologist must have the ability to:

- perform the serological methods in common use
- select appropriate serological tests to be applied to samples received in the laboratory, and direct supplementary tests based on initial results.

**1.16 Molecular Virology**

1.16.1 At the end of formal training, the virologist must have knowledge and understanding of:

- principles of nucleic acid-based virus detection techniques in use in the laboratory
- principles of amplification assays, sequencing and the clinical importance of genotyping in clinical virology
- laboratory design and work flow to minimise amplicon contamination
- principles of phylogenetic analysis
- genotypic drug resistance testing.

1.16.2 At the end of formal training, the virologist must have the ability to:

- perform commercial kit nucleic acid-based tests and any in-house nucleic acid-based tests which are available in the laboratory
- design primers, set up and trouble shoot new PCR assays
- analyse sequence data
- draw phylogenetic trees.

**1.17 Laboratory Accreditation**

1.17.1 At the end of formal training, the virologist should have knowledge and understanding of:

- principles of good laboratory practice
- requirements for laboratory accreditation according to ISO15189
- quality assurance compared to quality control
- information technology and data handling including an appreciation of the advantages and limitations of IT systems and the need for data protection
- laboratory management including technical, financial, human resource and administrative management
- team work to facilitate laboratory management and accreditation which may include attendance of local or national management courses.

**2.0 Public Health****2.1 Epidemiology**

2.1.1 At the end of formal training, the virologist must have knowledge and understanding of :

- epidemiology of viral diseases including molecular and sero-epidemiology
- impact of interventions such as immunisation on the epidemiology of viral infections including herd immunity and globalisation
- surveillance and outbreak control
- reservoirs, sources, routes of transmission of viruses implicated in community and hospital acquired infections
- interactions between the host, environment and viruses
- emerging and re-emerging virus infections including case definitions, causes, epidemiology and management of these diseases
- epidemiology of the vaccine preventable viral diseases including international, national and local eradication initiatives.



**2.2 Infection Control in Hospital and Community.**

2.2.1 At the end of formal training, the virologist must have knowledge and understanding of :

- public health principles as applied to infection control
- principles of patient isolation including various sterilisation and disinfection processes
- special precautions needed for handling patients with a viral haemorrhagic fever and their samples
- infection control procedures required to contain other medically important viruses in the hospital and community setting
- local, national and international guidelines for infection control in the hospital and community setting
- importance of non-clinical areas in infection control
- roles of other team members and co-operative working within a multidisciplinary team.

**2.3 Occupational Health**

2.3.1 At the end of formal training, the virologist must have knowledge and understanding of :

- international, national and local policies on occupational health issues in virology (hepatitis B and C viruses, HIV, rubella and varicella-zoster virus)
- principles of risk assessment and safe work practices of healthcare workers against viral diseases
- management of health care workers following accidental exposure to blood borne virus infections
- exposure incident management including follow-up protocols and post-exposure prophylaxis for blood-borne viruses including the ethical and medico-legal aspects.