WORLD ORGANISATION FOR ANIMAL HEALTH

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PVS Pathway

OIE Curricula Guidelines for Veterinary Paraprofessionals



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Foreword

The OIE's Sixth Strategic Plan for the period 2016–2020 commits to *continue to develop, renew and revise its standards and guidelines on the quality of Veterinary Services (including veterinary professionals).*

In this context, the OIE recognises the important role that veterinary paraprofessionals can play in support of strong National Veterinary Services particularly when the implementation of large-scale control strategies for major diseases is on their agenda. Thus, in addition to the competency and curriculum guidelines already developed for veterinarians, the development of these *OIE Curricula Guidelines for Veterinary Paraprofessionals* as a companion document to the previously issued *OIE Competency Guidelines for Veterinary Paraprofessionals* is a demonstration of the OIE's commitment. The overarching goal of this effort is to provide Member Countries with useful tools to help them better define the roles of veterinary paraprofessionals in the veterinary domain, the skills that they require, and the training they need to obtain and apply those skills in support of improved animal health and welfare, veterinary public health, and laboratory diagnosis, consistent with OIE standards.

To develop the two Guidelines, the OIE convened an *ad hoc* Group on Veterinary Paraprofessionals consisting of educators, regulators, experts and representatives of veterinary paraprofessional associations to identify desired competencies for veterinary paraprofessionals working in animal health, veterinary public health, and laboratory diagnosis tracks and to prepare model curricula designed to deliver these competencies for each track. Given the scope of the work involved, the Group restricted its focus to developing competencies associated with approved curricula delivered by accredited institutions offering programmes at the certificate, diploma, or degree level. However, the OIE recognises that the resources available for training veterinary paraprofessionals can vary considerably between countries. Therefore, the *ad hoc* Group strived to develop curricula guidelines that are flexible and can be used to build training programmes that focus on delivering a set of desired veterinary paraprofessional competencies. The duration of the training required to deliver those competencies is a decision to be made by the relevant training institutions and authorities responsible for regulating veterinary paraprofessionals.

Used together, the *Competency Guidelines and Curricula Guidelines* can be applied within Member Countries in many ways. Potential applications include: use by veterinary statutory bodies to improve recognition and definition of different categories of qualified VPPs; use by training institutions for programme and curricula development; use by Veterinary Services and other potential employers for development of veterinary paraprofessional job descriptions and requirements for training; use by policy-makers to help develop human resource needs assessments and skill development for veterinary paraprofessionals in the veterinary domain; and, use by veterinary paraprofessionals themselves for self-assessments aimed at continuing education and career advancement.

This work is an additional OIE contribution to the completion of some United Nations' Sustainable Development Goals, in particular Goal 4 'Ensure inclusive and equitable quality education and promote lifelong, learning opportunities for all,' Goal 5 'Achieve gender equality and empower all women and girls' and Goal 8 'Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.' As women and girls in rural areas are often directly responsible for the care of livestock and therefore well positioned to recognise conditions of health and disease in animals, they represent an important pool of potential candidates for training and employment as competent veterinary paraprofessionals.

The OIE encourages National Delegates to familiarise themselves with these *Curricula Guidelines* and to highlight them in discussions with relevant partners and stakeholders, including representatives of veterinary paraprofessional training establishments, veterinary and veterinary paraprofessional associations, and the National Veterinary Statutory Body. Member Countries should endeavour to harmonise veterinary paraprofessional training within, as well as between countries where mobility of veterinary paraprofessionals is required or desired and their competencies need to be assured.

Monique Eloit
Director General

Acronyms

AH Animal Health
CAM Curriculum Alignment Matrix
CPD Continuing Professional Development
EID Emerging Infectious Diseases
FAO Food and Agriculture Organization of the United Nations
IIAD Institute for Infectious Animal Diseases
NGO Non-Governmental Organisation
OHS Occupational Health and Safety
OIE World Organisation for Animal Health
PPE Personal Protective Equipment
PPR Peste des petits ruminants
SOA Sphere of Activity
SOP Standard Operating Procedures
VPH Veterinary Public Health
VPP Veterinary Paraprofessional (see definitions)
VS Veterinary Services (see definitions)
VSB Veterinary Statutory Body (see definitions)

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Relevant definitions[1]

Animal Health means the state, in animals, of being free from illness or injury.

Competency[2] means knowledge (e.g. cognitive abilities), skills (e.g. ability to perform specific tasks), attitudes (e.g. affective abilities, feelings and emotions), and aptitude (e.g. natural ability, talent, or capacity for learning).

Course means a series of lessons designed to communicate knowledge, skills, attitudes, and aptitude about a particular subject.

Course description means a synopsis of the contents of a Course.

Course objective(s): means a list of the key concepts and/or skills which are to be imparted to students who take the Course.

Curriculum means the Units and Courses comprising a course of study associated with a particular programme at a training or educational institution.

Curriculum alignment matrix means a tabulated comparison of the Learning Outcomes stated in the *OIE Curricula Guidelines* against the Learning Outcomes stated for existing VPP curricula at different training and educational institutions in order to assess the degree of alignment or concordance.

Laboratory diagnosis[3] means a diagnosis made by a chemical, microscopic, microbiologic, immunologic or pathologic study of secretions, discharges, blood, or tissue.

Learning Outcome means what a student will know and be able to do by the end of a course or programme.

Programme means the combination of Courses and other components of training that leads to a qualification in a specific field of study.

Sphere of Activity means a skill area in which a VPP should demonstrate competency.

Track means the principle job-related focus for a veterinary paraprofessional, be it animal health, veterinary public health, or laboratory diagnosis.

Unit[4] means a self-contained part of an educational Course.

Veterinarian[5] means a person with appropriate education, registered or licensed by the relevant Veterinary Statutory Body of a country to practice veterinary medicine/science in that country.

Veterinary Authority[6] means the Governmental Authority of a Member Country, comprising veterinarians, other professionals and paraprofessionals, having the responsibility and competence for ensuring or supervising the implementation of animal health and welfare measures, international veterinary certification and other standards and recommendations in the *Terrestrial Animal Health Code* in the whole territory.

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1 If no footnote is associated with a definition, then the definition was formulated by the *ad hoc* Group on Veterinary Paraprofessionals

2 From 'OIE recommendations on the Competencies of graduating veterinarians ('Day 1 graduates') to assure National Veterinary Services of quality'

3 Farlex Partner Medical Dictionary, Farlex, 2012

4 *Concise Oxford English Dictionary*, 11th edition, 2004

5 From the glossary of *Terrestrial Animal Health Code*

6 From the glossary of *Terrestrial Animal Health Code*

Veterinary domain[7] means all the activities that are directly or indirectly related to animals, their products and by-products, which help to protect, maintain and improve the health and welfare of humans, including by means of the protection of animal health and welfare, and food safety.

Veterinary Paraprofessional[8] (VPP) means a person who, for the purposes of the *Terrestrial Animal Health Code*, is authorised by the Veterinary Statutory Body to carry out certain designated tasks (dependent upon the category of veterinary paraprofessional) in a territory, and delegated to them under the responsibility and direction of a veterinarian. The tasks for each category of veterinary paraprofessional should be defined by the Veterinary Statutory Body depending on qualifications and training, and in accordance with need.

Veterinary Public Health[9] means the sum of all contributions to the complete physical, mental and social well-being of humans through an understanding and application of veterinary medical science.

Veterinary Services[10] (VS) means the governmental and non-governmental organisations that implement animal health and welfare measures and other standards and recommendations in the *Terrestrial Animal Health Code* and the OIE *Aquatic Animal Health Code* in the territory. The Veterinary Services are under the overall control and direction of the Veterinary Authority. Private sector organisations, veterinarians, veterinary paraprofessionals or aquatic animal health professionals are normally accredited or approved by the Veterinary Authority to deliver the delegated functions.

Veterinary Statutory Body[11] (VSB) means an autonomous regulatory body for veterinarians and veterinary paraprofessionals.

7 From Article 3.4.2 of *Terrestrial Animal Health Code*

8 From glossary of *Terrestrial Animal Health Code*

9 From World Health Organization Study Group. Future trends in veterinary public health. World Health Organ Tech Rep Ser 2002;907:1-85

10 From the glossary of *Terrestrial Animal Health Code*

11 From the glossary of *Terrestrial Animal Health Code*

Contents

Disclaimer 2

Foreword 3

Acronyms 4

Acknowledgements 4

Relevant definitions 5

Introduction 9

Background 9

How the *OIE Curricula Guidelines for Veterinary Paraprofessionals* were developed 9

Structure of the *OIE Curricula Guidelines for Veterinary Paraprofessionals* 10

How to use this document 17

Scope 18

Veterinary Paraprofessional Curricula: Courses, Units, and Learning Outcomes 20

Animal Health Track 21

Veterinary Public Health Track 27

Laboratory Diagnosis Track 35

Annexes 43

Annex 1. Animal Health Track Job Scenarios

Scenario 1 44

Scenario 2 46

Annex 2. Veterinary Public Health Track Job Scenarios

Scenario 1 48

Scenario 2 50

Annex 3. Laboratory Diagnosis Track Job Scenarios

Scenario 1 52

Scenario 2 54

Introduction

Background

As presented in the *OIE Competency Guidelines for Veterinary Paraprofessionals*, the effective delivery of national veterinary services for the protection of animal and public health requires a well-trained cadre of veterinarians and veterinary paraprofessionals (VPPs) working in both the public and private sectors.

The OIE supports the participation of VPPs in the delivery of national veterinary services and recognises the variety of roles that VPPs can play, including: participation in animal health field activities related to disease prevention and control; participation in veterinary public health activities such as rabies control and food safety; and participation in laboratory diagnosis.

Chapter 3.4 of the OIE *Terrestrial Animal Health Code* indicates that a Member Country's veterinary legislation should provide a basis for the regulation of veterinarians and VPPs in the public interest and suggests the creation of a regulatory entity, the Veterinary Statutory Body (VSB), to carry out that regulation. Article 3.4.6 indicates that the relevant veterinary legislation should:

a) define the prerogatives of veterinarians and of the various categories of VPPs that are recognised by the Member Country;

b) define the minimum initial and continuous educational requirements and competencies for veterinarians and VPPs;

c) prescribe the conditions for recognition of the qualifications for veterinarians and VPPs;

d) define the conditions to perform the activities of veterinary medicine/science; and

e) identify the exceptional situations, such as epizootics, under which persons other than veterinarians can undertake activities that are normally carried out by veterinarians.

In this context, it is essential that the desired competencies of VPPs working in the areas of animal health, veterinary public health, and laboratory diagnosis in both the public and private sectors are established and that guidelines for curricula are developed to ensure that graduating VPPs possess the desired competencies for each of these areas, or Tracks. The desired competencies are presented in the *OIE Competency Guidelines for Veterinary Paraprofessionals*[12] for the three Tracks of VPPs – animal health, veterinary public health, and laboratory diagnosis. The curricula required to instil these competencies are presented in this document as a companion to those guidelines.

The purpose of the *OIE Curricula Guidelines for Veterinary Paraprofessionals* is to provide a set of common guidelines for the expected knowledge, skills, attitudes, and aptitudes that VPPs should acquire in relevant Units and Courses by the end of their training. The *Curricula Guidelines* provides a framework to guide curricular development for each Track to produce competent VPPs working in various roles as part of a quality Veterinary Services.

How the *OIE Curricula Guidelines for Veterinary Paraprofessionals* were developed

A global analysis of existing curricula for the three Tracks of VPPs informed the development of the *OIE Curricula Guidelines for Veterinary Paraprofessionals*. Twenty-six curricula were assessed from all five OIE Regions by the Institute for Infectious Animal Diseases (IIAD), an OIE Collaborating Centre for Biological Threat Reduction, and presented to the OIE's *ad hoc* Group on Veterinary Paraprofessionals.

In addition, members of the *ad hoc* Group, in collaboration with IIAD, conducted three in-country missions to test the *OIE Curricula Guidelines for Veterinary Paraprofessionals*. The goal of the

[12] http://www.oie.int/fileadmin/Home/eng/Support_to_OIE_Members/pdf/A_Competence.pdf

in-country missions was to determine whether the *Curricula Guidelines* can efficiently produce competent VPPs within the context of Member Countries' needs. The missions provided the *ad hoc* Group with insights on how closely the *Curricula Guidelines* were aligned with existing practices.

Curricula alignment matrices were developed and tested during each mission in three contexts (i.e., academic institution, vocational training institution, and NGO). Each curriculum alignment matrix (CAM) provided preliminary information on how the *Curricula Guidelines* are applicable in practical situations and to existing veterinary paraprofessional educational programmes.

The missions proved valuable in validating the *Curricula Guidelines* by demonstrating high levels of alignment between the *Curricula Guidelines* and the established programmes, providing insights into suitable duration of training programmes, confirming their applicability to various training contexts, identifying potential gaps in subject matter, and highlighting the importance of practical training in addition to theoretical training.

Information from the missions informed the development of a flexible approach to curriculum development, in both duration and content, that would be adaptable to different Member Country contexts.

Structure of the *OIE Curricula Guidelines for Veterinary Paraprofessionals*

As outlined in the *OIE Competency Guidelines for Veterinary Paraprofessionals*, the primary structure of the competencies is based on Tracks and Spheres of Activity (SOAs). The Track refers to the principle job-related focus for the VPP, be it animal health, veterinary public health, or laboratory diagnosis. The SOA refers to the various competencies applicable to each of these Tracks. Each SOA includes two to five Competencies. The Competencies describe what knowledge, skills, attitudes, and aptitudes a student should be able to demonstrate through training in that SOA.

The Courses and Units in these *Curricula Guidelines* were developed to correspond to the SOA and to deliver the Competencies previously identified in the *Competency Guidelines*. The basic building block for curricula is the Unit. Each Unit describes discrete areas of training that allow students to achieve specific Learning Outcomes, which describe what the student will know and be able to do on completion of the Unit. Related Units are combined in the document to form indicative Courses, but Member Countries may choose to organise Units into a Course structure best adapted to their needs.

Current veterinary education theory emphasises the importance of practical training, although this is still not current standard practice around the world. For VPPs to be truly competent upon graduation, practical experience is critical. Therefore, practical Units are presented alongside related theoretical Units in each Course. Even though delivery of practical training can be challenging in terms of resources and logistics, no VPP curricula can be considered to adequately deliver the expected competencies without a practical training component.

Training institutions should consider integrating different and innovative methods, such as case-based learning, clinical observation, mentorships, internships, and practical field and laboratory work, for providing hands-on training in VPP curricula. Technology could also play an important role by integrating Internet access and content such as pictures, and videos, and e-learning platforms.

Table 1 provides an overview of all the Courses of the *Curricula Guidelines*, together with Course descriptions and objectives that reflect the expected VPP Competencies. For each Course, the Track(s) to which it is applicable are identified i.e. animal health, veterinary public health and/or laboratory diagnosis.

Courses shown with a white background include both theoretical and practical content. Courses and Units shaded in green represent theoretical content. Courses and Units shaded in blue represent practical Course content.

Some Units occur in more than one Course and these are noted with an asterisk (*). Where the Unit is relevant to more than one Track, the content of the Unit may vary according to the Track. The Learning Outcomes for each Unit can be found in the subsequent chapters of this document, by Track.

The format in Table 1 highlights that certain Courses and Units are common for more than one Track. These can be taught as 'Core Courses' across Tracks followed by specialised Courses and Units (i.e. Courses and Units specific to a given Track). Courses are presented alphabetically. The actual sequencing of Courses is best determined by Member Country needs and priorities.

Table 1. Courses, Units, and Tracks

Course Name, Description, and Objectives	Unit Name	AH	VPH	Lab
Anatomy and Physiology Anatomy is the study of structures and organ systems of animals at the gross and microscopic level. Physiology is the study of the normal function of living organisms at the biochemical, cellular, and tissue levels. Course objectives: Students successfully completing the Course will be able to: • Identify the structure and function of the major organ systems and corresponding physiological processes • Use proper anatomical terminology to describe major organs of each system, their location, and function • Compare anatomical and physiological differences across common animal species • Understand how anatomical and physiological knowledge can be applied to field practices	Anatomy and Physiology	✔	✔	✔
	Anatomy and Physiology Practicum	✔	✔	✔
Animal Diseases Animal Diseases is the study of specific infectious and non-infectious diseases. Course objectives: Students successfully completing the Course will be able to: • Describe and discuss the aetiology, epidemiological patterns, clinical signs, diagnosis, treatment, prevention, control and public health issues for relevant infectious diseases of importance • Describe and discuss the causes, epidemiological patterns clinical signs, diagnosis, treatment, prevention and control, for relevant non-infectious diseases of importance • Apply knowledge to recognise a specific disease in the field and suggest approaches to treatment, control and prevention	Zoonoses and Emerging Diseases*	✔	✔	✔
	Infectious Diseases of National Importance	✔	✔	✔
	Non-infectious Diseases of National Importance	✔	✔	✔
Animal Examination, Diagnostic and Therapeutic Techniques The Animal Examination, Diagnostic and Therapeutic Techniques Course provides the practical skills necessary to effectively restrain and clinically examine animals, obtain diagnostic specimens and administer treatments. Course objectives: Students successfully completing the Course will be able to: • Understand and interpret the behaviour of relevant animal species in relation to effective restraint and personal safety • Obtain a clinical history from the animal's keeper • Examine the animal's environment in the context of a disease occurrence • Identify and record physical abnormalities • Collect appropriate specimens for diagnosis • Conduct basic therapeutic procedures • Properly use and care for all equipment and supplies associated with restraint, examination, sampling and treatment	Animal Handling and Restraint Practicum	✔	✔	✔
	Clinical Examination Practicum	✔		
	Specimen Quality Practicum	✔	✔	✔
	Diagnostic and Therapeutic Techniques Practicum I	✔	✔	
	Diagnostic and Therapeutic Techniques Practicum II	✔		

Table 1. Courses, Units, and Tracks

Course Name, Description, and Objectives	Unit Name	AH	VPH	Lab
Animal Production Systems The Animal Production Systems Course is the study of different relevant species, their housing, handling, and nutritional needs, the fundamental concepts of reproduction, and agricultural economics as they relate to specific production systems. Course objectives: Students successfully completing the Course will be able to: • Understand and apply the fundamentals of husbandry, reproduction, nutrition and pasture management • Understand the economics of relevant commodity systems and value chains and understand dynamics of related market trends • Understand herd health management practices and nutritional recommendations so as to advise clients	Nutrition and Pasture Management	✔		
	Agricultural Economics	✔	✔	
	Production and Breeding Systems Management	✔	✔	
	Animal Production Practicum	✔		
Animal Welfare and Ethology The Animal Welfare Course covers the scientific basis for understanding an animal's response to its environment and establishing and ensuring the conditions for its health and well-being. Ethology is the study of animal behaviour in its interactions with humans, other animals, and their physical environment. Course objectives: Students successfully completing the Course will be able to: • Understand normal and abnormal animal behaviour of relevant species • Understand and ensure suitable conditions for housing, feeding, transport and slaughter for the welfare and well-being of relevant species	Animal Welfare	✔	✔	
	Ethology	✔	✔	
	Animal Welfare Practicum	✔	✔	
Clinical Pathology Clinical Pathology is concerned with the diagnosis of disease based on laboratory analysis of blood and other bodily fluids, tissues and microscopic evaluation of individual cells. Course objectives: Students successfully completing the Course will be able to: • Properly use a microscope for various diagnostic applications • Describe, conduct and report on common clinical pathology tests • Describe common cytological presentations	Haematology			✔
	Clinical Chemistry			✔
	Cytology			✔
	Clinical Pathology Practicum			✔
Communication The Communication Course covers the principles and practices of effective and efficient oral and written communication aimed at specific audiences. Course objectives: Students successfully completing the Course will be able to: • Develop oral and written communications skills • Demonstrate proficiency in technical communication with colleagues and other stakeholders • Provide and explain activities to the general public using lay language appropriate to the target audience • Apply critical thinking skills	Principles of Communication	✔	✔	✔
	Extension Communication	✔	✔	
	Practical Applications of Communication Practicum	✔	✔	✔
Field Biosafety and Biosecurity Field Biosafety covers the principles and practices of prevention of exposure or spread of hazards and biological materials. Field Biosecurity covers the prevention and mitigation measures that limit the spread of disease and pests. Course objectives: Students successfully completing the Course will be able to: • Understand and apply general principles of field biosafety and field biosecurity • Recognise relevant biological and chemical hazards, and their impact, control and prevention • Understand and work within relevant regulatory frameworks • Advise on and implement OHS principles and practices • Understand and apply methods relating to field biosecurity	Principles of Field Biosafety and Biosecurity	✔	✔	
	Food Chain Biosecurity		✔	
	Farm Biosafety and Biosecurity Practicum	✔	✔	
	Food Chain Biosecurity Practicum		✔	

Table 1. Courses, Units, and Tracks

Course Name, Description, and Objectives	Unit Name	AH	VPH	Lab
Food Hygiene Food Hygiene covers the general principles for protecting the safety and quality of food and their application at all levels of the food chain. Course objectives: Students successfully completing the Course will be able to: • Describe major infectious and chemical hazards and associated contamination sources • Apply methods and technologies for maximising safety and quality • Apply food testing methods • Understand and apply modern, risk-based food protection systems • Understand and apply national and international food safety and trade regulations • Assess the fitness of animal products for human consumption • Describe and critically analyse slaughter processes	Principles of Food Hygiene		✔	✔
	Food Safety Regulations and Policies		✔	
	Quality and Risk Management		✔	
	Food Hygiene Practicum		✔	
	Ante- and Post-mortem Inspection Practicum II		✔	
Immunology Immunology is the study of the structure and function of the immune system, innate and acquired immunity, mechanisms that allow the body to distinguish self from non-self, and vaccination theory and practice. Course objectives: Students successfully completing this Course will be able to: • Describe the fundamental elements of the immune system and their role in maintaining the health of the animal • Describe how vaccines work and are produced and demonstrate proper storage, handling, and administration • Understand protocols and strategies for effective vaccination • Understand the mechanisms of immunologic-based diagnostic tests	Principles of Immunology	✔	✔	✔
	Vaccinology	✔	✔	✔
	Serology	✔	✔	✔
Information Technology Applications The Information Technology Applications Course includes basic techniques in record keeping, data input, database management and the computer skills necessary to work in the veterinary environment. Course objectives: Students successfully completing the Course will be able to: • Use basic computer and information technology applications to input data and manage databases in a field or laboratory setting • Use information technology applications and software to generate reports and other outputs	Record Keeping and Data Collection Practicum	✔	✔	✔
	Data management practicum	✔	✔	✔
Laboratory Diagnostic Techniques The Laboratory Diagnostic Techniques Course covers the practical methods and techniques for tests used in a laboratory or field setting. Course objectives: Students successfully completing this Course will be able to: • Understand the theory and apply the practical skills required to perform methods and techniques for tests relevant to animal health and veterinary public health and produce reliable and repeatable results • Understand and apply the concepts of quality control and account for test limitations	Diagnostic Techniques			✔
	Diagnostic Techniques Practicum			✔

Table 1. Courses, Units, and Tracks				
Course Name, Description, and Objectives	**Unit Name**	**AH**	**VPH**	**Lab**
Laboratory Quality Management The Laboratory Quality Management Course covers the principles and techniques to control laboratory processes to obtain accurate and reliable results, ensure appropriate record keeping, optimise efficient workflow, and achieve maximum customer satisfaction. Course objectives: Students successfully completing the Course will be able to: • Understand and apply the fundamental principles of laboratory quality management to ensure the reliability of test results • Effectively organise and coordinate all aspects of workflow • Understand and apply appropriate methods of record keeping	Principles of Quality Management			✔
	Surge Capacity and Outbreaks			✔
	Quality Management Practicum			✔
Microbiology Microbiology is the study of microorganisms (bacteria, fungi and viruses) and their effect on animals. Course objectives: Students successfully completing the Course will be able to: • Understand the structure, function, nutrition, physiology, and genetics of microbes and their application to immunology, pathology, and microbial diversity • Knowledge of pathogenesis of infection, prevention and control measures including vaccination, and the use of antimicrobial agents • Understand and apply the basic principles of microbiology	Principles of Microbiology	✔	✔	✔
	Bacteriology and Mycology		✔	✔
	Virology		✔	✔
	Molecular			✔
	Bacteriology and Mycology Practicum			✔
Parasitology Parasitology is the study of parasites and protozoa, their hosts, their associated pathology as it relates to clinical applications, and the management of clinical parasitism in the field. Course objectives: Students successfully completing this Course will be able to: • Identify and describe the life cycles, parasite–host relationships, and associated pathology of the commonly encountered internal and external parasites and protozoa • Demonstrate the knowledge, skills, and abilities to identify and manage relevant internal and external parasites and protozoa	Internal and External Parasites	✔	✔	✔
	Internal and External Parasites Practicum	✔	✔	✔
Pathology Pathology is the study of disease processes and how the animal responds at the gross and microscopic levels. Course objectives: Students successfully completing this Course will be able to: • Define and describe the various types of pathological processes (e.g. inflammation, neoplasia) • Describe the clinical and physical manifestations of these processes at the level of tissues, organs, whole animal and animal populations • Perform necropsies on animals and describe gross pathologies • Recognise specific pathological presentations or diseases and use and maintain pathology equipment and protocols	Principles of Pathology	✔	✔	✔
	Systems Pathology		✔	✔
	Histology/ Histopathology			✔
	Necropsy and Gross Pathology Practicum	✔	✔	✔

Table 1. Courses, Units, and Tracks

Course Name, Description, and Objectives	Unit Name	AH	VPH	Lab
Pharmacology and Toxicology Pharmacology is the study of drugs, how they work, their usages and effects in different animal species. Toxicology is the study of the nature, effects, and detection of poisons affecting production animals. Course objectives: Students successfully completing the Course will be able to: • Understand and apply the principles of basic pharmacology, proper selection of drugs, common drugs used in veterinary practice, and their routes of administration • Describe adverse effects of common medications • Understand the basic principles of toxicology	Principles of Pharmacology	✔	✔	
	Applied Pharmacology Practicum	✔	✔	
	Principles of Toxicology	✔	✔	✔
Primary Animal Health Care Techniques Primary Animal Health Care Techniques are the basic animal production interventions and good management practices undertaken on a routine basis to maintain animal health and production. Course objectives: Students successfully completing the Course will be able to: • Associate anatomical and physiological knowledge with relevant practical applications • Perform first aid, wound care, bandaging, care of debilitated animals, and perform other common husbandry procedures • Conduct routine procedures such as preparation and management of surgical and other instruments, perform pre- and post-operative care, and administer medication	Primary Animal Health Care Techniques Practicum	✔		
Principles of Disease Control The Principles of Disease Control Course covers the principles and tools for effective disease control, the role of descriptive epidemiology in managing disease control programmes, and the specific disease control programmes that exist in the Member Country. Course objectives: Students successfully completing the Course will be able to: • Understand and apply the principles and tools of effective disease control programmes • Demonstrate the knowledge and skills required to assist in field epidemiological monitoring and control programmes for infectious diseases • Understand the obligation and importance of reporting disease as required by law, which diseases are notifiable, and to whom to report disease occurrence	Principles of Disease Control Programmes	✔	✔	
	Applied Epidemiology	✔	✔	
	Specific Disease Control Programmes and Policies	✔	✔	
	Applied Epidemiology Practicum	✔	✔	
Professional Jurisprudence and Ethics The Professional Jurisprudence and Ethics Course will teach students to understand and practice within the legislative and regulatory frameworks and established ethical standards of their jurisdiction. Course objectives: Students successfully completing this Course will be able to: • Understand the role of legislation and legislative processes in society • Know the veterinary and other relevant legislation in effect in the Member Country, including relevant regional legislation or international standards and agreements • Comply with and communicate to others the need for compliance with relevant legislation • Carry out their work according to the ethical codes of conduct and professional behaviour prevailing within their jurisdictions	Jurisprudence	✔	✔	✔
	Ethics	✔	✔	✔

Table 1. Courses, Units, and Tracks				
Course Name, Description, and Objectives	**Unit Name**	**AH**	**VPH**	**Lab**
Veterinary Public Health Veterinary Public Health covers the principles and practices associated with protecting human health with respect to hazards and disease at the interface between animals, humans and the environment. Course objectives: Students successfully completing this Course will be able to: • List key regional zoonotic diseases • Expand knowledge of zoonotic animal diseases, focusing on the implications for human health, particularly control and prevention • Understand and apply One Health concepts	Principles of Veterinary Public Health	✔	✔	
	Zoonoses and Emerging Infectious Diseases*		✔	
	Waste Management and Environmental Sciences		✔	
	One Health/Community-based Practice	✔	✔	
	Ante- and Post-mortem Inspection Practicum I	✔	✔	

How to use this document

For Member Countries or training institutions with existing VPP training programmes, these *Curricula Guidelines* may be used for evaluation or revision of existing curricula, as appropriate. For Member Countries or training institutions with no curricula developed, these *Guidelines* can be used to provide the basis for the establishment of a VPP training programme in one or more Tracks. Even training institutions with well-established VPP programmes may choose to consult this document and identify one or more Courses or Units which might serve to enhance their existing curricula.

The *Competency Guidelines and Curricula Guidelines* recommend competencies and curricula for veterinary paraprofessionals working in the veterinary domain. The *Curricula Guidelines* are designed to allow for the incremental development of competencies and have the flexibility to adapt to the country situation.

The *Competency Guidelines and Curricula Guidelines* together can be used at institutional and individual levels for:

- Improving Member Country's recognition and definition of qualified VPPs, aligning to appropriate authorisation or registration.
- Programme and curricula development: as a foundation for curricula and training programmes.
- Job description development: as guidance for writing standardised job descriptions based on competencies.
- Needs assessment: as a framework against which tools for self-assessment, observer assessment or both can be developed to identify needs and guide staff development planning.
- Self-assessment: as guidance for individuals to assess their current level of knowledge, skills, aptitudes, and abilities, identify areas in need of improvement, and plan for career development.

The *Curricula Guidelines* are designed to allow a modular approach to curriculum development. The Units are presented within suggested Courses, but single Units can be added to Courses within an established curriculum or re-arranged to make different Courses as appropriate for the qualification and competencies to be attained.

If a training institution currently delivers a general VPP curriculum, this document may provide a way to offer specialisation to VPPs, as it highlights Courses, Units, and Learning Outcomes for the training of more specialised VPPs in three different job-related Tracks. Member Countries can use these elements to modify or add specialisation to an existing curriculum, and/or use them to provide continuing professional development (CPD) programmes as needed.

The duration and format of a well-rounded and comprehensive curriculum may vary for each training institution. Where resources are available and there is no urgent requirement to increase numbers of qualified VPPs, a Member Country may choose to develop a comprehensive curriculum with strong emphasis on practical skills and a good theoretical knowledge to back up those skills. In circumstances where there is an urgent requirement for VPPs because they are needed but are currently lacking, a Member Country may select a smaller number of those Units which are deemed most relevant and deliver a shorter curriculum with an emphasis on building practical skills, with the understanding that further theoretical foundations will be available in the future.

Competencies are classified as 'basic' or 'advanced' in the *Competency Guidelines*; OIE Members may develop their VPP training programmes according to their needs. For example, the Animal Handling Competency is assigned as 'basic' for AH and VPH and advanced for Lab. Therefore, the Unit, Animal Handling and Restraint, might be given a different placement or emphasis in the Laboratory Track versus the other two Tracks.

In order to illustrate the many ways Units can be combined, this document includes six examples of curricula that train VPPs to perform different jobs in the three VPP Tracks. These job descriptions were presented in the Annexes of the *OIE Competency Guidelines for Veterinary Paraprofessionals* and are repeated here to demonstrate how the required competencies can be effectively taught in purpose-fit curricula. Two job-related curricula are included for each of the three Tracks: the first a curriculum producing entry-level VPP graduates; the second a curriculum producing more advanced VPP graduates.

Scope

Due to different animal health priorities, and the diverse range of training programmes currently available for veterinary paraprofessionals in OIE Member Countries, it is recognised that there is no single approach that will suit the needs of all countries. However, each country should endeavour to harmonise VPP training within the country to the extent possible.

The attainment of the expected competencies is the main and critical factor in determining the duration of any VPP training programme. Formal VPP training programmes around the world range from six (6) months in length to four (4) years or more. Therefore, these *Curricula Guidelines* cannot prescribe a required duration for VPP training. Numerous factors would contribute to that decision at the local level including availability of resources, the expected skills and qualifications of VPP graduates, and the registration requirements for VPPs by the VSB.

Nevertheless, based on documentary evidence and existing best practices assessed during the development of these Guidelines, it appeared that a minimum of six (6) months of training was required to produce an entry-level animal health Track VPP with practically-oriented, basic competencies. However, an additional one to two years would be required for the training of a well-rounded VPP with more theoretical knowledge and practical skills.

It could also be envisaged to develop a core curriculum that provides foundational knowledge and skills for all three Tracks in an initial phase of training, followed by specialised curricula for each Track in subsequent years of training.

As previously addressed in the *OIE Competency Guidelines*, Member Countries may use different titles to characterise VPPs that are trained to a similar level. Likewise, Member Countries may use similar titles for VPPs trained to different levels. Therefore, the OIE has avoided naming categories of VPPs and instead has assumed that VPPs will receive formal training at the certificate, diploma, or degree levels from training institutions accredited by the appropriate government agency or the Veterinary Statutory Body (VSB) and the activities that they are permitted to conduct will reflect their level of formal training.

Due to the different Member Country requirements for recognising an academic or vocational training qualification (i.e. certificate, diploma, degree), and the different registration or licensing requirements for VPPs, the specific type of qualification gained after completing a set of Units is also not specified in these *Guidelines*.

This document has been developed as applicable to VPPs working with terrestrial animals as defined in the *Terrestrial Animal Health Code* and *Manual of Diagnostic Tests and Vaccines for Terrestrial Animals*, although the OIE recognises that many of the Courses and Units identified here may be applicable to the aquatic sector as well.

These *Curricula Guidelines* are designed to develop competencies across the likely range of activities in which VPPs might be involved. Nevertheless, with regard to the responsibilities or prerogatives afforded to VPPs in different Member Countries, the needs of the Member Country's Veterinary Services and the decisions of its VSB should converge to determine what activities VPPs are allowed to undertake.

Consider, for example, Member Countries with a limited number of veterinarians and large livestock populations, some of which are in remote places. For livestock owners to obtain any clinical veterinary services at all, it may be necessary for the VSB to sanction VPPs to provide those services. Similarly, this document identifies expected Learning Outcomes to deliver the competencies for VPPs to carry out ante- and post-mortem meat inspection under the overall supervision and responsibility of veterinarians, but whether or not they would be allowed to do so remains a policy decision of each Member Country.

With regard to VPPs working under the responsibility and direction of veterinarians, OIE confirms and supports this expectation but also recognises that it is the prerogative of the VSB in each Member Country to determine the extent and nature of that responsibility and direction relative to the various activities that are sanctioned for VPPs to perform.

There are Courses and/or Units that are not included in these *Curricula Guidelines* that may reflect particular needs in Member Countries. These may include, for example, wildlife health for countries where wildlife is economically important; business skills where VPPs are engaged in private clinical practice or operate private enterprises; or, artificial insemination where the demand exists. Member Countries and their training institutions should address these needs in the form of electives included as part of their curricula, or as offerings associated with CPD following graduation.

Another issue that may reflect local conditions is how well-prepared potential students are to successfully complete a VPP curriculum. In general, it is accepted that potential candidates should have completed high school but since the quality and content of high school education may vary, specific prerequisites may have to be established. In cases where sufficient numbers of candidates with those prerequisites cannot be identified, remedial Courses may be needed as part of the VPP curriculum. Examples may include mathematical skills, language skills, biology, chemistry, biochemistry, or basic computer skills. Each Member Country should assess their own needs in this regard.

The *Curricula Guidelines* may need to be applied differently for the Laboratory Diagnosis Track, as many paraprofessionals working in the veterinary laboratory setting have been trained in biomedical laboratory training programmes. These paraprofessionals require additional veterinary-specific knowledge to ensure that they are competent to work in the veterinary diagnostic laboratory and certain Courses and Units in the Laboratory Diagnosis Track could be useful to future students in this regard.

Before developing any laboratory VPP curricula, veterinary training institutions should consider consultation with regulatory bodies with oversight of biomedical training institutions as well as the veterinary statutory bodies regarding training standards. Harmonised laboratory VPP curricula should be acceptable to both regulatory agencies. Such a 'One Health' collaborative approach could be beneficial in order to avoid duplication and the development of parallel infrastructure when most needs may already be met by existing programmes, even when outside of the veterinary domain.

The *OIE Curricula Guidelines* clarify the curricula needed to appropriately train VPPs around the world to fulfil the competency needs identified in the *OIE Competency Guidelines*. Training institutions may use both documents to define and improve the quality and outcomes of VPP training with emphasis on delivering the appropriate competencies. Veterinary statutory bodies will also be able to use these documents to better define the roles and responsibilities of VPPs working in the veterinary domain, and clearly establish categories of VPP for recognition and registration. The *Competency* and *Curricula Guidelines* contribute to competent veterinary paraprofessionals as well as the improvement of the quality of Veterinary Services around the world, as described in Chapters 3.1.[13] and 3.2.[14] of the OIE *Terrestrial Animal Health Code*[15].

[13] http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_vet_serv.htm

[14] http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_eval_vet_serv.htm

[15] http://www.oie.int/en/standard-setting/terrestrial-code/access-online/

Veterinary Paraprofessional Curricula: Courses, Units, and Learning Outcomes

In the *OIE Competency Guidelines*, competencies for VPPs were presented for three distinct Tracks of VPP: animal health, veterinary public health, and laboratory diagnosis. The following section presents the Courses, Units, and Learning Outcomes for each Track intended to deliver those competencies. To appreciate how these curricula can be used, please refer to the 'How to use this document' section in the Introduction of this document.

In the following chapters, the VPP curriculum for each Track is presented in a separate table where Course names and Course descriptions are presented alongside Units and their respective Learning Outcomes as illustrated in Figure 1. The list of Learning Outcomes provided for each Unit is not exhaustive but is intended to highlight what training is necessary to deliver the relevant Competency. Training institutions may choose to add more Learning Outcomes depending on their needs.

Many Courses and Units are common to the three Tracks, while the Learning Outcomes for a common Unit are tailored to the needs of a specific Track. For this reason, the Course descriptions are the same for each course across the tracks.

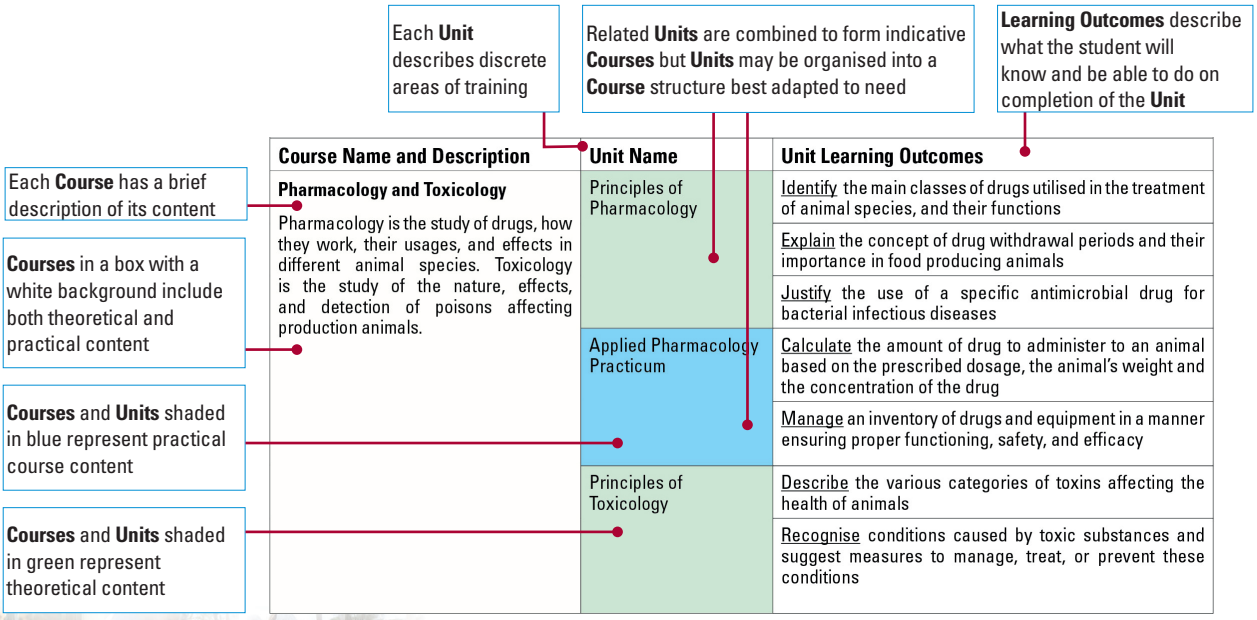
If a user of this document wants to focus on curriculum development for a specific track, curricula for the three Tracks are presented consecutively in this section – Animal Health Track, followed by Veterinary Public Health Track, followed by Laboratory Diagnosis Track.

To illustrate the many ways Units can be combined, this document includes Annexes containing six examples of curricula that deliver competencies for different jobs in the three Tracks. These job descriptions were presented in the Annexes of the *OIE Competency Guidelines* for Veterinary Paraprofessionals and are repeated in the Annexes of this document to demonstrate how the required competencies can be effectively taught in purpose-fit curricula. Two example curricula are included for each Track: the first, a curriculum producing VPPs for an entry-level job; the second, a curriculum producing more well-rounded VPPs.

Figure 1. Key to reading the curricula tables

The Courses and Units in these *Curricula Guidelines* were developed to deliver the SOA and Competencies previously identified in the *Competency Guidelines*.
The Track refers to the principal job-related focus for the VPP, be it animal health, veterinary public health, or laboratory diagnosis.
The basic building block for these curricula is the Unit.

Courses and Units are presented in the following chapters by Track.
For VPP graduates to be truly competent upon graduation, practical experience is critical. Therefore, practical Units are presented alongside related theoretical Units in each Course.



Animal Health Track

The following table presents the curriculum for the Animal Health Track. There are 17 Courses, 46 Units, and 93 Learning Outcomes. Courses shown with a white background include both theoretical and practical content. Courses and Units shaded in green represent theoretical content. Courses and Units shaded in blue represent practical content.

Table 2: Courses, Units, and Learning Outcomes for the Animal Health Track

Course Name and Description	Unit Name	Unit Learning Outcomes
Anatomy and Physiology Anatomy is the study of structures and organ systems of animals at the gross and microscopic level. Physiology is the study of the normal function of living organisms at the biochemical, cellular, and tissue levels.	Anatomy and Physiology	Describe the anatomical and physiological systems in animal species of importance
		Explain key anatomical and physiological differences between species of clinical relevance
	Anatomy and Physiology Practicum	Indicate the position of any organ or part of an organ in the animal body using correct anatomical terminology
		Locate the anatomical features relevant to clinical examination, venepuncture, and vaccine and drug administration within species of importance
		Demonstrate the ability to age animals based on their dentition
Animal Diseases Animal Diseases is the study of specific infectious and non-infectious diseases.	Zoonoses and Emerging Diseases	Describe the zoonotic diseases of importance to the country/region
		Recognise the possibility of emerging diseases and the responsibility to report these
		Describe the methods of control and prevention for the zoonotic diseases of importance
	Infectious Diseases of National Importance	Describe infectious diseases of national importance including the causative agent(s), modes of transmission, clinical signs, appropriate sampling, and suggested control and prevention measures
	Non-infectious Diseases of National Importance	Describe non-infectious diseases of national importance including the risk factors, causes, clinical signs, appropriate sampling, and suggested treatment and prevention measures

Table 2: Courses, Units, and Learning Outcomes for the Animal Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Animal Examination, Diagnostic and Therapeutic Techniques This Course provides the theoretical knowledge and practical skills necessary to effectively restrain and clinically examine animals, obtain diagnostic specimens, and administer treatments.	Animal Handling and Restraint Practicum	Demonstrate proper animal restraint techniques
		Recommend suitable methods and facilities for restraining and handling livestock
		Advise on transport procedures to minimise animal stress and disease risk
	Clinical Examination Practicum	Demonstrate the ability to conduct a complete clinical examination including history taking, physical examination, and premises evaluation
		Estimate body weight and perform body condition scoring
		Utilise the results of the clinical examination to demonstrate the ability to use clinical reasoning to formulate a differential diagnosis list
	Specimen Quality Practicum	Collect the correct specimen and prepare appropriate samples based on a differential diagnosis list
		Demonstrate proper handling, labelling, packaging, and transport of specimens and samples for submission to a laboratory
	Diagnostic and Therapeutic Techniques Practicum I	Conduct intramuscular, intradermal, and subcutaneous injections and administer solid and liquid oral medications
		Demonstrate the proper use of a stethoscope and thermometer, including accurate recording of clinical signs in relevant animal species
	Diagnostic and Therapeutic Techniques Practicum II	Demonstrate the passage of a stomach tube and administration of oral medications
		Demonstrate intravenous fluid administration

Table 2: Courses, Units, and Learning Outcomes for the Animal Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Animal Production Systems The Animal Production Systems Course is the study of different relevant species, their housing, handling, nutritional needs, the fundamental concepts of reproduction, and agricultural economics as they relate to specific production systems.	Husbandry	Describe the important routine activities that farmers should carry out to ensure the optimal health and productivity of their animals
	Nutrition and Pasture Management	Describe macro and micro nutrients necessary to provide proper nutrition to various animal species
		Describe feeds used in animal nutrition, including their nutritional value, to provide proper nutrition to various animal species
		Describe relevant nutritional deficiencies and related clinical conditions
	Agricultural Economics	Apply the practical principles of agricultural economics to the profitable management of various animal production systems
		Describe the economics of relevant commodities in various value chains and associated market trends
	Production and Breeding Systems Management	Describe farming systems of major importance for animal production
		Identify the different breeds of species and their production characteristics
		Describe the important routine activities that farmers should carry out to ensure the optimal reproductive performance of their animals
	Animal Production Practicum	Identify the types and quality of various feed sources, edible grasses and toxic plants at pasture
		Assess key elements of farming systems during farm visit
Animal Welfare and Ethology The Animal Welfare Course covers the scientific basis for understanding an animal's response to its environment and establishing and ensuring the conditions for its health and well-being. Ethology is the study of animal behaviour in its interactions with humans, other animals, and their physical environment.	Animal Welfare	Describe the conditions for humane husbandry of animals in different production systems
		Describe the principles and practices of humane slaughter
	Ethology	Describe basic scientific methods used to assess animal welfare
		Apply the principles of ethology to analyse and understand behaviour in any species
	Animal Welfare Practicum	Assess farming and transport systems to determine compliance with animal welfare standards
		Apply measures to minimise fear, pain, stress, and discomfort

Table 2: Courses, Units, and Learning Outcomes for the Animal Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Communication The Communication Course covers the principles and practices of effective and efficient oral and written communication aimed at specific audiences.	Principles of Communication	Describe the basic principles of effective and efficient communication to different groups of stakeholders
	Extension Communication	Demonstrate the ability to communicate effectively with various stakeholders using technical and non-technical terminology
	Practical Applications in Communication Practicum	Demonstrate the ability to effectively communicate a disease condition or disease outbreak situation to relevant stakeholders both orally and in writing
Field Biosafety and Biosecurity Field Biosafety covers the principles and practices of prevention of exposure or spread of hazards and biological materials. Field Biosecurity covers the prevention and mitigation measures that limit the spread of disease and pests.	Principles of Field Biosafety and Biosecurity	Describe the procedures recommended to prevent the spread of infectious disease within and between farms.
		Describe the necessary measures for disposal of sharps and other hazardous waste created during field work
		Describe the principles of risk analysis and application to disease control
	Field Biosafety and Biosecurity Practicum	Demonstrate the proper use of personal protective equipment (PPE)
		Demonstrate the ability to avoid personal injury and reduce disease spread when working with animals and equipment under field conditions
		Develop a farm biosecurity plan and demonstrate the ability to effectively communicate future risk mitigation practices to the farmer
		Assess vehicles and other transport equipment with regard to the risk of disease spread
		Assess market facilities, equipment, and animals present with regard to the risk of disease spread
Immunology Immunology is the study of the structure and function of the immune system, innate and acquired immunity, mechanisms that allow the body to distinguish self from non-self, and vaccination theory and practice.	Principles of Immunology	Describe the structure and functions of the immune system
	Vaccinology	Describe how vaccination prevents disease
		Explain the proper handling of vaccines to ensure their quality and efficacy
	Serology	Explain the relationship between the humoral immune response and diagnostic serology
Information Technology Applications The Information Technology Applications Course includes basic techniques in record keeping, data input, database management, and the computer skills necessary to work in the veterinary environment.	Record Keeping and Data Collection Practicum	Complete specific forms of importance accurately, and submit to relevant authorities
		Utilise information technology applications for data collection and data entry
	Data Management Practicum	Apply relevant applications to retrieve, organise, and present data
		Demonstrate the ability to organise and present the retrieved data into reports

Table 2: Courses, Units, and Learning Outcomes for the Animal Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Microbiology Microbiology is the study of microorganisms (bacteria, fungi, and viruses) and their effect on animals.	Principles of Microbiology	Identify the structural differences between the main categories of microorganisms in animals
		Describe the mechanisms by which the main categories of microorganisms cause disease in animals
Parasitology The Parasitology Course is the study of parasites and protozoa, their hosts, their associated pathology as it relates to clinical applications, and the management of clinical parasitism in the field.	Internal and External Parasites	Describe the life cycle and host-parasite relationships for parasites of importance in the Member Country
	Internal and External Parasites Practicum	Demonstrate correct control and prevention measures for various parasites of importance in the Member Country, including the selection and administration of anthelmintics
		Perform basic parasitological diagnostic tests for parasites of importance in the Member Country
Pathology Pathology is the study of disease processes and how the animal responds at the gross and microscopic levels.	Principles of Pathology	Describe how the body and different tissues respond to the various causes of disease
		Describe the gross lesions commonly identified with diseases of importance.
	Necropsy and Gross Pathology Practicum	Conduct a routine field necropsy including identification of gross abnormalities in relevant species
		Collect and prepare appropriate specimens and conduct relevant pen-side tests
Pharmacology and Toxicology Pharmacology is the study of drugs, how they work, their usages, and effects in different animal species. Toxicology is the study of the nature, effects, and detection of poisons affecting production animals.	Principles of Pharmacology	Identify the main classes of drugs utilised in the treatment of animal species, and their functions
		Explain the concept of drug withdrawal periods and their importance in food producing animals
		Justify the use of a specific antimicrobial drug for bacterial infectious diseases
	Applied Pharmacology Practicum	Calculate the amount of drug to administer to an animal based on the prescribed dosage, the animal's weight and the concentration of the drug
		Manage an inventory of drugs and equipment in a manner ensuring proper functioning, safety, and efficacy
	Principles of Toxicology	Describe the various categories of toxins affecting the health of animals
		Recognise conditions caused by toxic substances and suggest measures to manage, treat, or prevent these conditions

Table 2: Courses, Units, and Learning Outcomes for the Animal Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Primary Animal Health Care Techniques Primary Animal Health Care Techniques are the basic animal production interventions and good management practices undertaken on a routine basis to maintain animal health and production.	Primary Animal Health Care Techniques Practicum	Apply suitable animal identification methods for use in a practical situation
		Demonstrate the ability to clean, suture, and bandage minor wounds and perform other first aid procedures, using pain relief as appropriate
		Demonstrate the ability to properly perform simple, common production interventions, such as closed castration, tail docking, and hoof trimming, using pain relief as appropriate
		Demonstrate the ability to properly perform more advanced, common production interventions, such as open castration and dehorning, using pain relief as appropriate
Principles of Disease Control The Principles of Disease Control Course covers the principles and tools for effective disease control, the role of descriptive epidemiology in managing disease control programmes, and the specific disease control programmes that exist in the Member Country.	Principles of Disease Control Programmes	Describe the main tools for effective disease control
		Describe how to apply disease control tools in the event of known and emerging infectious disease outbreaks
	Specific Disease Control Programmes	Identify the components for the specific disease control programmes in the Member Country
	Applied Epidemiology	Describe the elements included in conducting a disease outbreak investigation
		Describe the elements of descriptive epidemiology
	Applied Epidemiology Practicum	Participate in on-going national disease control programmes
		Conduct an outbreak investigation, as appropriate
		Apply the elements of descriptive epidemiology
		Develop an investigation report to provide to a veterinarian
Professional Jurisprudence and Ethics This Course will teach students to understand and practice within the legislative and regulatory frameworks and established ethical standards of their jurisdiction.	Jurisprudence	Demonstrate knowledge of relevant laws and regulations that define the requirements and conditions under which the animal health VPP must work
		Explain appropriate regulations which provide the legal basis to carry out and enforce animal health and welfare legislation
	Ethics	Uphold the code of ethics that applies to VPPs in the Member Country

Table 2: Courses, Units, and Learning Outcomes for the Animal Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Veterinary Public Health This Course covers the principles and practices associated with protecting human health with respect to hazards and disease at the interface between animals, humans and the environment.	Principles of Veterinary Public Health	Describe how the veterinary domain interacts with human and environmental health
	One Health/ Community-based practice	Identify the key stakeholders and participants across disciplines who must be collaborated with when dealing with different veterinary public health issues
		Participate in veterinary public health issues at the local, regional and international level as part of a team
	Ante- and Post-mortem Inspection Practicum I	Perform animal inspection before slaughter
		Perform post-mortem carcass examination

Veterinary Public Health Track

The following table presents the curriculum for the Veterinary Public Health Track. There are 17 Courses, 53 Units, and 103 Learning Outcomes. Courses shown with a white background include both theoretical and practical content. Courses and Units shaded in green represent theoretical content. Courses and Units shaded in blue represent practical content.

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Anatomy and Physiology Anatomy is the study of structures and organ systems of animals at the gross and microscopic levels. Physiology is the study of the normal function of living organisms at the biochemical, cellular, and tissue levels.	Anatomy and Physiology	Recognise normal structure and function of key body systems for relevant production species
	Anatomy and Physiology Practicum	Perform procedures based on knowledge of topographical sites
Animal Diseases Animal Diseases is the study of specific infectious and non-infectious diseases.	Zoonoses and Emerging Diseases	Describe the zoonotic diseases of importance to the country/ region
		Describe the methods of control and prevention for the zoonotic diseases of importance
	Infectious Diseases of National Importance	Recognise key infectious diseases affecting fitness for consumption
		Recognise infectious diseases reportable to the Veterinary Authority and why they are notifiable
	Non-infectious Diseases of National Importance	Recognise key non-infectious diseases affecting fitness for consumption

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Animal Examination and Diagnostic and Therapeutic Techniques This Course provides the theoretical knowledge and practical skills necessary to effectively restrain and clinically examine animals, obtain diagnostic specimens, and administer treatments, as appropriate.	Animal Handling and Restraint	Recommend suitable methods and facilities for handling livestock
		Apply suitable animal restraint and handling to undertake effective and safe ante-mortem inspection and slaughter that does not compromise animal welfare
		Apply appropriate stunning and slaughter methods to optimise animal welfare and food quality and safety
		Advise on transport procedures to minimise animal stress and disease risk
	Specimen Quality Practicum	Describe what specimens and/or samples are needed for relevant disease investigations
		Demonstrate proper specimen and sample collection techniques in a field environment
		Demonstrate proper handling, labelling, packaging, and transport of specimens for submission to a laboratory
	Diagnostic Techniques Practicum	Use test results to assist in decisions on fitness of animals or products for human consumption or trade
Animal Production Systems The Animal Production Systems Course is the study of different relevant species, their housing, handling, nutritional needs, the fundamental concepts of reproduction, and agricultural economics as they relate to specific production systems.	Husbandry (housing, ventilation, sanitation, breeds)	Define animals on the basis of species, breed, age, production system, etc.
		Recognise husbandry and nutrition problems that may result in animals being unfit for human consumption
	Agricultural Economics	Describe the economics of relevant commodities in various value chains and associated market trends
		Perform duties so as to optimise commodity value and productivity
	Production and Breeding Systems Management	Describe how key production systems work from farm to fork
		Describe how populations of animals are managed and how this relates to food productivity, safety and quality
		Identify reproductive conditions that may influence the fitness of animals for human consumption

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Animal Welfare and Ethology The Animal Welfare Course covers the scientific basis for understanding an animal's response to its environment and establishing and ensuring the conditions for its health and well-being. Ethology is the study of animal behaviour in its interactions with humans, other animals, and their physical environment.	Animal Welfare	Understand appropriate animal management and slaughter procedures to optimise animal welfare
		Describe the principles and practices of humane slaughter as applied to religious slaughter
	Ethology	Describe normal and abnormal behaviour in animals on farm or at the slaughterhouse that may indicate conditions that compromise food quality and safety
	Animal Welfare Practicum	Apply appropriate stunning and slaughter methods to optimise animal welfare, reducing stress and negative effects on food quality and safety
		Evaluate premises for adequacy of animal welfare as it applies to fitness of animal products for human consumption
Communication The Communication Course covers the principles and practices of effective and efficient oral and written communication aimed at specific audiences.	Principles of Communication	Use appropriate language to communicate with producers and other stakeholders
	Extension Communication	Demonstrate the ability to communicate effectively with various stakeholders using technical and non-technical terminology
	Practical Applications in Communication Practicum	Organise, as part of a team, public forums and other opportunities for stakeholder communication
		Compile official reports using accurate, succinct, and appropriate grammar, spelling, and formatting
		Reference legislation and the work of others effectively when reporting

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Field Biosafety and Biosecurity Field Biosafety covers the principles and practices of prevention of exposure or spread of hazards and biological materials. Field Biosecurity covers the prevention and mitigation measures that limit the spread of disease and pests.	Principles of Field Biosafety and Biosecurity	Describe the various components of a biosecurity plan
		Recognise methods of traceability for livestock and livestock products
		Describe the principles and application of risk analysis to disease control
	Food Chain Biosecurity	Recognise good design of facilities, equipment, and protocols associated with maintaining biosecurity and biosafety
	Field Biosafety and Biosecurity Practicum	Demonstrate the proper use of personal protective equipment (PPE)
		Demonstrate the ability to avoid personal injury and reduce disease spread when working with animals and equipment under field conditions
		Participate in the design and audit of a biosecurity protocol
	Food Chain Biosecurity Practicum	Assess production, slaughter, processing, and market environments to assure good hygiene and management practices and standards
		Manage the handling and disposition of products, by-products, and condemned and waste materials so that they no longer pose a hazard to animals or humans
Food Hygiene The Food Hygiene Course covers the general principles for protecting the safety and quality of food and their application at all levels of the food chain.	Principles of Food Hygiene	Understand and apply fundamental concepts of food microbiology and epidemiology
		Describe the important food-borne diseases with respect to causes, impacts, detection and prevention
	Food Safety Regulations and Policies	Recognise laws, regulations, policies and standards that are relevant to food safety, quality, and trade
		Demonstrate how to operate within these regulations, and advise producers and processors as to compliance
	Quality and Risk Management	Understand the processes of risk analysis and assessment in a food production context
		Apply principles of food safety and quality and generic quality management systems
	Food Hygiene Practicum	Perform basic food microbiology procedures to assess the fitness of products for human consumption
		Apply operational and pre/post-operational hygiene principles to protect the food chain
	Ante-mortem and Post-mortem Inspection Practicum	Demonstrate animal examination procedures for ante-mortem inspection
		Perform standardised or certified post-mortem processes
		Liaise with veterinary and related quality assurance staff on findings to assist with making disposal decisions

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Immunology Immunology is the study of the structure and function of the immune system, innate and acquired immunity, mechanisms that allow the body to distinguish self from non-self, and vaccination theory and practice.	Principles of Immunology	Recognise signs of infection and animal immunological response and the impacts on fitness for consumption
	Vaccinology	List vaccine protocols necessary for animals used for human consumption and trade
	Serology	State how serological results contribute to decision-making on the suitability of animals for human consumption and trade
Information Technology Applications The Information Technology Applications Course includes basic techniques in record keeping, data input, database management, and the computer skills necessary to work in the veterinary environment.	Record Keeping and Data Collection Practicum	Apply appropriate tools for data collection in the field and within facilities
		Record information to be stored in a manner that is secure and allows ready, but authorised, access
	Data Management Practicum	Perform a data quality audit on relevant databases
		Manage data relevant to routine daily VPH activities in electronic and hard-copy formats, including entry, storage and reorganisation
Microbiology Microbiology is the study of microorganisms (bacteria, fungi, and viruses) and their effect on animals.	Principles of Microbiology	Differentiate infectious from non-infectious disease and potential for contamination of the food chain
		Distinguish between the main categories of microorganisms which cause disease in animals and humans
	Bacteriology and Mycology	Describe basic microbiological tests used for public health evaluation
	Virology	Recommend appropriate control and prevention strategies based on an understanding of viral disease
Parasitology The Parasitology Course is the study of parasites and protozoa, their hosts, their associated pathology as it relates to clinical applications and the management of clinical parasitism in the field.	Internal and External Parasites	Describe the life cycles and host-parasite relationships for parasites of public health importance in the Member Country.
	Internal and External Parasites Practicum	Implement correct control and prevention measures for parasites of public health importance in the Member Country.

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Pathology Pathology is the study of disease processes and how the animal responds at the gross and microscopic levels.	Principles of Pathology	Describe pathological processes that compromise food safety and quality
	Systems Pathology	Differentiate generalised from system specific disease for the purposes of fitness for consumption decisions
		Describe the common pathological lesions in the major organ systems of common species
	Necropsy and Gross Pathology Practicum	Perform necropsies on key production species
		Perform routine post-mortem abattoir procedures on key production species
		Differentiate normal from abnormal structure and function at the gross level
		Identify pathological processes that impact on fitness for human consumption
Pharmacology and Toxicology Pharmacology is the study of drugs, how they work, their usages, and effects in different animal species. Toxicology is the study of the nature, effects, and detection of poisons affecting production animals.	Principles of Pharmacology	Describe how antimicrobials and other chemicals used in agricultural and veterinary applications can compromise the health of people and the safety and trade of foods
	Applied Pharmacology Practicum	Advise on withdrawal periods and other residues avoidance protocols
		Demonstrate procedures relating to national residue avoidance programmes
	Principles of Toxicology	Recognise toxicants that may compromise food safety and quality, or market access

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Principles of Disease Control The Principles of Disease Control Course covers the principles and tools for effective disease control, the role of descriptive epidemiology in managing disease control programmes, and the specific disease control programmes that exist in the Member Country.	Principles of Disease Control Programmes	Understand fundamental concepts of population medicine and herd health
		Describe the specific methods used for disease control: surveillance, compartmentalisation, eradication, stamping out, vaccination, quarantine, and traceability
	Applied Epidemiology	Understand foundational epidemiological principles to protect the quality, safety, and marketability of foods
		Describe the methods used for descriptive epidemiology and how these are applied in a field setting
	Specific Disease Control Programmes and Policies	Describe regional control programmes for notifiable diseases, including those with food safety and quality significance
		Identify the roles of the VPH VPP in specific disease control programmes in the Member Country
	Applied Epidemiology Practicum	Describe the appropriate use of specific methods of disease control
		Prepare reports from field data relating to surveillance, outbreaks, response campaigns, etc.
		Conduct an outbreak investigation, as appropriate
		Calculate key metrics for descriptive epidemiology associated with disease control and prevention programmes
Professional Jurisprudence and Ethics This Course will teach students to understand and practice within the legislative and regulatory frameworks and established ethical standards of their jurisdiction.	Jurisprudence	Demonstrate knowledge of legislation and regulations relevant to the veterinary public health VPP
		Explain appropriate legislation which provides the legal basis to carry out and enforce veterinary public health and welfare legislation
	Ethics	Recognise specific customs, ethics and situational issues when working with various stakeholders
		Conduct activities in a professional manner
		Uphold the code of ethics that applies to veterinary public health VPPs in the Member Country

Table 3: Courses, Units, and Learning Outcomes for Veterinary Public Health Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Veterinary Public Health This Course covers the principles and practices associated with protecting human health with respect to hazards and disease at the interface between animals, humans and the environment.	Principles of Veterinary Public Health	Describe how the veterinary domain interacts with human and environmental health
	Zoonoses and Emerging Infectious Diseases (EID)	List key zoonotic diseases in the region
		Describe the impact of zoonotic diseases with respect to human health, food security and, trade
		Advise on control and prevention approaches for zoonotic diseases
		Describe the impacts of EID in their region, the drivers for their emergence, and the basis for control and prevention
	Waste Management and Environmental Sciences	Describe waste management procedures to optimise animal health and welfare, and food safety and quality
		Assist producers and processors on methods to enhance environmental sustainability
	One Health/ Community-based Practice	Collaborate with key stakeholders and participants across disciplines when dealing with veterinary public health issues
		Manage veterinary public health issues at the local, regional, and international levels, as appropriate

Laboratory Diagnosis Track

The following table presents the curriculum for the Laboratory Diagnosis Track. There are 16 Courses, 41 Units, and 103 Learning Outcomes. Courses shown with a white background include both theoretical and practical content. Courses and Units shaded in green represent theoretical content. Courses and Units shaded in blue represent practical content.

In the Laboratory Diagnosis Track, the practical components of the Immunology Course and the Pharmacology and Toxicology Course could be delivered in the Laboratory Diagnostic Techniques Course. It is envisaged that the Laboratory Diagnostic Techniques Course would be a large practicum delivered throughout the training programme in parallel with the relevant theoretical information. It could cover basic and advanced tests depending on the Member Country needs. There could also be an option to deliver some of this practicum training during placements in external facilities. Courses for which the practicum would be delivered in the Laboratory Diagnostic Techniques Course are noted with the symbol (§) for ease of reference in Table 4. The user of these *Guidelines* should structure curricula in such a way as to reinforce theoretical learning with associated practical learning.

Many paraprofessionals working in the veterinary laboratory setting may have already been trained in biomedical laboratory training programmes. Those paraprofessionals may still require additional 'on the job' veterinary-specific training to ensure that they are competent to work in the veterinary diagnostic laboratory. Therefore, the *Curricula Guidelines* may need to be applied differently for the Laboratory Track.

Before developing any laboratory curricula specifically for the Laboratory Diagnosis Track, training institutions should consider the curricula used by existing biomedical training institutions to assess gaps and synergies to meet required Competencies and Learning Outcomes for laboratory VPPs. Harmonised laboratory VPP curricula should be acceptable to both the relevant regulatory and educational authorities. Such a collaborative approach could be beneficial to avoid duplication and the development of parallel training programmes when much of the necessary training may already be met by existing programmes, even when outside of the veterinary domain.

It is advisable for the practical Units to be offered concurrently with related theoretical Units throughout the entire period of the training programme. The practical Units may also be offered as practicum placements in existing veterinary laboratories rather than solely at a training institute.

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track

Course Name and Description	Unit Name	Unit Learning Outcomes
Anatomy and Physiology Anatomy is the study of structures and organ systems of animals at the gross and microscopic levels. Physiology is the study of the normal function of living organisms at the biochemical, cellular, and tissue levels.	Applied Anatomy and Physiology	Describe normal anatomy and physiology of relevant species
		Describe how to take a range of biological specimens from common species
	Anatomy and Physiology Practicum	Demonstrate the ability to take a range of biological specimens from common species

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Animal Diseases Animal Diseases is the study of specific infectious and non-infectious diseases.	Zoonoses and Emerging Diseases	Be aware of relevant zoonotic diseases and how to prevent transmission in the laboratory setting
	Infectious Diseases of National Importance	Describe the relevant infectious disease of national importance and the specimens required to obtain a diagnosis
		Describe what tests are required and how to relate laboratory findings to confirm a diagnosis
	Non-infectious Diseases of National Importance	Describe the relevant non-infectious disease of national importance and the specimens required to obtain a diagnosis
		Describe what tests are required and how to relate laboratory findings to confirm a diagnosis
Animal Examination and Diagnostic and Therapeutic Techniques This Course provides the theoretical knowledge and practical skills necessary to effectively restrain and clinically examine animals, obtain diagnostic specimens, and administer treatments.	Animal Handling and Restraint Practicum	Demonstrate the ability to capture, handle and restrain animals for the purpose of specimen collection
		Demonstrate the ability to work in a team
	Specimen Quality Practicum	Demonstrate the ability to collect appropriate specimens
		Assess specimen acceptability
		Demonstrate proper handling, labelling, packaging, and transport of specimens and samples
Clinical Pathology Clinical Pathology is concerned with the diagnosis of disease based on laboratory analysis of blood and other bodily fluids, tissues, and microscopic evaluation of individual cells.	Haematology	Describe the different haematological changes resulting from common diseases and conditions
		Describe different tests used in haematology
	Clinical Chemistry	Describe the body's response to disease and the common tests used in diagnosis
		Describe different tests used in clinical pathology
	Cytology	Describe the tests commonly used
	Clinical Pathology Practicum	Demonstrate the ability to conduct appropriate tests
		Prepare appropriate controls and reference charts
Communication The Communication Course covers the principles and practices of effective and efficient oral and written communication aimed at specific audiences.	Principles of Communication	Demonstrate interpersonal communication with clients, colleagues, and animal health professionals using appropriate terminology
		Understand the preparation of clear, concise and effective reports and presentations
	Practical Applications in Communications Practicum	Produce diagnostic test reports for distribution
Food Hygiene This Course covers the general principles for protecting the safety and quality of food and their application at all levels of the food chain.	Principles of Food Hygiene	Describe the tests commonly used for food safety

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Immunology[§] Immunology is the study of the structure and function of the immune system, innate and acquired immunity, mechanisms that allow the body to distinguish self from non-self, and vaccination theory and practice.	Principles of Immunology	Describe the components of the immune system, how it works, and the characteristics of normal immune cells
	Vaccinology	Describe the basis of antigen and adjuvant selection for effective immune protection
		Understand the impact of vaccines on diagnostic test results
	Serology	Describe the basis of test mechanisms
Information Technology Applications The Information Technology Applications Course includes basic techniques in record keeping, data input, database management and the computer skills necessary to work in the veterinary environment.	Record Keeping and Data Collection Practicum	Collate disease programme test results
		Produce reports of test results
	Data Management Practicum	Demonstrate the ability to input data correctly into databases
		Demonstrate proficiency in the use of spreadsheets and the ability to compile and present laboratory data in an appropriate format

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Laboratory Biosafety and Biosecurity Laboratory Biosafety covers the principles and practices for the prevention of unintentional exposure to hazards and biological materials, or their accidental release. Laboratory Biosecurity covers the controls on biological materials in order to prevent their loss, misuse, unauthorised access, or intentional release to mitigate the risk of biological threats.	Laboratory Biosafety and Biosecurity	Describe pertinent biosafety and biosecurity regulations
		Describe the components of laboratory risk analysis
		Describe the importance of biological threat containment and mitigation
	Principles of Risk Analysis	Describe the process of biological risk analysis in the laboratory setting
		Describe the risk-based protocols to be followed that determine which tests should be conducted
		Demonstrate the ability to apply the principles of risk analysis to task under responsibility
		Demonstrate effective risk communication
	Laboratory Biosafety and Biosecurity Practicum	Show willingness to follow procedures and regulations
		Demonstrate adherence to SOPs
		Demonstrate proper usage of a biosafety cabinet
		Demonstrate proper usage of PPE
		Demonstrate proper disinfection protocols of workspace
		Demonstrate an understanding of best practices with regard to waste management
		Understand the role of the laboratory in avoiding negative impacts on the environment

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Laboratory Diagnostic Techniques The Laboratory Diagnostic Techniques Course covers the practical methods and techniques for tests used in a laboratory or field setting.	Diagnostic Techniques	Describe why a test is required and how test results relate to specific diseases
		Describe diagnostic test performance characteristics
	Diagnostic Techniques Practicum	Demonstrate proficiency in the performance of basic analytical tests on biological materials
		Demonstrate proficiency in the preparation of test-appropriate reagents, solutions, media, and compounds
		Demonstrate proficiency in the utilisation of test-appropriate laboratory equipment
		Demonstrate the ability to process, label, and store specimens appropriately
		Demonstrate proper adherence to test-specific SOPs
		Demonstrate proficiency in the performance of intermediate analytical tests on biological materials
		Recognise non-conforming work, determine the cause, and address it
		Demonstrate proficiency in the performance of advanced analytical tests on biological materials
		Demonstrate the ability to interpret test results with respect to the expected performance of the test and normal reference ranges for key physiological and biological parameters

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Laboratory Quality Management The Laboratory Quality Management Course covers the principles and techniques to control laboratory processes to obtain accurate and reliable results, ensure appropriate record keeping, optimise efficient workflow, and achieve maximum customer satisfaction.	Principles of Quality Management	Describe the principles of quality management
		Understand the importance of test controls
	Surge capacity and outbreaks	Be aware of the need to enhance capability and capacity for specific testing functions during disease surveillance and outbreak programmes
		Be familiar with effective workflow practices
	Quality Management Practicum	Demonstrate the ability to conduct routine maintenance of laboratory equipment
		Monitor calibration of laboratory equipment according to laboratory procedures
		Demonstrate the ability to monitor the laboratory environment
		Demonstrate a willingness to follow laboratory policies and procedures
		Demonstrate proper adherence to SOPs
		Demonstrate an understanding of how to prioritise work and work flow management
		Demonstrate proficiency in record keeping and attention to detail

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Microbiology Microbiology is the study of microorganisms (bacteria, fungi, and viruses) and their effect on animals.	Principles of Microbiology	Describe the basic structure of and differences between the main categories of microorganisms that cause disease in animals.
		Demonstrate an awareness of commonly used antibiotics and the principles of antibiotic resistance
		Describe the tests used to determine the genetic and phenotypic basis for AMR in different microorganisms
	Bacteriology and Mycology	Describe the classifications and biology of microorganisms
		Describe common tests to diagnose bacterial and fungal disease
	Virology	Describe the classifications and biology of viruses and common viral diseases
		Describe common tests to diagnose viral disease
		Understand how viruses are cultured
	Molecular	Understand the role of molecular sequencing in the identification of microorganisms
		Describe the basis of molecular techniques
		Demonstrate an understanding of the factors that promote AMR
	Bacteriology and Mycology Practicum	Perform basic cultures and staining techniques
		Identify different organisms based on common methods
Parasitology The Parasitology Course is the study of parasites and protozoa, their hosts, their associated pathology as it relates to clinical applications, and the management of clinical parasitism in the field.	Internal and External Parasites	Describe the classifications of internal parasites
		Describe life cycle of internal parasites, including haemoparasites
		Describe the classifications of external parasites
		Describe life cycle of external parasites
		Understand the role of ectoparasites and other arthropods in the transmission of disease
	Internal and External Parasites Practicum	Demonstrate the ability to identify common parasites
		Demonstrate the ability to perform quantitative tests

Table 4. Courses, Units, and Learning Outcomes for the Laboratory Track		
Course Name and Description	**Unit Name**	**Unit Learning Outcomes**
Pathology Pathology is the study of disease processes and how the animal responds at the gross and microscopic levels.	Principles of Pathology	Describe the body's response to disease
	Systems Pathology	Describe the common pathological lesions in the major organ systems of common species
	Histology/Histopathology	Understand the principles of histology
		Describe how to prepare specimens for microscopic examination
	Necropsy and Gross Pathology Practicum	Conduct basic necropsy according to standard operating procedures (SOP)
		Demonstrate the ability to take appropriate diagnostic specimens and to prepare them for examination
Pharmacology and Toxicology[§] Pharmacology is the study of drugs, how they work, their usages, and effects in different animal species. Toxicology is the study of the nature, effects, and detection of poisons affecting production animals.	Principles of Toxicology	Understand the action of toxic substances
		Describe the tests used to detect toxic substances in animals, feed, and the environment
Professional Jurisprudence and Ethics This Course will teach students to understand and practice within the legislative and regulatory frameworks and established ethical standards of their jurisdiction.	Jurisprudence	Demonstrate an awareness of the relevant laws that regulate work in the veterinary laboratory
		Demonstrate the willingness and ability to conform to acceptable standards of professional conduct
	Ethics	Demonstrate professional integrity in data management
		Demonstrate professional integrity in hazard management
		Demonstrate expected professional conduct
		Maintain principles of confidentiality
		Uphold the code of ethics that applies to laboratory VPPs in the Member Country

ANNEXES

The purpose of the *Curricula Guidelines for Veterinary Paraprofessionals* is to provide guidance in the identification of necessary curricula for VPPs to properly carry out the responsibilities expected of them depending on the nature of their work, the extent of their training, and the prerogatives defined for them by the Veterinary Statutory Body (VSB) or other regulatory body.

The document will be useful for VS or other potential employers to review workforce needs and plan for future programmes and activities. The document will also be of value to training institutions and educators who need to review their existing curricula and/or develop new curricula to ensure that the required competencies are addressed during VPP training.

Courses consist of a combination of Units. The Learning Outcomes for a given Unit may vary according to the required competencies for each Track. The content and duration of the curricula should be adapted to the Learning Outcomes.

To illustrate how the document may be useful in these contexts, six scenarios –two for each Track– are presented in the Annexes. For each Track, one scenario corresponds to an entry-level position and the second to an advanced-level position. These same six scenarios first appeared in the companion document *OIE Competency Guidelines for Veterinary Paraprofessionals.* In that document, it was demonstrated how the competencies could be utilised to identify the necessary skills for the six specific jobs descriptions. Here, in the Annex of this *OIE Curricula Guidelines for Veterinary Paraprofessionals* document, the training programmes necessary to deliver the competencies and skills already identified for the six job scenarios are presented. The user can refer back to the original job descriptions in the *OIE Competency Guidelines for Veterinary Paraprofessionals* to see the detailed descriptions of the expected competencies.

Based on the tasks identified for the job description listed in each scenario, Courses and Units are proposed that would deliver the expected competencies for each job. The overall *OIE Curricula Guidelines for Veterinary Paraprofessionals* allow for a comprehensive approach to the training of VPPs in each of the three Tracks. However, these six scenarios also demonstrate that the *Curricula Guidelines* can be used in a flexible, modular way. Taken together, these six scenarios also demonstrate the variability of Course and Unit content that can occur between the different Tracks.

These scenarios are meant to serve as *examples* of the use of this document, not as compulsory models. Users are encouraged to develop their own curricula and build the appropriate sets of Courses and Units either to develop full comprehensive curricula specific to each VPP Track or for use of job-specific competencies that match Member Country needs.

ANNEX 1

Animal Health Track Job Scenarios

Scenario 1: VPPs to work in a National PPR Control and Eradication Programme

Peste des petits ruminants (PPR) is endemic in Country A and the government has decided to embark on a National PPR Control and Eradication Programme in the context of the OIE/FAO Global PPR Eradication Programme. There are areas of the country where there are large numbers of small ruminants but few or no veterinarians to carry out disease control programmes.

The decision is made to develop a cadre of veterinary paraprofessionals (VPPs), under the supervision of a designated government veterinarian, who can implement the national PPR control and eradication programme in defined areas (e.g. sub-districts) for which they are responsible. The Veterinary Services wants to be sure that the VPPs are properly trained to carry out high-quality work and successfully eradicate PPR following the key elements of the Global Control and Eradication Strategy, namely outreach and extension, epidemiologic surveillance, including interviews and sero-surveillance, disease investigation, and vaccination.

Job description

The following tasks are determined for a VPP to be employed in this programme:

- PPR extension and awareness
- Epidemiological and serological surveillance
- Disease investigation and sampling
- PPR vaccination

Curriculum to deliver required competencies for this job

(Note that Units shaded in blue represent practical training)

Course	Units	Competencies
Anatomy and Physiology	Anatomy and Physiology	1.1, 1.2
	Anatomy and Physiology Practicum	1.3
Animal Diseases	Infectious Diseases of National Importance	1.2
Animal Examination, Diagnostic and Therapeutic Techniques	Animal Handling and Restraint Practicum	1.3, 3.2, 6.1, 6.2, 6.3, 7.1, 7.2, 9.1, 9.2, 9.3, 10.1b, 14.1, 14.2, 14.3
	Specimen Quality Practicum	
	Clinical Examination Practicum	
	Diagnostic and Therapeutic Techniques Practicum I	
Animal Production Systems	Husbandry	1.1, 1.2, 7.1, 7.2
	Production and Breeding Systems Management	1.1, 1.2, 8.1, 8.2
	Animal Production Practicum	1.3, 3.1, 3.2, 7.1
Animal Welfare and Ethology	Animal Welfare	1.1, 7.1, 7.2
	Animal Welfare Practicum	1.3, 6.4

Course	Units	Competencies
Communication	Principles of Communication	4.1
	Extension Communication	4.1, 14.3
	Practical Applications in Communication	4.2, 5.2
Field Biosafety and Biosecurity	Principles of Biosafety and Biosecurity	3.1, 3.2, 3.3
	Field Biosafety and Biosecurity Practicum	3.1, 3.2, 3.3, 6.2
Immunology	Principles of Immunology	1.2, 1.3, 10.1b, 10.2b, 14.1, 14.3, 16.1, 16.2, 16.3
	Vaccinology	
	Serology	
Information Management	Record Keeping and Data Collection Practicum	9.2, 12.1, 12.2, 13.1, 13.2
Pharmacology and Toxicology	Principles of Pharmacology	15.1, 15.3
	Applied Pharmacology	15.2, 15.3
Principles of Disease Control	Principles and Policies of Disease Control Programmes	6.2, 6.4, 9.1, 9.2, 9.3, 14.1, 14.2 14.3, 15.1, 15.2, 15.3
	Specific Disease Control Programmes (PPR)	
	Applied Epidemiology	
	Applied Epidemiology Practicum	14.3
Professional Jurisprudence and Ethics	Jurisprudence	5.1, 5.2, 5.3
	Ethics	

Animal Health Track

Scenario 2:
VPPs authorised to provide both clinical services to livestock owners and government regulatory services in a designated area

Under the rules of the Veterinary Statutory Body in Country B, veterinary paraprofessionals can be registered to provide clinical services to farmers and regulatory services on behalf of the government within a specific geographical area. In order for a VPP to be registered to carry out these specific activities, the Veterinary Statutory Body requires demonstration of specific competencies acquired through formal training at an accredited training institution.

Job description

The VPP, so registered, should be able to perform the following tasks:

- Routine veterinary extension services
- Veterinary clinical services (e.g. reproduction related activities, basic treatments)
- Regulatory services (e.g. surveillance, reporting)

Curriculum to deliver required competencies for this job

(Note that Units shaded in blue represent practical training)

	Phase 1		Phase 2	
Course	**Units**	**Competencies**	**Units**	**Competencies**
Anatomy and Physiology	Anatomy and Physiology	1.1, 1.2		
	Anatomy and Physiology Practicum	1.3, 9.1		
Animal Diseases	Zoonoses and Emerging Diseases	1.1, 1.2, 3.1, 3.2, 3.3	Infectious Diseases of National Importance	1.2, 4.1, 4.2, 9.1, 9.2, 9.3, 14.1, 14.4, 16.3
			Non-infectious Diseases of National Importance	1.2, 4.1, 4.2, 9.1, 9.2, 9.3, 16.1, 16.2
Animal Examination, Diagnostic and Therapeutic Techniques	Animal Handling and Restraint	1.3, 3.2, 6.1, 6.2, 7.1, 7.2, 9.1	Clinical Examination Practicum	1.2, 3.2, 3.3, 7.1, 7.2
			Diagnostic and Therapeutic Techniques Practicum I	1.2, 1.3, 3.2, 3.3, 7.1, 7.2
			Diagnostic and Therapeutic Techniques Practicum II	9.1, 9.2, 9.3, 14.2
Animal Production Systems	Husbandry	1.1, 1.2, 7.1, 7.2	Nutrition and Pasture Management	1.1, 3.1, 4.1, 6.1, 6.4, 8.2
	Production and Breeding Systems Management	1.1, 1.2, 8.1, 8.2	Nutrition and Pasture Management Practicum	1.1
	Animal Production Practicum	1.3, 3.1, 3.2, 6.1, 6.2, 6.3, 6.4, 7.1	Agricultural Economics	4.1, 8.1, 8.2
Animal Welfare and Ethology	Animal Welfare	1.1, 7.1, 7.2		
	Animal Welfare Practicum	1.3, 6.4		

	Phase 1		Phase 2	
Course	**Units**	**Competencies**	**Units**	**Competencies**
Communication	Principles of communication	4.1, 4.2		
	Extension Communication	4.2, 14.3		
	Practical Applications in Communication	4.2, 5.2		
Field Biosafety and Biosecurity			Principles of Biosafety and Biosecurity	3.1, 3.2
			Farm Biosafety and Biosecurity Practicum	3.1, 3.2, 3.3, 6.2, 9.3
			Field Biosecurity Practicum	4.2, 6.2, 6.4, 9.3
Immunology			Principles of Immunology	1.1, 14.1, 14.3
			Vaccinology	1.1, 1.2, 3.1, 3.2, 4.1, 5.2, 6.1, 6.2, 7.1, 14.1, 14.3, 15.1, 15.3
			Serology	1.1, 1.2, 1.3, 6.1, 9.1, 10.1b, 10.2b, 14.1, 14.3
Information Technology Applications			Record Keeping and Data Collection Practicum	9.2, 12.1, 12.2, 13.1, 13.2
			Data Management Practicum	4.2, 5.2, 9.2, 13.7
Microbiology	Principles of Microbiology	1.2		2.1, 2.2, 2.3, 3.1, 3.2, 9.1, 9.3, 10.1a, 10.1b, 10.2a, 10.2b
Pharmacology and Toxicology	Principles of Pharmacology	15.1, 15.2, 15.3		
	Applied Pharmacology Practicum	15.2, 15.3, 15.4	Principles of Toxicology	1.3, 3.1, 3.2, 9.1, 14.1, 14.2, 14.3
			Toxicology Practicum	1.3, 15.2, 15.4
Professional Jurisprudence and Ethics			Jurisprudence	5.1, 5.2
			Ethics	5.3
Parasitology	Internal and External Parasites	1.2, 14.1		
	Internal and External Parasites Practicum	9.1, 9.2, 9.3, 10.1b		
Pathology			Principles of Pathology	1.2, 9.1
			Necropsy and Gross Pathology Practicum	3.2, 6.1, 6.2, 9.1, 9.2, 9.3 14.1
Primary Animal Health Care Techniques	Primary Animal Health Care Techniques Practicum	1.3, 3.1, 3.2, 3.3, 6.1, 6.2, 6.3, 6.4, 7.2, 7.1, 14.1, 14.2		
Principles of Disease Control			Principles and Policies of Disease Control Programmes	14.1, 14.2, 14.3, 14.4
			Specific Disease Control Programmes	14.1, 14.2, 14.3, 14.4
			Applied Epidemiology	14.2
			Applied Epidemiology Practicum	14.3

ANNEX 2

Veterinary Public Health Track Job Scenarios

Scenario 1:
VPPs to work in a meat quality assessment programme

The government of Country C has established that a programme for the assessment of meat quality as well as a framework for improved monitoring of abattoirs, community slaughter slabs, and retail outlets of raw meat be established. There are areas of the country where there are few or no veterinarians to carry out this programme, and therefore the government has decided that VPPs will be able to contribute to this objective. The government has decided to recruit veterinary public health paraprofessionals to enter the programme. A government-employed veterinary epidemiologist will design a sampling strategy and VPPs will be expected to collect samples, gather data, and administer a questionnaire among abattoirs, community slaughter slabs, and retail outlets of raw meat in Country C. The government wants to be sure that the VPPs are properly trained to carry out high-quality work and successfully implement the programme and framework as envisioned.

Job description

The following tasks are determined for a VPP to be employed in this programme:

- Organisation of workflow
- Communication with stakeholders
- Meat inspection
- Data collection and recording
- Sample collection

Curriculum to deliver required competencies for this job

(Note that Units shaded in blue represent practical training)

Course	Unit	Competencies
Animal Diseases	Zoonotic Diseases	1.2
	Infectious Diseases of National Importance	
	Non-infectious Diseases of National Importance	
Animal Examination and Diagnostic and Therapeutic Techniques	Animal Handling and Restraint Practicum	1.2
	Clinical Examination Practicum	1.2
	Specimen and Sample Quality Practicum	3.1, 6.1, 6.2, 9.1, 9.3
Animal Production Systems	Production and Breeding Systems Management (Herd Health)	1.2
Communication	Principles of Communication	4.1
	Practical Applications of Communication Practicum	4.2
Field Biosafety and Biosecurity	Principles of Field Biosafety and Biosecurity	3.1, 12.1, 12.2
	Food Chain Biosecurity	
	Food Chain Biosecurity Practicum	3.1
Food Hygiene	Principles of Food Hygiene	16.1
	Quality and Risk Management	3.3
	Food Hygiene Practicum	6.1, 16.2, 16.3, 16.4, 16.5
Information Technology Applications	Record Keeping and Data Collection Practicum	9.2, 13.1, 13.2
	Data Management Practicum	9.2, 13.1, 13.2
Professional Jurisprudence and Ethics	Jurisprudence	5.1
	Ethics	5.3
Veterinary Public Health	Principles of Veterinary Public Health	1.2

Veterinary Public Health Track

Scenario 2:
VPPs to work in a porcine cysticercosis control programme

There have been increased reported incidents of neurocysticercosis in humans. The government of Country D has decided to monitor practices in the pork sector to help prevent outbreaks. The government has requested that VPPs working in veterinary public health should work with veterinarians to implement a control programme in the affected communities to assess if porcine cysticercosis incidence has also increased in the region. Specifically, VPPs will help with an awareness campaign for consumers, farming system improvement, slaughterhouse inspection, and reporting.

Job description

The following tasks are determined for a VPP to be employed in this programme:

- Assessment of risk areas/situations
- Communicate with stakeholders (i.e. affected community)
- Animal identification before slaughter
- Post-mortem inspection
- Sample collection
- Data collection and recording
- Data reporting to veterinarian for disease control programme

Curriculum to deliver required competencies for this job

(Note that Units shaded in blue represent practical training)

	Phase 1		Phase 2	
Course	**Units**	**Competencies**	**Units**	**Competencies**
Animal Diseases	Zoonoses	1.2	Non-infectious Diseases of National Importance	1.2
	Infectious Diseases of National Importance	1.2		
Animal Examination and Diagnostic Therapeutic Techniques	Animal Handling and Restraint Practicum	1.2, 7.1		
	Clinical Examination Practicum	1.2, 14.1		
	Specimen and Sample Quality Practicum	1.2, 3.1, 3.2, 6.2, 9.1, 9.3		
	Diagnostic Techniques Practicum	1.2, 14.1		
Animal Production Systems	Production and Breeding Systems Management	8.1, 8.2	Agricultural Economics	8.1, 8.2
Animal Welfare and Ethology			Ethology	7.1, 7.2, 14.1
			Animal Welfare	7.1, 7.2, 14.1
			Animal Welfare Practicum	7.2, 16.4
Communication	Principles of Communication	1.2, 4.1, 14.3, 16.3	Extension Communication	4.1, 4.2
	Practical Applications in Communication Practicum	1.2, 4.1, 14.3, 16.3		
Field Biosafety and Biosecurity	Principles of Farm Biosafety and Biosecurity	3.1, 3.2, 3.3, 12.1, 12.2	Food Chain Biosecurity Practicum	3.1, 3.2, 16.2
	Food Chain Biosecurity	3.1, 3.2, 3.3, 12.1, 12.2	Food Biosafety and Biosecurity Practicum	16.2
Food Hygiene	Principles of Food Hygiene	6.1, 16.1, 16.2, 16.3	Quality and Risk Management	6.1, 16.1, 16.2, 16.3
	Food Hygiene Practicum	16.3		
	Ante-mortem and Post-mortem Inspection Practicum	16.4		
Information Technology Applications	Record Keeping and Data Collection Practicum	6.2, 9.2, 13.1, 13.2, 14.3, 16.3	Data Management Practicum	6.2, 9.2, 13.1, 13.2, 14.3, 16.3
Parasitology	Internal and External Parasites	1.2		
Principles of Disease Control	Principles of Disease Control Programmes	1.2, 14.1, 14.2	Applied Epidemiology	1.2, 14.1, 14.2
	Sampling Methodologies	1.2, 14.1, 14.2	Applied Epidemiology Practicum	1.2
			Specific Disease Control Programmes and Policies (Cysticercosis)	1.2, 14.1, 14.2
Professional Jurisprudence and Ethics			Jurisprudence	5.1, 5.2, 5.3
			Ethics	5.1, 5.2, 5.3
Veterinary Public Health	One Health/Community-based Practice	14.1, 14.4	Waste Management and Environmental Sciences	14.1, 14.4

ANNEX 3

Laboratory Diagnosis Track Job Scenarios

Scenario 1:
VPPs to work in the district or provincial laboratories to support the efforts of a National PPR Control and Eradication Campaign

The government of Country E has evaluated workforce needs in its national veterinary laboratory network and recognises the need for entry-level laboratory VPPs, in the context of the OIE/FAO Global PPR Eradication Programme. The government has decided that particular competencies at entry level are required to develop capabilities at the provincial and district levels of the veterinary laboratory network, in order to assist with ramped-up activities in the field that will generate increased sample flow and work for the laboratories at those levels. The government wants to be sure that the laboratory VPPs are properly trained to carry out high-quality work and successfully implement the programme as envisioned.

Job description

The following tasks are determined for an entry-level Laboratory VPP:

- Perform laboratory testing according to Standard Operating Procedures, including pre- and post-analytic phases
- Understand the principles of biosafety, biosecurity, and OHS and use appropriate PPE
- Autoclave and sterilise glassware, instruments and waste
- Clean and maintain work area and all laboratory equipment and supplies
- Prepare samples for testing using various types of laboratory equipment
- Prepare and maintain accurate and reliable laboratory records and interpret results

Curriculum to deliver required competencies for this job

(Note that Units shaded in blue represent practical training)

Courses	Units	Competencies
Animal Diseases	Infectious Diseases of National Importance	1.2, 14.3
Animal Examination and Diagnostic and Therapeutic Techniques	Specimen and Sample Quality Practicum	9.1, 10.1a
Communication	Practical Applications in Communications Practicum	4.1, 4.2
Immunology	Principles of Immunology	2.1
	Serology	2.1
Information Technology Applications	Record Keeping and Data Collection Practicum	13.2
Laboratory Biosafety and Biosecurity	Laboratory Biosafety and Biosecurity	3.1
	Laboratory Biosafety and Biosecurity Practicum	3.2
Laboratory Diagnostic Techniques	Diagnostic Techniques	2.2, 9.2
	Diagnostic Techniques Practicum	10.1a, 10.2a
Laboratory Quality Management	Principles of Quality Management	6.1, 13.1
	Quality Management Practicum	6.2, 6.3, 6.4, 11.2, 12.1
Microbiology	Principles of Microbiology	2.1
	Virology	2.1
Pathology	Principles of Pathology	2.2
	Necropsy and Gross Pathology Practicum	2.3
Professional Jurisprudence and Ethics	Jurisprudence	5.1, 5.2

Laboratory Diagnosis Track

Scenario 2:
Laboratory VPPs to support enhanced disease surveillance and diagnostic capacity in screening programme for brucellosis

There has been an increase in the reported instances of abortions in dairy cattle in Country F. The government is also concerned about a rise in the number of villagers in two communities demonstrating antibodies to *Brucella abortus* in a recent health study.

In a preliminary epidemiological investigation, conducted by the Department of Livestock, 8/100 cattle in the same communities have tested positive serologically to *Brucella abortus*. Due to the growing dairy sector in Country F, and the recent import of vaccinated cattle from several other countries, the government would like to establish a country wide screening programme for brucellosis. To assess the extent of the problem and to develop a disease control plan, the government recognises that the laboratory capability and competencies required to support this work will need to be expanded significantly.

Job description

The following tasks are determined for a mid-level Laboratory VPP:

- Perform laboratory testing according to Standard Operating Procedures, including pre- and post-analytic phases
- Contribute to a safe and secure environment for customers, visitors and co-workers by following established standards and procedures; complying with legal regulations
- Oversee and monitor quality management and biosafety systems
- Keep equipment operating by following operating instructions; troubleshooting breakdowns; maintaining supplies; performing preventive maintenance; calling for repairs
- Understand, troubleshoot, and recognise non-conforming work and select corrective steps
- Keep laboratory supplies ready by inventorying stock; placing orders; verifying receipt
- Use databases and paper means to keep, retrieve, and analyse records and prepare reports
- Participate in national disease control programmes

Curriculum to deliver required competencies for this job

(Note that Units shaded in blue represent practical training)

	Phase 1		Phase 2	
Course	**Units**	**Competencies**	**Units**	**Competencies**
Animal Diseases			Zoonoses and Emerging Diseases	14.3, 14.4
			Infectious Diseases of National Importance	14.3, 14.4
Animal Examination and Diagnostic and Therapeutic Techniques	Specimen Quality Practicum	9.1, 9.2, 9.3		
			Animal Handling and Restraint Practicum	7.1, 7.2

	Phase 1		Phase 2	
Course	**Units**	**Competencies**	**Units**	**Competencies**
Clinical Pathology	Clinical Chemistry	2.1		
Communication	Principles of Communication	4.1		
	Practical Applications in Communications Practicum	4.2		
Diagnostic Techniques			Laboratory Diagnostic Techniques	2.2, 2.3
			Laboratory Diagnostic Techniques Practicum – Intermediate and Advanced*	10.1a, 10.2a
Food Hygiene			Principles of Food Hygiene	2.4, 16.1
Immunology	Principles of Immunology	2.1		
	Serology	2.1		
			Vaccinology	2.1
Information Technology Applications	Record Keeping and Data Collection Practicum	13.1, 13.2		
			Data Management Practicum	13.2
Laboratory Biosafety and Biosecurity	Laboratory Biosafety and Biosecurity	3.1		
	Laboratory Biosafety and Biosecurity Practicum	3.1		
Laboratory Quality Management	Principles of Quality Management	6.1, 11.1		
			Surge Capacity and Outbreaks	6.1, 11.1, 13.1
			Laboratory Quality Management Practicum	6.2, 6.3, 6.4, 11.2, 12.1, 12.2, 13.2
Microbiology	Principles of Microbiology	2.1		
	Bacteriology and Mycology	2.1		
			Bacteriology and Mycology Practicum	10.1a, 10.2a
Pathology	Principles of Pathology	2.2, 2.3		
			Pathology Practicum	10.1a
Professional Jurisprudence and Ethics	Jurisprudence	5.1, 5.2		
	Ethics	5.3		

* Some Units occur in more than one course and these are noted with an asterisk

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