

Laboratory Leadership Competency Framework



Food and Agriculture
Organization of the
United Nations



World Health
Organization



Laboratory Leadership Competency Framework

Laboratory leadership competency framework

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Introduction

Background

Laboratories are an essential and fundamental part of health systems and play a critical role in the detection, diagnosis, treatment and control of diseases (1, 2). However, reliable laboratory services continue to be limited in many low- and middle-income countries (3). Although there have been examples of effective laboratory responses to outbreaks (4-6), a well-documented number of such events, including some at the convergence of human, animal, and environmental health, have shown how a lack of robust laboratory systems can impede disease control and prevention efforts. Recent examples include outbreaks of: Ebola viral disease, human H5N1 (avian) influenza, Zika viral disease, bovine spongiform encephalopathy (BSE) and foot and mouth disease (FMD) (7-9). Likewise, the control and management of endemic diseases such as human immunodeficiency virus (HIV) disease, malaria, cholera and brucellosis, as well as infections caused by antimicrobial-resistant pathogens, are also hampered by a lack of adequate laboratory services (10). These circumstances highlight the importance of building sustainable national health laboratory systems that are a component of overall health systems (11). This would require a long-term commitment and laboratory leaders who are able to manage laboratories in complex environments and build strong collaborative networks at every level of the health system in order to attain optimal human, animal and environmental health (12).

It is recognized that, in order to lead efforts in the development and direction of capable laboratory systems, laboratory leaders require meaningful education and training in leadership and management skills (13), and that most of them have not had sufficient specific training in these areas

(World Health Organization, unpublished report on the Laboratory leadership and management training programme meeting, Lyon, France, 12–13 May 2011). The lack of adequate leadership and management training is particularly acute in low- and middle-income countries. To effectively address this gap, a comprehensive, competency-based learning programme, applicable on a global scale, is needed to provide the foundation for training programmes for laboratory leadership and management.

Towards this end, six leading organizations have partnered to develop the Global Laboratory Leadership Programme (GLLP) targeting professionals working in human and animal health laboratories, as well as laboratories with public health functions (for example, environmental, agricultural, food, chemical and aquatic laboratories). The partners include:

- Association of Public Health Laboratories (APHL)
- Centers for Disease Control and Prevention (CDC)
- European Centre for Disease Prevention and Control (ECDC)
- Food and Agriculture Organization of the United Nations (FAO)
- World Organisation for Animal Health (OIE)
- World Health Organization (WHO).

In order to create the GLLP, the partners committed to the development of the Laboratory Leadership Competency Framework (subsequently referred to as the Framework), which provides a foundation for the GLLP.

Framework development

This Framework was developed through a consensus process involving subject matter experts from the aforementioned GLLP partners. In October 2017 the partners established the GLLP Competency Framework Development Workgroup. Based on consultation and literature review (14, 15), including the report on the above-cited 2011 meeting, the partners agreed upon nine leadership competencies

In the first stage, the Workgroup designed the structure of the Framework, developed descriptions of each competency and defined competency domains, subdomains, and areas of activity. The action verbs¹ that describe the areas of activity are observable and measurable and were developed based on the Structure of the Observed Learning Outcome (SOLO) (17) and Bloom's (18) taxonomies. Some modifications of the definitions of the verbs were incorporated to represent learned outcomes specifically related to leadership. Performance activities are associated with levels of proficiency and are presented at three levels: developing, skilled, and expert.

Framework scope

The purpose of the Framework is to outline the essential competencies needed by laboratory leaders to build and direct sustainable national laboratory systems for disease detection, control and prevention in health systems. This Framework takes a multisectoral One Health approach (12) addressing the entire "National health laboratory system", defined in the context of the Framework as network(s) that includes human, animal, environmental, agricultural, food, aquatic and chemical laboratories in support of health systems. Accordingly, this Framework provides a strong orientation to the One Health approach, recognizing that improving coordination between human, animal and environmental health sectors has reciprocal benefits and will lead to stronger health systems. This Framework is designed to build bridges, enhance communication, and

foster collaboration as well as understanding of existing synergies within the human, animal and environmental health sectors.

Intended use of the Framework

Multisectoral laboratory workforce development is essential and the use of shared standards of competency across disciplines and organizations can facilitate communication, cooperation and career growth. The Framework can be used by national authorities from all sectors and disciplines, including policy-makers, regulatory agencies and educational institutions, as well as other stakeholders such as donors, nongovernmental organizations (NGOs) and private sector organizations. The Framework can be used for:

- *workforce development*: as a standardized reference for laboratory workforce development applicable across human, animal, environmental, and other relevant health sectors;
- *programme development*: as a foundation for laboratory leadership learning programmes;
- *specific job descriptions*: as guidance in writing standardized job descriptions;
- *needs assessment*: as guidance in developing a tool for self-assessment, observer assessment or a combination of both to identify individual or group needs and guide staff development planning;
- *self-assessment*: as guidance for individuals in assessing their current level of knowledge, skills and abilities, identifying areas in need of improvement, and planning for achieving higher levels of proficiency.

The Framework may facilitate the development of other leadership learning programmes, and each competency is designed in a way that allows complementary learning opportunities for those who need to develop a particular competency. It also allows flexibility in learning programmes and may be adapted to meet country-specific needs.

¹Adapted from Merriam-Webster dictionary (16).

While the document can be used as highlighted above, the partners of the GLLP have also committed to the development of the Learning Package, including guidance on programme development, planning, implementation and evaluation. Within the context of that initiative, and when implemented as a whole programme for the training of laboratory leaders, the Framework is intended to be used as a tool in mentoring current and emerging laboratory leaders engaged in the process of building, strengthening and sustaining national laboratory systems. Activity areas in each competency of the Framework reinforce each other and completion of the GLLP in its entirety will require participants to complete, or demonstrate proficiency in, all nine competencies. The Learning Package, with its attendant course materials and guidance, is currently under development.

Framework structure

The Framework consists of nine competencies.

1. Laboratory system
2. Leadership
3. Management
4. Communication
5. Quality management system
6. Biosafety and biosecurity
7. Disease surveillance and outbreak investigation
8. Emergency preparedness, response and recovery
9. Research

The following key considerations were taken into account during the development of the Framework.

1. Terms used are defined in the glossary and definitions incorporate the One Health approach embraced by the Framework.
2. Competencies may be applied at the laboratory system or facility level, as appropriate.
3. Duplication of activity areas across competencies is intentional, to facilitate flexible use of the framework and to acknowledge that some areas of activity, such as designing organograms or organizational structures, have both leadership and management components. Areas of duplication are indicated with parenthetical cross references.

Framework design

Each competency is structured as follows.

Competency: A combination of the knowledge, skills and abilities that are critical to perform a task effectively (for example, “3. Management”).

Competency domain: A discrete component of a competency (for example, “3.2 Resource management”).

Subdomain: A subcomponent of a domain (for example, “3.2a. Budgeting and financial management”).

Area: Competency domains and subdomains are broken down further into areas of activity (for example, “3.2.1 Laboratory budget”, “3.2.2. Financial auditing process”, “3.2.3 Financial resource utilization”).

Performance activities: Activities that allow for evaluation of individual performance at three levels of proficiency.

Performance activities are designed in levels according to proficiency, as described below.

Levels of Proficiency

Developing: The individual has advanced knowledge of the principles, concepts and/or methodologies related to the competency as attained through education or training (e.g. coursework, on-the-job orientation, mentorship, etc.) and is able to perform a range of assignments under supervision, or during mentorship and/or coaching.

Skilled: The individual analyses and independently applies principles, concepts and/or methodologies related to the competency as attained through education or training and successful experience in a variety of complex assignments.

Expert: The individual has mastered the principles, concepts and/or methodologies related to the competency and has demonstrated significant success in performing the most demanding assignments requiring the competency. Applies innovations in the competency to problem-solving and task completion and is able to synthesize, critique or teach the competency and is able to provide coaching and mentoring.

For each performance activity, action verbs are standardized according to level of proficiency, as shown in Table 1.

Table 1. Action verbs^a by level of proficiency

Developing	Skilled	Expert
<p>Define: to determine or identify the essential qualities or meaning of</p> <p>Describe: to represent or give an account of in words (or represent by figure, model or picture)</p> <p>Identify: to establish the identity of</p> <p>Outline: to indicate the principal features or different parts of</p> <p>List: to make a simple series of words or numerals</p>	<p>Explain: 1) to give the reason for or cause of; 2) to show the logical development or relationships of</p> <p>Analyze: to study or determine the nature and relationship of the parts</p> <p>Apply: to put to use, especially for practical purposes</p> <p>Demonstrate: 1) to prove or make clear by reasoning or evidence; 2) to illustrate and explain, especially with many examples</p> <p>Implement: to give practical effect to and ensure of actual fulfilment by concrete measures</p>	<p>Create: 1) to produce or bring about by a course of action; 2) to produce through skill; 3) to make or bring into existence something new</p> <p>Design: 1) to conceive and plan out in the mind; 2) to draw plans for</p> <p>Develop: to set forth or make clear by degrees or in detail</p> <p>Evaluate: to determine the significance, worth or condition of, usually by careful appraisal and study</p> <p>Perform:^b to carry out an action</p> <p>Prioritize: to list or rate in order of priority</p>

^aAdapted from Merriam-Webster dictionary (16).

^bMay be used at more than one level of proficiency, depending on context.

Framework Outline

Competencies, competency domains and subdomains

Competency 1. Laboratory System	
Domain 1.1	Policy and legal framework
Domain 1.2	Information Systems
Domain 1.3	Infrastructure
Domain 1.4	Workforce

Competency 2. Leadership	
Domain 2.1	Strategic planning
Domain 2.2	Organizational leadership
Domain 2.3	Critical thinking, problem-solving and decision-making
Domain 2.4	Partnerships and coalition building
Domain 2.5	Ethics and integrity

Competency 3. Management	
Domain 3.1	Laboratory Management
Domain 3.2	Resource Management
	Subdomain 3.2a Budgeting and financial management
	Subdomain 3.2b People management

Competency 4. Communication	
Domain 4.1	General communication skills
Domain 4.2	Proposal writing
Domain 4.3	Communication with media
Domain 4.4	Risk communication
Domain 4.5	Scientific communication

Competency 5. Quality Management System	
Domain 5.1	Process management
	Subdomain 5.1a Sample management
	Subdomain 5.1b Process control
Domain 5.2	Document and record management
Domain 5.3	Equipment and consumables
Domain 5.4	Purchasing and inventory
Domain 5.5	Nonconforming events management
Domain 5.6	Assessments
	Subdomain 5.6a Audits
	Subdomain 5.6b External Quality Assessment
	Subdomain 5.6c Norms and accreditation
Domain 5.7	Continual improvement
Domain 5.8	Customer focus

Competency 6. Biosafety and Biosecurity	
Domain 6.1	Biosafety
Domain 6.2	Biosecurity
Domain 6.3	Shipment of dangerous goods including nonbiological goods

Competency 7. Disease Surveillance and Outbreak Investigation	
Domain 7.1	Surveillance
Domain 7.2	Outbreak investigation

Competency 8. Emergency Preparedness, Response and Recovery	
Domain 8.1	Preparedness
Domain 8.2	Response
Domain 8.3	Recovery

Competency 9. Research	
Domain 9.1	Health research
Domain 9.2	Innovation and development

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Competency Framework

Competency 1. Laboratory System

Knowledge, skills, and abilities needed to develop, maintain and strengthen a complete and functional national health laboratory system capable of producing high quality results using efficient and effective procedures, administration and policies throughout all levels of the health system.*

*A national health laboratory system is defined as networks that include human, animal, environmental, agricultural, food, aquatic and chemical laboratories in support of health systems.

Domain 1.1 Policy and legal framework

1.1.1 Organizational structure (see also 1.4.1, 2.1.2)

Performance activities	
Developing	Outline the organization of the national/regional/multinational/international networks of laboratories.
Skilled	Explain the organization of the national/regional/multinational/international networks of laboratories.
Expert	Evaluate the organization of the national/regional/multinational/international networks of laboratories.

1.1.2 Human-animal-environmental interface

Performance activities	
Developing	Identify the sectors and disciplines working within the human-animal-environmental interface.
Skilled	Explain the various roles of the sectors and disciplines working within the human-animal-environmental interface.
Expert	Evaluate collaboration among the various sectors and disciplines working within the human-animal-environmental interface.

1.1.3 National policies (see also 5.1.5, 5.3.1, 9.1.3)

Performance activities	
Developing	List existing national policies that impact laboratory practice.
Skilled	Explain the cause and effect of the existing national policies that impact laboratory practice.
Expert	Design national policies that maximally support laboratory practice through a consultative process.

1.1.4 Legal framework

Performance activities	
Developing	Identify the legal framework that governs laboratory systems operations.
Skilled	Explain the legal framework that governs laboratory systems operations.
Expert	Evaluate the legal framework that governs laboratory systems operations.

Domain 1.2 Information systems

1.2.1 Documentation control (see also 5.2, 5.5.2)

Performance activities	
Developing	Define laboratory documentation and records systems.
Skilled	Analyse laboratory documentation and records systems.
Expert	Design and evaluate standard laboratory documentation and records systems and ensure compatibility with the national health information system.

1.2.2 Laboratory information management system (LIMS) (see also 1.2.6)

Performance activities	
Developing	Describe the components of a LIMS.
Skilled	Analyse the LIMS.
Expert	Evaluate an improved LIMS.

1.2.3 Required information

Performance activities	
Developing	Identify the relevant information that supports laboratory systems.
Skilled	Apply the key elements of the relevant information in relation to laboratory operations.
Expert	Evaluate the relevant information based on laboratory system needs.

1.2.4 Information sharing (see also 2.4.5, 3.1.8 and Competency 4)

Performance activities	
Developing	Identify the processes for information sharing across relevant sectors and disciplines.
Skilled	Apply the processes for information sharing across relevant sectors and disciplines.
Expert	Evaluate appropriate processes for information sharing across relevant sectors and disciplines.

1.2.5 Information systems sustainability

Performance activities	
Developing	Describe the methods through which the financial and technical sustainability of the information system is assured.
Skilled	Analyse the methods through which the financial and technical sustainability of the information system is assured.
Expert	Evaluate the methods through which the financial and technical sustainability of the information system is assured.

1.2.6 Information technology (see also 1.2.2)

Performance activities	
Developing	Identify information technology needs and applicable policies.
Skilled	Explain information technology needs and applicable policies.
Expert	Evaluate information technology needs and applicable policies.

1.2.7 Data protection (see also 2.5.1)

Performance activities	
Developing	Describe the process whereby personal and sensitive data is captured and protected.
Skilled	Apply the data protection standards necessary to protect personal and sensitive data.
Expert	Design and implement standards for protection of personal and sensitive data, adhering to all applicable laws, rules and regulations.

Domain 1.3 Infrastructure

1.3.1 Laboratory design (see also 3.1.5)

Performance activities	
Developing	Define basic laboratory design and maintenance requirements.
Skilled	Apply the process for designing and maintaining a laboratory.
Expert	Evaluate laboratory design and maintenance requirements to address changing needs.

1.3.2 Engineering systems (see also 3.1.3)

Performance activities	
Developing	Identify the guidelines needed for engineering design, creation and use.
Skilled	Apply guidelines for engineering design, creation and use.
Expert	Evaluate the application of guidelines related to engineering design, creation and use.

1.3.3 Equipment and consumables inventory (see also 5.4)

Performance activities	
Developing	Outline a plan for the inventory of laboratory equipment and supplies.
Skilled	Implement a plan for the inventory of laboratory equipment and supplies with regard to specific laboratory operational needs.
Expert	Design and evaluate a plan to establish and maintain an inventory of laboratory equipment and supplies.

1.3.4 Preventive maintenance (see also 5.3.6)

Performance activities	
Developing	Describe the essential components of a preventive maintenance programme for equipment.
Skilled	Analyse the effectiveness of a preventive maintenance programme for equipment.
Expert	Develop and/or evaluate the preventive maintenance programme for equipment.

1.3.5 Waste management (see also 6.1.9)

Performance activities	
Developing	Identify the essential components of a waste management system.
Skilled	Analyse the design and function of a waste management system.
Expert	Develop and/or evaluate the waste management system.

1.3.6 Nonbiological risks

Performance activities	
Developing	Identify nonbiological risks.
Skilled	Implement appropriate responses in case of exposure to nonbiological substances.
Expert	Design and evaluate the system in place to respond to nonbiological substances exposure.

1.3.7 Contract management

Performance activities	
Developing	Outline the basic requirements for the development of contracts.
Skilled	Apply local or national guidelines that impact contracts.
Expert	Evaluate and design contracts that adhere to local or national requirements.

Domain 1.4 Workforce

1.4.1 Strategies and policies (see also 1.1.3, 7.2.1, 8.2.3)

Performance activities	
Developing	Identify the key strategies and policies that support the laboratory workforce plan.
Skilled	Implement strategies and policies within the national health laboratory system that support the laboratory workforce plan.
Expert	Evaluate the efficacy of the current health laboratory workforce plan, including strategies and policies.

1.4.2 Alignment of laboratory workforce with current and future needs (see also 3.2.6, 8.1.5)

Performance activities	
Developing	Describe laboratory talent management policies, i.e. education and training, recruitment, deployment and retention.
Skilled	Implement a plan to optimize laboratory talent management policies.
Expert	Evaluate talent management policies within the national health laboratory system.

1.4.3 Laboratory technical and management capacities (see also 3.2.7)

Performance activities	
Developing	Identify the key components of a plan to strengthen the laboratory technical and management capacities (policies, processes, workforce development, etc.).
Skilled	Implement the key components of a plan to strengthen the laboratory technical and management capacities (policies, processes, workforce development, etc.).
Expert	Evaluate the key components of a plan to strengthen the laboratory technical and management capacities (policies, processes, workforce development, etc.).

Competency 2. Leadership

Knowledge, skills and abilities essential for motivating and inspiring a group of people to take action towards achieving a common goal. This includes strategic approaches to improve and sustain the success of the laboratory or laboratory systems by positively influencing people to attain desired outcomes.

Domain 2.1 Strategic planning

2.1.1 Strategic thinking

Performance activities	
Developing	Define strategic thinking processes.
Skilled	Apply strategic thinking processes.
Expert	At regular intervals evaluate strategic planning processes and their implementation.

2.1.2 Strategic plan development and implementation (see also 1.1.1)

Performance activities	
Developing	Describe the development and implementation processes for the national laboratory strategic plan.
Skilled	Apply creative and strategic thinking to develop and implement the national laboratory strategic plan.
Expert	Evaluate the national laboratory strategic plan and prioritize implementation at all levels of the laboratory system.

2.1.3 Strategic plan monitoring and evaluation

Performance activities	
Developing	Describe the process for monitoring and evaluating the national laboratory strategic plan.
Skilled	Apply the monitoring and evaluation process to the national laboratory strategic plan.
Expert	Evaluate the national laboratory strategic plan based on monitoring and evaluation findings, identify opportunities for making changes to the plan and justify conclusions.

Domain 2.2 Organizational leadership

2.2.1 Laboratory organogram (see also 1.1.1, 3.2.6)

Performance activities	
Developing	Describe the laboratory organogram.
Skilled	Analyse the strengths and weaknesses of the laboratory organogram.
Expert	Design or evaluate and redesign the laboratory organogram for maximum efficiency and effectiveness.

2.2.2 Management and leadership styles

Performance activities	
Developing	Identify the process for organizing staff according to their management and leadership styles and strengths.
Skilled	Apply the process for organizing staff members according to their management and leadership strengths to promote successful outcomes.
Expert	Design or evaluate and redesign the staff development plan.

2.2.3 Motivational and empowering approach (see also 3.2.8)

Performance activities	
Developing	Describe motivational theory.
Skilled	Apply motivational and empowering principles, providing staff with clear direction, delegating work appropriately and showing confidence in staff.
Expert	At all levels of the organization, prioritize development of a sense of ownership of and responsibility for desired outcomes on the part of staff, motivating them towards achieving objectives.

2.2.4 Change management

Performance activities	
Developing	Describe new ideas, methods of working and approaches.
Skilled	Apply new methods of working and approaches, proposing solutions to improve work processes.
Expert	Prioritize the management of changing conditions to address ongoing challenges.

Domain 2.3 Critical thinking, problem-solving and decision-making

2.3.1 Critical thinking

Performance activities	
Developing	Outline principles of critical thinking.
Skilled	Implement critical thinking principles.
Expert	Evaluate the benefits of critical thinking for successful problem-solving and decision-making.

2.3.2 Problem-solving

Performance activities	
Developing	Define a problem and explain problem-solving.
Skilled	Apply established problem-solving processes.
Expert	Evaluate the benefits of problem-solving processes.

2.3.3 Decision-making

Performance activities	
Developing	Describe the steps in decision-making.
Skilled	Apply established decision-making processes.
Expert	Prioritize decision-making processes as part of the organizational culture, avoiding decision-making traps.

Domain 2.4 Partnerships and coalition building

2.4.1 Laboratory collaboration with internal and external partners and stakeholders (see also 8.1.6)

Performance activities	
Developing	Identify the laboratory's internal and external partners and stakeholders and describe mechanisms for collaboration with them.
Skilled	Demonstrate how to develop collaborations between the laboratory and internal and external partners and stakeholders.
Expert	Evaluate collaborations with the laboratory's internal and external partners and stakeholders.

2.4.2 Role of laboratory in national health system (see also 1.1.1)

Performance activities	
Developing	Outline how the laboratory functions within the national health system.
Skilled	Explain how the laboratory functions within the national health system.
Expert	Evaluate how the laboratory functions within the national health system.

2.4.3 Multidisciplinary and multisectoral collaboration

Performance activities	
Developing	Define the role of different agencies/partners involved in multidisciplinary and multisectoral laboratory collaborations.
Skilled	Demonstrate how to organize the different agencies involved in multidisciplinary and multisectoral collaborations for routine activities.
Expert	Evaluate the roles of different agencies involved in multidisciplinary and multisectoral collaborations for both routine and new activities.

2.4.4 Community partnerships

Performance activities	
Developing	Identify community partners that support epidemiological and laboratory-based investigations and surveillance.
Skilled	Demonstrate how to foster collaboration with community partners to support epidemiological and laboratory-based investigations and surveillance.
Expert	Evaluate, prioritize and create community partnerships in support of epidemiological and laboratory-based investigations and surveillance.

2.4.5 Information-sharing (see also 1.2.4)

Performance activities	
Developing	Identify procedures used for information-sharing.
Skilled	Implement procedures used for information-sharing.
Expert	Evaluate procedures used for information-sharing.

2.4.6 Advocating for the laboratory (see also 4.2)

Performance activities	
Developing	Describe the principles of advocacy, the resources of existing advocacy campaigns, and the strengths of existing advocacy campaigns and materials.
Skilled	Apply principles of advocacy in the promotion of the laboratory.
Expert	Evaluate the effectiveness of advocacy campaigns and materials used in the promotion of the laboratory.

Domain 2.5 Ethics and integrity

2.5.1 Legal framework (see also 1.2.7)

Performance activities	
Developing	Describe laws relevant to data collection, management, dissemination and use, and to personal data protection.
Skilled	Apply laws relevant to data collection, management, dissemination and use, and to personal data protection.
Expert	Create an environment where adherence to all laws pertaining to data collection, management, dissemination and use and personal data protection are part of the culture.

2.5.2 Ethical principles (see also 9.1.2)

Performance activities	
Developing	List ethical principles relevant to human-animal-environment relationships.
Skilled	Apply ethical principles relevant to human-animal-environment relationships.
Expert	Develop an environment that follows ethical principles relevant to human-animal-environment relationships.

2.5.3 Professional code of conduct

Performance activities	
Developing	Describe the professional code of conduct and conduct oneself in accordance with it.
Skilled	Implement a professional code of conduct and conduct oneself in accordance with it.
Expert	Design policies that demonstrate the organizational expectations for adhering to a professional code of conduct and conducting oneself in accordance with it.

2.5.4 Conflicts of interest

Performance activities	
Developing	Identify potential conflicts of interest in the laboratory.
Skilled	Demonstrate ethical responses to conflicts of interest in the laboratory.
Expert	Evaluate and respond ethically to any personal or staff conflicts of interest.

Competency 3. Management

Knowledge, skills and abilities to effectively and efficiently achieve high-quality laboratory results using available resources. May include operational management together with long-range strategic management within the laboratory.

Domain 3.1 Laboratory management

3.1.1 Laboratory core functions (see also 1.1)

Performance activities	
Developing	Define laboratory core functions.
Skilled	Implement laboratory core functions.
Expert	Evaluate how national laboratory policies and plans are reflected in laboratory core functions.

3.1.2 Laboratory programme functions and directives (see also 8.1.1)

Performance activities	
Developing	Outline laboratory programmes/services and their functions and directives.
Skilled	Implement laboratory programmes/services and their functions and directives.
Expert	Design and evaluate laboratory programmes/services and their functions based on the laboratory mandate.

3.1.3 Implementation planning (see also 1.3.3)

Performance activities	
Developing	Outline an implementation plan for a new laboratory programme/service.
Skilled	Implement a plan for a new laboratory programme/service.
Expert	Evaluate laboratory services and programme implementation plans.

3.1.4 Management roles and responsibilities (see also 3.2.6)

Performance activities	
Developing	Describe management roles and responsibilities at all organizational levels.
Skilled	Demonstrate management roles and responsibilities.
Expert	Evaluate management roles and responsibilities to optimize performance.

3.1.5 Laboratory operations and workflow (see also 1.3.1)

Performance activities	
Developing	Outline the components of laboratory operations and their relationships to workflow.
Skilled	Apply the appropriate components of laboratory operations to workflow.
Expert	Evaluate the components of laboratory operations related to workflow.

3.1.6 Laboratory monitoring, evaluation and auditing (see also 5.6a)

Performance activities	
Developing	Describe the standards and good practices required for laboratory quality monitoring, evaluation and auditing.
Skilled	Apply the standards and good practices required for laboratory quality monitoring, evaluation and auditing.
Expert	Evaluate the standards and good practices required for laboratory quality monitoring, evaluation and auditing.

3.1.7 Disease surveillance and outbreak investigation (see also 7.2)

Performance activities	
Developing	Outline the laboratory role in surveillance, outbreak investigation and response to rare or emerging diseases.
Skilled	Demonstrate the performance of the laboratory in its role in surveillance, outbreak investigation and response to rare or emerging diseases.
Expert	Evaluate the laboratory's performance in its role in surveillance, outbreak investigation and response to rare or emerging diseases.

3.1.8 Utilization of laboratory data (see also 1.2.4, 2.4.5)

Performance activities	
Developing	Describe how laboratory data is used for decision- and policy-making.
Skilled	Demonstrate how laboratory data is used for decision- and policy-making.
Expert	Evaluate the suitability and relevance of laboratory data used for decision- and policy-making.

3.1.9 Emergency laboratory response (see also 8.2)

Performance activities	
Developing	Identify management functions associated with emergency laboratory response.
Skilled	Demonstrate management functions associated with emergency laboratory response.
Expert	Evaluate management functions associated with emergency laboratory response.

3.1.10 Customer focus (see also 5.8.1)

Performance activities	
Developing	Describe how laboratory services meet the needs of various types of customers.
Skilled	Analyse how laboratory services meet the needs of various types of customers.
Expert	Evaluate laboratory services provided in the context of customer needs.

Domain 3.2 Resource management (see also 8.1.5)

Subdomain 3.2a Budgeting and financial management

3.2.1 Laboratory budget

Performance activities	
Developing	Identify the components of a budget.
Skilled	Analyse the components of a budget.
Expert	Develop a budget.

3.2.2 Cost analysis

Performance activities	
Developing	Describe the purpose of a cost analysis.
Skilled	Demonstrate how to conduct a cost analysis.
Expert	Evaluate the results of a cost analysis.

3.2.3 Financial resource utilization

Performance activities	
Developing	Identify how financial resources align with laboratory operations.
Skilled	Analyse financial resources in support of ongoing laboratory functions as well as emerging challenges.
Expert	Evaluate the use of financial resources, ensuring that timelines are met and laboratory goals are achieved.

3.2.4 Financial auditing processes

Performance activities	
Developing	Outline financial auditing processes.
Skilled	Apply financial auditing processes.
Expert	Evaluate financial auditing processes.

3.2.5 Financial sustainability

Performance activities	
Developing	Outline the foundation for financial sustainability for the laboratory.
Skilled	Demonstrate where opportunities exist to financially support the laboratory.
Expert	Design a financial sustainability model for the laboratory.

Subdomain 3.2.b People management

3.2.6 Organizational structure (see also 1.4.2, 2.2.1, 3.1.4)

Performance activities	
Developing	Outline the existing organizational structure.
Skilled	Analyse the existing organizational structure.
Expert	Design and evaluate an organizational structure including a functional chart with clear assignment of responsibility.

3.2.7 Team management (see also 1.4.3)

Performance activities	
Developing	Outline the stages of team development.
Skilled	Demonstrate effective team management considering the stages of team development.
Expert	Evaluate team development to ensure that desired results are achieved.

3.2.8 Staff motivation (see also 2.2.3)

Performance activities	
Developing	Describe motivational theory.
Skilled	Apply motivational theory and practice.
Expert	Evaluate staff motivation and apply motivational theory to maximize staff performance.

3.2.9 Conflict management

Performance activities	
Developing	Describe the strategies needed to minimize and manage workplace conflict.
Skilled	Apply strategies to minimize and manage workplace conflict.
Expert	Create an environment in which occasions for conflict are minimized.

3.2.10 Stress management

Performance activities	
Developing	List the elements of stress management.
Skilled	Apply the elements of stress management.
Expert	Create a work environment that minimizes stress.

3.2.11 Staff development (see also 1.4.1)

Performance activities	
Developing	Outline staff development process.
Skilled	Apply staff development processes.
Expert	Evaluate staff development processes to ensure inclusion of all appropriate processes.

3.2.12 Staff retention

Performance activities	
Developing	Describe staff retention strategies.
Skilled	Implement staff retention strategies.
Expert	Prioritize strategies for staff retention, e.g. workload review, financial rewards and flexible work schedules.

Competency 4. Communication

Knowledge, skills, and abilities necessary to communicate laboratory and laboratory system-related information across scientific disciplines in a clear and concise manner adjusted to the type of audience.

Domain 4.1 General communication skills

4.1.1 Oral communication (see also 1.2.4, 9.1.5)

Performance activities	
Developing	Describe effective oral communication skills.
Skilled	Demonstrate effective oral communication skills.
Expert	Develop pathways for subordinates to strengthen oral communication skills.

4.1.2 Written communication

Performance activities	
Developing	Describe principles of effective written communication.
Skilled	Apply principles of effective written communication.
Expert	Evaluate training in principles of effective written communication.

Domain 4.2 Proposal writing (see also 2.4.6)

4.2.1 Identifying funders

Performance activities	
Developing	Identify potential funders of one's organization.
Skilled	Implement strategies to attract potential new funders.
Expert	Evaluate strategies used for attracting funders and identify elements of success.

4.2.2 Proposal components

Performance activities	
Developing	Identify the main components of a successful proposal.
Skilled	Apply the components of a successful proposal.
Expert	Evaluate the composition of a proposal.

4.2.3 Writing process

Performance activities	
Developing	Describe the key steps and elements of the proposal writing process.
Skilled	Apply the keys steps of the proposal writing process.
Expert	Develop and/or evaluate a proposal.

4.2.4 Peer-review process (see also 9.1.4)

Performance activities	
Developing	Outline the principal components of a peer-review process.
Skilled	Implement the peer-review process.
Expert	Evaluate the peer-review process.

Domain 4.3 Communication with media (see also 8.2.7)

4.3.1 Media relations policies and strategies

Performance activities	
Developing	Describe media relations policies and strategies.
Skilled	Implement media relations policies and strategies.
Expert	Evaluate media relations policies and strategies.

4.3.2 Media communication strategies

Performance activities	
Developing	Describe effective verbal and written media communication strategies.
Skilled	Implement effective verbal and written media communication strategies.
Expert	Evaluate verbal and written media communication strategies.

Domain 4.4 Risk communication

4.4.1 Communicating risk

Performance activities	
Developing	Describe principles of risk communication.
Skilled	Apply principles of risk communication during emergency and non-emergency situations.
Expert	Design a risk communication plan for use during emergency and non-emergency situations.

4.4.2 Key messages for high-risk topics

Performance activities	
Developing	Describe methods of delivery for key messages on complicated high-risk topics.
Skilled	Demonstrate the delivery of key messages on complicated high-risk topics.
Expert	Design a plan for how to deliver key messages on complicated high-risk topics.

4.4.3 Empathetic messaging

Performance activities	
Developing	Describe the principles of empathetic messaging.
Skilled	Apply the principles of empathetic messaging for high-risk situations and emergencies.
Expert	Design empathetic messages for high-risk situations and emergencies.

Domain 4.5 Scientific communication

4.5.1 Communicating scientific information (see also 9.1.5)

Performance activities	
Developing	Describe principles of effective scientific communication.
Skilled	Apply principles of effective scientific communication.
Expert	Perform effective communication of scientific information to varied audiences.

4.5.2 Scientific reports/papers

Performance activities	
Developing	Outline the essential elements of a scientific report/paper.
Skilled	Demonstrate scientific report/paper preparation.
Expert	Develop and/or evaluate a scientific report/paper.

Competency 5. Quality Management System

Knowledge, skills and abilities required to implement and sustain a national quality management system and a culture of quality in laboratory operations.

Domain 5.1 Process management

Subdomain 5.1a Sample management

5.1.1 Sample collection, handling, and transport practices

Performance activities	
Developing	Outline the policies, processes and procedures pertaining to sample collection, handling and transport.
Skilled	Apply the policies, processes and procedures pertaining to sample collection, handling and transport.
Expert	Evaluate policies, processes and procedures pertaining to sample collection, handling and transport.

5.1.2 Sample accessioning and processing

Performance activities	
Developing	Describe sample accessioning and processing.
Skilled	Implement sample accessioning and processing.
Expert	Evaluate sample accessioning and processing.

5.1.3 Sample referral, storage, retention and disposal policies

Performance activities	
Developing	Describe sample referral, storage, retention, chain of custody and disposal policies.
Skilled	Implement sample referral, storage retention, chain of custody and disposal policies.
Expert	Design sample referral, storage, retention, chain of custody and disposal policies.

5.1.4 Biobanking/repository

Performance activities	
Developing	Outline biobanking/repository policies, processes and procedures.
Skilled	Implement biobanking/repository policies, processes and procedures.
Expert	Create biobanking/repository policies, processes and procedures.

Subdomain 5.1b Process Control

5.1.5 Quality control policies, processes and procedures (see also 1.1.3)

Performance activities	
Developing	Describe quality control policies, processes and procedures.
Skilled	Apply quality control policies, processes and procedures.
Expert	Evaluate quality control policies, processes and procedures.

5.1.6 Monitoring tools for process control

Performance activities	
Developing	Describe tools for monitoring processes to ensure high quality.
Skilled	Apply tools for monitoring processes to ensure high quality.
Expert	Evaluate tools for monitoring processes to ensure high quality.

Domain 5.2 Document and record management

5.2.1 Document management (see also 1.2.1)

Performance activities	
Developing	Describe a document management system.
Skilled	Apply a document management system.
Expert	Evaluate the document management system.

5.2.2 Record management

Performance activities	
Developing	Describe a record management system.
Skilled	Apply a record management system.
Expert	Evaluate the record management system.

Domain 5.3 Equipment and consumables

5.3.1 Selection and acquisition (see also 1.1.3)

Performance activities	
Developing	Describe policies, processes and procedures for equipment selection and acquisition.
Skilled	Apply policies, processes and procedures for equipment selection and acquisition.
Expert	Evaluate policies, processes and procedures for equipment selection and acquisition.

5.3.2 Equipment policy and planning

Performance activities	
Developing	Identify the minimum equipment package needed for each tier of laboratory services.
Skilled	Explain the minimum equipment package needed for each tier of laboratory services as related to its testing algorithms.
Expert	Prioritize laboratory equipment distribution and use in testing.

5.3.3 Consumables planning

Performance activities	
Developing	Describe consumables planning.
Skilled	Apply supply chain plans.
Expert	Evaluate supply chain plans.

5.3.4 Equipment verification and validation plan

Performance activities	
Developing	Outline plan for equipment verification and validation.
Skilled	Implement the equipment verification and validation plan.
Expert	Develop the equipment verification and validation plan.

5.3.5 Calibration

Performance activities	
Developing	Describe equipment calibration.
Skilled	Analyse equipment calibration results.
Expert	Evaluate instrument and equipment calibration policies, processes and procedures.

5.3.6 Preventive maintenance (see also 1.3.4)

Performance activities	
Developing	Describe the policies, processes and procedures for preventive maintenance, service, troubleshooting and repair.
Skilled	Apply the policies, processes and procedures for preventive maintenance, service, troubleshooting and repair.
Expert	Design and evaluate processes for preventive equipment maintenance, service, troubleshooting and repair.

5.3.7 Decommissioning

Performance activities	
Developing	Outline policies, processes and procedures for equipment decommissioning.
Skilled	Apply policies, processes and procedures for equipment decommissioning.
Expert	Evaluate policies, processes and procedures for equipment decommissioning.

Domain 5.4 Purchasing and inventory (see also 1.3.3)

5.4.1 Procurement

Performance activities	
Developing	Outline the procurement system.
Skilled	Implement the procurement system.
Expert	Design a procurement system and/or evaluate the efficiency and effectiveness of a procurement system.

5.4.2 Inventory management

Performance activities	
Developing	Outline the inventory management system.
Skilled	Implement the inventory management system.
Expert	Design an inventory management system and/or evaluate the efficiency and effectiveness of an inventory management system.

Domain 5.5 Nonconforming events management

5.5.1 Managing nonconforming events

Performance activities	
Developing	Define nonconforming events.
Skilled	Analyse nonconforming events.
Expert	Evaluate policies, procedures and processes to respond to nonconforming events.

5.5.2 Documentation (see also 1.2.1, 5.2)

Performance activities	
Developing	Describe documentation used to record nonconforming events.
Skilled	Analyse documentation used to record nonconforming events.
Expert	Evaluate documentation used to record nonconforming events.

5.5.3 Root-cause analysis

Performance activities	
Developing	Describe a root-cause analysis.
Skilled	Analyse the results of a root-cause analysis.
Expert	Evaluate the results of a root-cause analysis.

Domain 5.6 Assessments (see also 3.1.6)

Subdomain 5.6a Audits

5.6.1 Quality indicators

Performance activities	
Developing	Define quality indicators.
Skilled	Apply quality indicators.
Expert	Evaluate quality indicators.

5.6.2 Internal audits

Performance activities	
Developing	Outline the internal audit process.
Skilled	Implement internal audit processes.
Expert	Evaluate outcomes of internal audits.

Subdomain 5.6b External Quality Assessment (EQA)

5.6.3 EQA concepts

Performance activities	
Developing	Outline EQA concepts.
Skilled	Apply EQA concepts.
Expert	Evaluate application of EQA concepts.

5.6.4 EQA programme planning and implementation

Performance activities	
Developing	Describe the elements of an EQA programme.
Skilled	Implement an EQA programme.
Expert	Design and/or evaluate an EQA programme for a national health laboratory system.

5.6.5 EQA results analysis

Performance activities	
Developing	Describe EQA results.
Skilled	Analyse EQA results and take action.
Expert	Evaluate the impact of EQA results.

Subdomain 5.6c Norms and accreditation

5.6.6 Norms and standards

Performance activities	
Developing	Define laboratory norms and standards.
Skilled	Apply laboratory norms and standards.
Expert	Evaluate use of laboratory norms and standards.

5.6.7 Laboratory registration, licensure, certification and accreditation

Performance activities	
Developing	Define laboratory registration, licensure, certification and accreditation.
Skilled	Explain laboratory registration, licensure, certification and accreditation processes.
Expert	Evaluate laboratory registration, licensure, certification and accreditation processes and plan for development of national health laboratory system quality standards.

5.6.8 Development of national standards

Performance activities	
Developing	Describe processes to develop national standards.
Skilled	Apply processes to develop national standards.
Expert	Evaluate national standards.

Domain 5.7 Continual improvement

5.7.1 Continual quality improvement (CQI) strategies

Performance activities	
Developing	Define CQI strategies for continual process improvement.
Skilled	Implement CQI strategies for continual process improvement.
Expert	Design and evaluate CQI strategies for continual process improvement.

5.7.2 CQI tools and activities

Performance activities	
Developing	Identify CQI tools and activities.
Skilled	Apply CQI tools and implement processes for continual improvement.
Expert	Evaluate tools and processes for continual improvement.

5.7.3 Corrective action

Performance activities	
Developing	Describe corrective action processes and procedures.
Skilled	Apply corrective action processes and procedures.
Expert	Evaluate corrective action processes and procedures.

5.7.4 Preventive action

Performance activities	
Developing	Describe preventive action processes and procedures.
Skilled	Apply preventive action processes and procedures.
Expert	Evaluate preventive action processes and procedures.

Domain 5.8 Customer focus

5.8.1 Customer needs, expectations and requirements (see also 3.1.10)

Performance activities	
Developing	Describe policies, processes and procedures to address customer needs, expectations and requirements.
Skilled	Apply policies, processes and procedures to address customer needs, expectations and requirements.
Expert	Develop policies, processes and procedures to address customer needs, expectations and requirements.

5.8.2 Feedback and satisfaction tools and data

Performance activities	
Developing	List feedback tools for internal and external customers.
Skilled	Apply feedback tools and analyse data from internal and external customer feedback.
Expert	Evaluate feedback tools and satisfaction data from internal and external customers.

Competency 6. Biosafety and Biosecurity

Knowledge, skills and abilities required to ensure the laboratory system is operating in a way that optimally minimizes the risks related to biohazards generated both externally and internally.

Domain 6.1 Biosafety

6.1.1 Biosafety principles

Performance activities	
Developing	Outline laboratory biosafety principles.
Skilled	Implement principles of laboratory biosafety.
Expert	Evaluate principles of laboratory biosafety.

6.1.2 National biosafety rules and regulations and international guidance

Performance activities	
Developing	Outline national biosafety rules and regulations and international guidance.
Skilled	Implement national biosafety rules and regulations and international guidance.
Expert	Evaluate compliance with national biosafety rules and regulations and international guidance applicable to local context.

6.1.3 Biosafety policies and procedures

Performance activities	
Developing	Identify laboratory biosafety policies and procedures.
Skilled	Apply laboratory biosafety policies and procedures.
Expert	Evaluate laboratory biosafety policies and procedures.

6.1.4 Biosafety programme management and manual

Performance activities	
Developing	Describe the structure of a comprehensive laboratory biosafety programme and the essential elements of a biosafety manual.
Skilled	Implement a biosafety programme that includes a biosafety manual.
Expert	Design strategic and implementation plans for the establishment of a laboratory biosafety programme, including development of a biosafety manual.

6.1.5 Biosafety risk assessment

Performance activities	
Developing	Outline the steps involved in a biosafety risk assessment.
Skilled	Implement a biosafety risk assessment to reduce risk.
Expert	Evaluate biosafety risk assessment tools and apply relevant tools to a local context.

6.1.6 Biological risk mitigation

Performance activities	
Developing	Describe common laboratory biosafety control measures and procedures.
Skilled	Apply biosafety control measures and procedures.
Expert	Evaluate risk mitigation measures for their suitability in addressing identified risks.

6.1.7 Biosafety training

Performance activities	
Developing	Describe the essential elements of staff biosafety training.
Skilled	Implement staff biosafety training.
Expert	Develop a framework for staff biosafety training.

6.1.8 Biosafety incident management

Performance activities	
Developing	Outline the components of a biosafety incident reporting and management system.
Skilled	Apply biosafety incident management.
Expert	Develop policies and procedures for biosafety incident response and reporting.

6.1.9 Waste management (see also 1.3.5)

Performance activities	
Developing	Describe the different types of waste management and decontamination procedures.
Skilled	Implement waste management and decontamination procedures.
Expert	Evaluate waste management practices to ensure compliance with policies, rules and regulations.

Domain 6.2 Biosecurity

6.2.1 Biosecurity principles

Performance activities	
Developing	Outline biosecurity principles.
Skilled	Implement biosecurity principles.
Expert	Evaluate biosecurity principles.

6.2.2 National biosecurity rules and regulations and international guidance

Performance activities	
Developing	Identify national biosecurity rules and regulations and international guidance.
Skilled	Implement national biosecurity rules and regulations and international guidance.
Expert	Evaluate compliance with national biosecurity rules and regulations and international guidance.

6.2.3 Biosecurity policies and procedures

Performance activities	
Developing	Identify biosecurity policies and procedures.
Skilled	Apply biosecurity policies and demonstrate biosecurity procedures.
Expert	Evaluate biosecurity policies and procedures.

6.2.4 Biosecurity programme management

Performance activities	
Developing	Describe the features of a good laboratory biosecurity programme.
Skilled	Implement a laboratory biosecurity programme.
Expert	Design strategic and implementation plans for the establishment of a laboratory biosecurity programme.

6.2.5 Biosecurity risk assessment

Performance activities	
Developing	Outline the steps involved in a biosecurity risk assessment.
Skilled	Apply biosecurity risk assessment to reduce risks.
Expert	Evaluate biosecurity risk assessment tools and apply relevant tools to the local context.

6.2.6 Biosecurity risk mitigation

Performance activities	
Developing	Describe common laboratory biosecurity control measures and procedures.
Skilled	Apply biosecurity control measures and procedures.
Expert	Evaluate biosecurity risk mitigation measures and procedures for their suitability to address locally identified risks.

6.2.7 Biosecurity training

Performance activities	
Developing	Describe the need for biosecurity training.
Skilled	Implement staff biosecurity training.
Expert	Design biosecurity training.

6.2.8 Biosecurity incident management

Performance activities	
Developing	Outline the components of a biosecurity incident reporting and management system.
Skilled	Implement biosecurity incident management.
Expert	Develop policies and procedures for biosecurity incident response and reporting.

6.2.9 Sensitive information and technology (see also 4.1)

Performance activities	
Developing	Describe processes and procedures for identifying, prioritizing and controlling sensitive information, agents and technology.
Skilled	Apply processes and procedures for identifying, prioritizing and controlling sensitive information, agents and technology.
Expert	Develop policies, processes and procedures for identifying, prioritizing and controlling sensitive information, agents and technology.

Domain 6.3 Shipment of dangerous goods including nonbiological goods

6.3.1 Regulations

Performance activities	
Developing	Outline various national and international regulations that may be applicable to the transport of dangerous goods within country and across national borders.
Skilled	Apply national and international regulations pertaining to the transport of dangerous goods within country and in regional contexts.
Expert	Evaluate compliance with national and internationally applicable regulations pertaining to the transport of dangerous goods.

6.3.2 Classification of dangerous goods

Performance activities	
Developing	Outline the different classes of dangerous goods and provide general examples for each class.
Skilled	Apply dangerous goods classifications to materials that may be found in, or are applicable to, laboratory operations.
Expert	Develop standard processes and procedures to address dangerous goods classification requirements in the local laboratory context.

6.3.3 Classification of infectious substances

Performance activities	
Developing	Outline the different biological substance categories and the classification of infectious substances.
Skilled	Apply categories and classification groups to potential infectious substances present in the local laboratory context.
Expert	Develop standard processes and procedures that address the use of infectious substance classification in the local laboratory context.

6.3.4 Packaging, labelling and documentation

Performance activities	
Developing	Describe basic elements of triple packaging for infectious substances and list the most common marks, labels and documents required.
Skilled	Explain how the packaging, marking, labelling and documentation of infectious substances contribute to safety and containment.
Expert	Design scenarios which illustrate the differences between the packaging, marking, labelling and documentation of different infectious substance classifications.

6.3.5 Transportation of dangerous goods

Performance activities	
Developing	List the most important topics to be included in a training programme on dangerous goods transportation.
Skilled	Analyse the content of various training options and/or programmes that impart knowledge about dangerous goods transportation.
Expert	Evaluate the effect of training on the competency and proficiency of shippers involved in the transportation of dangerous goods.

Competency 7. Disease Surveillance and Outbreak Investigation

Knowledge, skills, and abilities required for the ongoing routine management of a health surveillance system at both the laboratory system and individual laboratory levels, including outbreak response.

Domain 7.1 Surveillance (see also 3.1.7)

7.1.1 Development and sustainability of laboratory support for surveillance systems

Performance activities	
Developing	Identify the laboratory sample collection methods and data necessary for health surveillance.
Skilled	Apply methods of laboratory sample and data collection necessary for health surveillance.
Expert	Prioritize laboratory sample collection methods and data necessary for health surveillance.

7.1.2 Integrated surveillance

Performance activities	
Developing	Define integrated surveillance approaches.
Skilled	Implement integrated surveillance approaches.
Expert	Develop an integrated surveillance system.

7.1.3 Laboratory-based surveillance

Performance activities	
Developing	Describe laboratory-based surveillance.
Skilled	Apply the principles of a laboratory-based surveillance system.
Expert	Evaluate a laboratory-based surveillance system.

7.1.4 Standardized testing algorithms for surveillance of priority diseases

Performance activities	
Developing	Outline the testing algorithms for priority diseases.
Skilled	Apply the testing algorithms for priority diseases.
Expert	Evaluate and create testing algorithms for priority diseases.

7.1.5 Surveillance data for disease detection and response

Performance activities	
Developing	Identify the surveillance data needed for disease detection and response.
Skilled	Analyse surveillance data for disease detection and response.
Expert	Evaluate surveillance data for disease detection and response.

Domain 7.2 Outbreak investigation

7.2.1 Mobilization and redirection of staff and resources (see also 1.4, 3.1.7)

Performance activities	
Developing	Identify where laboratory support is essential for outbreak response, including roles and responsibilities of laboratory personnel.
Skilled	Apply laboratory support as appropriate for outbreak investigation.
Expert	Prioritize activities and mobilize and redirect staff and resources to meet outbreak response needs.

7.2.2 Outbreak protocols and testing requirements

Performance activities	
Developing	Outline the process for timely sample testing and results reporting during an outbreak.
Skilled	Apply processes and procedures to ensure appropriate and timely sample testing and results reporting during an outbreak.
Expert	Prioritize and evaluate processes and procedures to ensure appropriate and timely sample testing and results reporting and prioritize testing as required.

7.2.3 Communication (see also 4.3, 4.4, 4.5)

Performance activities	
Developing	Outline a communication strategy for outbreak-related laboratory information to be shared with the outbreak team.
Skilled	Implement communication strategies for outbreak-related laboratory information to be shared with the outbreak team.
Expert	Design and carry out a communication strategy for outbreak-related laboratory information to be shared with the outbreak team and the public.

7.2.4 Participation in outbreak investigation team

Performance activities	
Developing	Identify ways that the laboratory can assist with an outbreak investigation.
Skilled	Implement laboratory activities contributing to an outbreak investigation.
Expert	Prioritize and evaluate the laboratory's contribution as a member of the outbreak investigation team.

7.2.5 Outbreak report (see also 4.2, 4.3)

Performance activities	
Developing	Identify laboratory data required for an outbreak report.
Skilled	Analyse laboratory data and write a preliminary outbreak report.
Expert	Evaluate laboratory response, write a final outbreak report and communicate results and recommendations.

Competency 8. Emergency Preparedness, Response and Recovery

Knowledge, skills and abilities needed to prepare for, respond to and recover from an emergency or other natural or human-caused adverse health event.

Domain 8.1 Preparedness

8.1.1 National emergency management system (see also 3.1.2)

Performance activities	
Developing	Describe the national emergency management system and the laboratory's role in it.
Skilled	Implement the national emergency management system in the laboratory.
Expert	Evaluate the laboratory's role in the national emergency management system.

8.1.2 All-hazard risk assessments

Performance activities	
Developing	Describe an all-hazard risk assessment.
Skilled	Implement an all-hazard risk assessment.
Expert	Evaluate the results of an all-hazard risk assessment to guide preparedness planning.

8.1.3 Mitigation

Performance activities	
Developing	Outline mitigation strategies as they apply to a laboratory in an emergency.
Skilled	Apply principles of mitigation planning in a laboratory.
Expert	Evaluate mitigation plans.

8.1.4 Laboratory priorities in emergencies

Performance activities	
Developing	Outline laboratory priorities in potential emergency situations.
Skilled	Implement laboratory priorities in potential emergency situations.
Expert	Prioritize laboratory activities in emergency situations.

8.1.5 Resource identification (see also 1.4.6, 3.2)

Performance activities	
Developing	Identify resources (personnel, equipment, financial etc.) needed for emergency response.
Skilled	Implement strategies and processes for obtaining resources during emergency situations.
Expert	Design, implement and monitor strategies and processes for mobilizing resources during emergency situations.

8.1.6 Partnership and collaboration building (see also 2.4.1)

Performance activities	
Developing	Identify partners for preparedness planning.
Skilled	Demonstrate collaboration with partners for preparedness planning.
Expert	Prioritize partnership building and collaboration in preparedness activities.

8.1.7 Emergency operations plan

Performance activities	
Developing	Outline a laboratory emergency operations plan.
Skilled	Implement a laboratory emergency operations plan.
Expert	Evaluate the laboratory emergency operations plan and ensure it is aligned with other partners' plans.

8.1.8 Exercises

Performance activities	
Developing	Identify partners for preparedness collaboration and conducting training, exercises and drills.
Skilled	Implement coordinated training, exercises and drills with partners.
Expert	Evaluate the impact of coordinated training, exercises and drills with partners.

8.1.9 Communication (see also Competency 4)

Performance activities	
Developing	Outline the information required for effective communication in emergency situations.
Skilled	Apply the communication strategy required for a coordinated emergency response.
Expert	Design and implement an emergency communication strategy.

Domain 8.2 Response

8.2.1 Situational assessment

Performance activities	
Developing	Describe the process for performing a situational assessment during an emergency.
Skilled	Analyse the results of a situational assessment during an emergency.
Expert	Evaluate the results of a situational assessment during an emergency.

8.2.2 Coordination of laboratory response

Performance activities	
Developing	Describe mechanisms for coordination of laboratory activities during an emergency response.
Skilled	Demonstrate coordination of laboratory activities during an emergency response.
Expert	Design a strategy for coordinating laboratory activities during an emergency response.

8.2.3 Mobilization of staff and resources (see also 1.4)

Performance activities	
Developing	Identify where laboratory support is essential for emergency response.
Skilled	Apply laboratory support as appropriate for emergency response.
Expert	Prioritize activities and mobilize and redirect laboratory staff and resources to meet emergency response needs.

8.2.4 Implementation of emergency operations plans, laboratory protocols and testing requirements

Performance activities	
Developing	Outline the components of a laboratory emergency response plan, including how it relates to laboratory protocols and testing requirements.
Skilled	Implement a laboratory emergency response plan, laboratory protocols and testing requirements.
Expert	Evaluate a laboratory emergency response plan.

8.2.5 Prioritization of health system laboratory activities during an emergency

Performance activities	
Developing	Identify laboratory priorities during an emergency.
Skilled	Apply laboratory priorities during an emergency.
Expert	Evaluate laboratory priorities during an emergency.

8.2.6 Active participation in incident management system

Performance activities	
Developing	Describe the laboratory's role in the incident management system.
Skilled	Implement the laboratory's role in the incident management system.
Expert	Evaluate the policy that describes the laboratory's role within the incident management system.

8.2.7 Communication with other responders, the public and media (see also 4.3, 4.4, and 4.5)

Performance activities	
Developing	Outline the components of effective communication during emergency situations.
Skilled	Demonstrate the communications required during a coordinated emergency response.
Expert	Design a strategy for communicating with emergency response partners, the public and the media.

Domain 8.3 Recovery

Note: During recovery from an adverse animal health event, laboratories will test to demonstrate freedom from disease prior to conducting activities listed in Domain 8.3. The activities and performance activities will be similar to those listed for Domain 8.2, but the purpose will be to prove freedom from disease and remove trade and travel barriers.

8.3.1 After-action review/report (AAR) and follow up

Performance activities	
Developing	Identify components of an AAR and describe follow-up processes.
Skilled	Analyse an AAR and explain the impact of identified gaps in laboratory systems.
Expert	Design an AAR and evaluate the response to the AAR and whether gaps were addressed.

8.3.2 Financial and staff resources (see also 3.2a)

Performance activities	
Developing	Identify financial and staff resources needed to facilitate laboratory's response and recovery.
Skilled	Analyse financial and staff resources needed to facilitate laboratory's response and recovery.
Expert	Evaluate financial resources and staff needed to facilitate laboratory's response and recovery.

8.3.3 Return to normal activities

Performance activities	
Developing	Outline needs for restoring laboratory infrastructure, function and systems after emergencies.
Skilled	Analyse needs for rebuilding and/or reopening of laboratory infrastructure, function and systems.
Expert	Develop a plan to re-establish routine laboratory infrastructure, function and systems after emergencies.

Competency 9. Research

Knowledge, skills and abilities needed to plan, conduct and analyse hypothesis-driven and other well-articulated investigations. These would address relevant health questions and would include innovative approaches and methods as well as testing and evaluation designed to advance health by correlating basic science with clinical, epidemiological and laboratory practice.

Domain 9.1 Health research

9.1.1 Health research

Performance activities	
Developing	Outline the stages of a health-oriented research project.
Skilled	Implement a health-oriented research project.
Expert	Evaluate a health-oriented research project.

9.1.2 Ethical principles in research (see also 2.5.2)

Performance activities	
Developing	Describe ethical principles regarding human, animal and environmental welfare when planning studies, conducting research and reporting results.
Skilled	Apply ethical principles regarding human, animal and environmental welfare when planning studies, conducting research, and writing reports.
Expert	Evaluate study design, conduct of research, and report writing while considering ethical principles regarding human, animal and environmental welfare.

9.1.3 Legal aspects of conducting research (see also 1.1.4)

Performance activities	
Developing	Identify laws and rules pertaining to the collection, management, dissemination and use of data.
Skilled	Apply laws and rules pertaining to the collection, management, dissemination and use of data.
Expert	Evaluate compliance with laws and rules pertaining to the collection, management, dissemination and use of data.

9.1.4 Research proposal review (see also 4.2.4)

Performance activities	
Developing	Define role of research proposal review committees and peer review.
Skilled	Implement peer review principles.
Expert	Perform as member of research proposal review committee and/or scientific editorial board.

9.1.5 Communicating research findings (see also 4.1, 4.5.1)

Performance activities	
Developing	Outline critical components of communication of research findings.
Skilled	Apply the process for communicating and acting on research findings.
Expert	Design the process for communicating and acting on research findings.

Domain 9.2 Innovation and development

9.2.1 Innovation in research

Performance activities	
Developing	Describe an environment conducive to innovation.
Skilled	Implement actions conducive to innovation in research and acquiring the necessary resources.
Expert	Create an environment conducive to innovation in research with mobilized resources.

9.2.2 Applying research results to benefit health

Performance activities	
Developing	Describe the process of translating research results into innovative applications benefitting health.
Skilled	Apply research results to innovative applications benefitting health.
Expert	Prioritize translation of research results into innovative applications benefitting health.

9.2.3 Health technology assessment of new diagnostic devices for decision-making and health interventions

Performance activities	
Developing	Describe methods for assessing diagnostic devices.
Skilled	Apply actions for assessing diagnostic devices.
Expert	Evaluate performance to integrate diagnostic devices into the laboratory-testing algorithm.

Glossary of Terms

In the context of the Framework, all definitions incorporate the concepts of the One Health approach and the intersection of human-animal-environment relationships.

Definitions were developed by the GLLP Competency Framework working group unless otherwise indicated with a reference.

Accreditation	Procedure by which an authoritative body gives formal recognition that an organization is competent to carry out specific tasks (19).
Adverse event	An imminent harm or danger that threatens the health of humans, animals or the environment. ¹
Advocacy	The act or process of supporting a cause or proposal. ²
Area	Competency domains and subdomains are broken down further into areas of activity. (Defined by its specific use in the Leadership Competency Framework.)
Audit	Systematic, independent and documented process for obtaining objective evidence and evaluating it objectively to determine the extent to which audit criteria are fulfilled (21).
Biosafety	The principles and practices for the prevention of unintentional exposure to biological materials, or their accidental release (22).
Biosecurity	The controls on biological materials within laboratories in order to prevent their loss, theft, misuse, unauthorised access, or intentional unauthorised release (22).
Certification	Procedure by which a third party gives written assurance that a product, process or service conforms to specific requirements (23).
Code of conduct, code of ethics, code of practice	Non-legislated guidelines, which one or more organizations and individuals voluntarily agree to abide by, that set out the standard of conduct or behavior with respect to a particular activity (24).
Communication	A process by which information is related between individuals and across disciplines in a clear and concise manner adjusted to the level and type of audience using a common system of symbols, signs, or behaviour. ²
Competency	A combination of knowledge, skills and abilities that are critical to performing a task effectively. (Defined by its specific use in the Leadership Competency Framework.)

¹Adapted from Enhancing early warning capabilities and capacities for food safety, training handbook (20).

²Adapted from Merriam-Webster dictionary (16).

Competency domain	Discrete components of a competency. (Defined by its specific use in the Leadership Competency Framework.)
Core functions	See “Laboratory core functions”.
Customer	Person or organization that could or does receive a product or service that is intended for or required by this person or organization (21).
Dangerous goods	Items or materials with inherently hazardous properties which, if adequate control measures are not applied, have the potential to cause harm to people, animals, infrastructure and/or the environment (25).
Developing	Advanced knowledge of the principles, concepts and/or methodologies related to the competency as attained through education or training (e.g. coursework, on-the-job orientation, mentorship, etc.). Individuals are able to perform a range of assignments under supervision, or during mentorship and/or coaching. (Defined by its specific use in the Leadership Competency Framework.)
Directive	Something that serves to direct, guide, and usually impel toward an action or goal, especially (government): an authoritative order or instrument issued by a high-level body or official. ¹
Disease surveillance	See “Surveillance”.
Emergency response	A cyclical process, involving repeated assessment, planning, action and review, to respond appropriately to needs and capacities as they evolve during an emergency (26).
Emergency preparedness	The knowledge and capacities and organizational systems developed by governments, response and recovery organizations, communities and individuals to effectively anticipate, respond to, and recover from the impacts of likely, imminent, emerging, or current emergencies (27).
Emergency Operations Plan	A written plan for who will do what, when, with what resources, and by what authority – before, during, and immediately after an emergency. ²
Ethics	The principles of conduct governing an individual or a group. ¹
Expert	An individual who has mastered the principles, concepts and/or methodologies related to the competency and has had significant success in performing the most demanding assignments requiring the competency. Within the context of the competency, able to apply innovations to problem-solving and task completion. Individuals are able to synthesize, critique or teach the competency and are able to provide coaching and mentoring. (Defined by its specific use in the Leadership Competency Framework.)

¹Adapted from Merriam-Webster dictionary (16).

²Adapted from Guide for all-hazard emergency operations planning (28).

External quality assessment	A system for objectively checking the laboratory's performance using an external agency or facility. ¹
Guidance	Non legally binding standards.
Health	(noun) A state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (30). (adjective) Of or relating to the well-being of humans, animals and the environment. ²
Health laboratories	Clinical, diagnostic, medical, public health, animal, environmental or any other laboratories performing testing for the purpose of disease diagnosis, screening, prevention, medical treatment decisions, surveillance or public health. ¹
Health security	The activities required, both proactive and reactive, to minimize vulnerability to acute health events that endanger the collective health of populations living across geographical regions and international boundaries. ³
Health system	All activities whose primary purpose is to promote, restore, and maintain human, animal and environmental health. ⁴
Infectious substances	Infectious substances are substances that are known to, or are reasonably expected to, contain pathogens. Pathogens are defined as microorganisms (including bacteria, viruses, rickettsiae, parasites, fungi) and other agents, such as prions, which can cause disease in humans or animals (33).
Integrated surveillance	Surveillance program that promotes the rational use of resources by integrating and streamlining common surveillance activities across disciplines. ⁵
Internal audit	An activity carried out by laboratory staff that verifies that laboratory operations adhere to the requirements of the management system, the customer, and/or regulatory agencies (14).
Laboratory core functions	Essential roles assumed by the laboratory that underlie the laboratory's ability to support health. ⁶
Laboratory information management system (LIMS)	System for the exchange of laboratory data. A LIMS may range in complexity from networked computers and servers with connectivity to automated testing equipment handling a large volume of specimens to a standalone computer serving a small laboratory that uses manual equipment. A LIMS may also be a paper-only system where everything is done manually, or a hybrid of manual and computer components (36).

¹Adapted from Laboratory quality management system handbook (29).

²Adapted from Merriam-Webster dictionary (16).

³Adapted from The world health report 2007 A safer future: global public health security in the 21st century (31).

⁴Adapted from Health systems strengthening glossary (32).

⁵Adapted from Technical guidelines for integrated disease surveillance and response in the African Region (34).

⁶Adapted from Core functions and capabilities of state public health laboratories (35).

Laboratory leader	Individual laboratory science subject matter expert responsible for managing finances, motivating staff, advocating for the laboratory, building relationships with external partners and navigating legislative processes.
Laboratory manager	Person who directs and manages the activities of a laboratory (19).
Laboratory network(s)	Laboratories with specific shared objectives at all levels of the health system organized to exchange information and establish, maintain and expand collaborative connections.
Laboratory system	See “National health laboratory system”.
Law	A binding custom or practice of a community; a rule of conduct or action prescribed or formally recognized as binding or enforced by a controlling authority; the whole body of such customs, practices, or rules. ¹
Leadership	Motivating and inspiring a group of people to act towards achieving a common goal.
Licensure	Granting of permission by a competent authority (usually a government agency) to an organization or individual to engage in a practice or activity; a legal confirmation that the laboratory can operate. ²
Management	A person or group of people with authority and responsibility for the conduct and control of an organization. Coordinated activities to direct and control an organization (21).
Multinational	Relating to, or involving, two or more nations. ¹
Multisectoral/ Multidisciplinary	Concerning or involving more than one sector or industry, economy, etc. Combining or involving several academic disciplines or professional specializations in an approach to a topic or problem. ³
National health laboratory system	Networks that include human, animal, environmental, agricultural, food, and chemical laboratories in support of health systems.
Nonconforming event	An occurrence that does not conform to the laboratory’s policies, processes, and/or procedures, does not conform with applicable regulatory or accreditation requirements, or has potential to affect (or has affected) patient, donor, or employee safety (38).

¹Adapted from Merriam-Webster dictionary (16).

²Adapted from Laboratory quality management system handbook (29).

³Adapted from Oxford living dictionary (37).

One Health Approach

An approach to address a health threat at the human-animal-environment interface based on collaboration, communication and coordination across all relevant sectors and disciplines, with the ultimate goal of achieving optimal health outcomes for both people and animals; a One Health approach is applicable at the subnational, national, regional, and global levels (39).

Outbreak

Occurrence of cases of disease in excess of what would normally be expected in a defined community, geographical area or season (40).

Outbreak investigation

Steps taken to identify, respond to and control a disease outbreak affecting humans, animals or the environment.

People management

The engagement and effective direction of people to obtain optimum efficiency in the use of their talents while engaging them in organizational strategy.

Performance activities

Descriptions of activities that allow for evaluation of individual performance at three levels of proficiency. (Defined by its specific use in the Leadership Competency Framework.)

Policy

A set of basic principles or guidelines to direct plans, actions and decisions of staff and an organization (14).

Priority diseases

Diseases that pose a health risk because of their epidemic potential and for which there are no, or insufficient, countermeasures (41).

Procedure

A specified way to carry out an activity of a process (21).

Processes

Set of interrelated or interacting activities that transform inputs into outputs (19).

Public health

Public health is the science of protecting and improving the health of people and their communities. This work is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases (42).

Public health laboratory

Laboratory working in collaboration with the public health system to provide clinical diagnostic testing, disease surveillance and advanced skills in laboratory practice (43).

Quality control

A set of activities or techniques whose purpose is to ensure that all quality requirements are being met. Simply put, it is examining “control” materials of known substances along with patient samples to monitor the accuracy and precision of the complete examination process.¹

¹Adapted from Laboratory quality management system handbook (29).

Quality management system

Coordinated activities to direct and control an organization with regard to quality.¹

Recovery

1) Decisions and actions taken after a disaster with a view to restoring or improving the pre-disaster living conditions of the stricken community, while encouraging and facilitating necessary adjustments to reduce disaster risk; 2) Longer-term effort to (a) reconstruct and restore a disaster-stricken area, e.g. through repairing or replacing homes, businesses, public works, and other structures; (b) deal with the disruption that a disaster has caused in community life and meet the recovery-related needs of victims; and (c) mitigate future hazards (44).

Regional

Serving an administrative area, division, or district; may be within a country or include more than one country.²

Registration

The act of entering a name into a specified register as a demonstration that an organization or individual meets certain criteria and has been accepted into membership to a given body, e.g. the Health Professions Council.

Regulations

Any standard that is mandated by a governmental agency or authoritative body.¹
See "Law"

Research

Investigation, experimentation or evaluation aimed at the discovery and interpretation of information, or the practical application of such information to the field of public health. Research may be categorized as applied, basic, clinical, systems and services, or translational.

- Applied - Solves problems rather than acquiring new knowledge. Such research might be used to improve a process.
- Basic - Tests a hypothesis or answers a scientific question. The motivation for such research is to acquire new knowledge.
- Clinical - Determines the safety or efficacy of medications, devices, diagnostic products/procedures and regimens. Often carried out for the prevention, treatment or diagnosis of a disease or condition.
- Systems and Services - Examines the organization, financing and delivery of public health services in communities, and assesses the impact of these services on public health.
- Translational - Translates the findings in basic research and applies them to meaningful health outcomes that broadly affect a population or community (45).

Response

Actions taken to put preparedness plans into action in order to save lives and prevent damage during an emergency event (46).

¹Adapted from Laboratory quality management system handbook (29).

²Adapted from Merriam-Webster dictionary (16).

Retention strategy

Policies and plans that organizations follow to reduce employee turnover and attrition and ensure employees are engaged and productive over the long term.¹

Risk

The likelihood of the occurrence and the likely magnitude of consequences of an adverse event or effect to animal, human, or environmental health.²

Risk assessment

Identifying potential failure modes, determining severity of consequences, identifying existing controls, determining probabilities of occurrence and detection, and evaluating risks to identify essential control points.³

Risk communication

The real-time exchange of information, advice and opinions between experts, officials and people who face a threat to their wellbeing, to enable informed decision-making and to adopt protective behaviours (49).

Rules

A prescribed guide for conduct or action.⁴
See “Regulations”.

Skilled

Able to independently analyse and apply principles, concepts and/or methodologies related to the competency as attained through education or training and successful experience in a variety of complex assignments. (Defined by its specific use in the Leadership Competency Framework.)

Stakeholder

Person or organization that can affect, be affected by, or perceive themselves to be affected by a decision or activity. (Note: A decision-maker can be a stakeholder.) (50).

Standard(s)

Document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context (51).

Strategic plan

An organization’s written plan for how it will operate and grow over a given period of time (usually 3 to 5 years) including the organization’s vision, mission and strategic goals and objectives.

Subdomain

A subcomponent of a domain. (Defined by its specific use in the Leadership Competency Framework.)

Surge capacity plan

Ability to obtain additional resources when needed during an emergency (52).

Surveillance

The continuous, systematic collection, analysis and interpretation of health-related data needed for the planning, implementation, and evaluation of public health practice (53).

¹Adapted from *HRZone: what is a retention strategy?* (47).

²Adapted from *Terrestrial animal health code glossary* (48).

³Adapted from *Laboratory quality management system handbook* (29).

⁴Adapted from *Merriam-Webster dictionary* (16).

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