

Guidance for One Health field epidemiology continuing education programmes

A supplemental manual to the *Competencies
for One Health field epidemiology (COHFE) framework*



Food and Agriculture
Organization of the
United Nations



World Health
Organization



World Organisation
for Animal Health
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Guidance for One Health field epidemiology continuing education programmes

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for One Health field epidemiology (COHFE) framework*

Guidance for One Health field epidemiology continuing education programmes: a supplemental manual to the *Competencies for One Health field epidemiology (COHFE) framework*

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Foreword

Infectious diseases are emerging at a rapid rate and pose a severe threat to health security, the global economy, and food safety. Novel infectious diseases have been increasingly reported in the past 50 years, including severe acute respiratory syndrome (SARS), Middle East respiratory syndrome (MERS), Ebola virus disease, avian influenza H5N1, pandemic influenza A (H1N1), Zika virus and COVID-19. As demonstrated by the COVID-19 pandemic, emerging infectious diseases can cause massive health and socio-economic impacts.

More than 60% of emerging infectious diseases are of animal origin.¹ Diseases emerge from a confluence of several drivers, including rapid population growth and urbanization, land-use change, encroachment on wild habitats, and changing global and local weather patterns. As the world population has grown from about 1.6 billion in the 1900s to 7.8 billion today, the demand for food and housing has increased concurrently. To meet this demand, we have resorted to intensive farming and clearing forests at the rate of 10 million hectares per annum. As a result, humans and domestic animals are coming into closer contact with wild animals, increasing the chances for spillover of pathogens from wildlife to domestic animals and humans. The risk is further exacerbated by climate change, antimicrobial resistance, and cross-border trade of livestock and wildlife.

The challenges to address emerging infectious diseases are multifactorial. The traditional siloed approach of working in isolation in the public health, animal health and environment sectors is not adequate to tackle them. Instead, we need a workforce that can function across all of these sectors using the One Health approach, defined recently as “an integrated, unifying approach that aims to sustainably balance and optimise the health of people, animals and ecosystems. It recognises the health of humans, domestic and wild animals, plants, and the wider environment (including ecosystems) are closely linked and interdependent.”²

The current field epidemiology workforce is not yet sufficiently prepared to work across the human-animal-environment interface. Field epidemiology training programmes (FETPs) are crucial for preparing the health workforce to prevent, detect and contain infectious diseases. Still, most programmes currently train either public health or animal health epidemiologists, with very few programmes working across both sectors and even fewer that include the environment sector or wildlife. It is only with this kind of collaboration and the ability of professionals in various sectors to work together that the emergence of new infections can be limited, preventing negative health outcomes and socio-economic disruptions.

The *Competencies for One Health field epidemiology (COHFE) framework* addresses the increasing and urgent need to strengthen collaboration among the public health, animal health and environment sectors to tackle health threats at the human-animal-environment interface. Developed jointly by the Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO) and the World Organisation for Animal Health (WOAH), the *COHFE framework* defines the core One Health, optional One Health, and sector-specific knowledge, skills, and competencies for field epidemiologists. The framework can be used by existing public health and veterinary field epidemiology training programmes to design and update their curriculum, or by countries or regions to set up new One Health field epidemiology training programmes. A specifically designed prioritization tool allows programmes to rank optional One Health and sector-specific knowledge, skills, and competencies and create a framework to suit their context and needs. The adoption of this framework will ensure that training participants are able to work across multiple sectors to tackle emerging infectious diseases and other evolving challenges and apply the necessary systems thinking of the One Health approach.

¹ Jones KE, Patel NG, Levy MA, Storeygard A, Balk D, Gittleman JL, Daszak P. Global trends in emerging infectious diseases. *Nature*. 2008 Feb 21;451(7181):990-3. doi: 10.1038/nature06536. PMID: 18288193; PMCID: PMC5960580.

² One Health High-Level Expert Panel (OHHLEP), Adisasmito WB, Almuhairi S, Behravesh CB, Bilivogui P, Bukachi SA, et al. (2022) One Health: A new definition for a sustainable and healthy future. *PLoS Pathog* 18(6): e1010537. <https://doi.org/10.1371/journal.ppat.1010537>

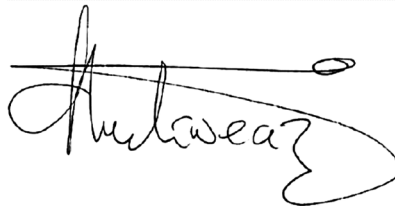
The *COHFE framework* is accompanied by four supplemental manuals:

- *Guidance for One Health field epidemiology curriculum development*
- *Guidance for One Health field epidemiology mentorship*
- *Guidance for One Health field epidemiology learning evaluation and certification*
- *Guidance for One Health field epidemiology continuing education programmes*

These manuals are meant to assist countries with implementation of the *COHFE framework*. We believe the framework and guidance documents present an innovative approach to strengthening field epidemiology capacity and health security. Together with other resources and tools, the *COHFE framework* and supplemental guidance will help governments and international organizations to effectively prevent and manage emerging infectious diseases and other evolving health challenges at the human-animal-environment interface.



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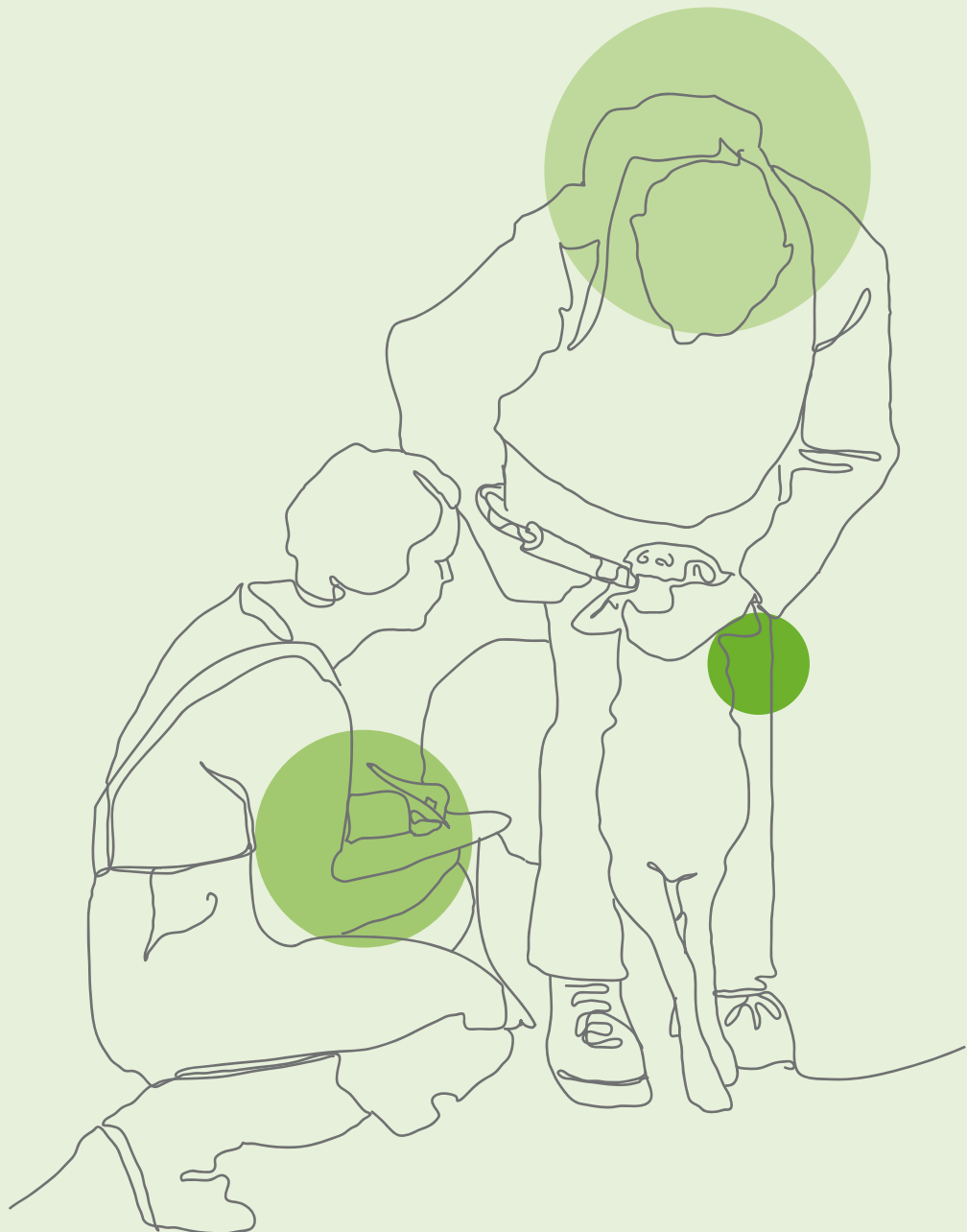
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Acronyms

CE	Continuing education
CECH	Continuing education contact hour
CEP	Continuing education provider
CERP	Continuing education review panel
CPC	Country programme coordinator
FETP	Field Epidemiology Training Program
FETPV	Field Epidemiology Training Programme for Veterinarians
FAO	Food and Agriculture Organization of the United Nations
ISAVET	In Service Applied Veterinary Epidemiology Training
UNEP	United Nations Environment Programme
WOAH	World Organisation for Animal Health
WHO	World Health Organization

1. Introduction

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1.1 Background

The Food and Agriculture Organization of the United Nations (FAO), the World Health Organization (WHO), and the World Organisation for Animal Health (WOAH) recognize the importance of continuing education (CE) for field epidemiologists. The goal of CE for this population is to maintain and expand professional knowledge in addressing the detection and reporting of disease outbreaks and to stay current on field applications in disease surveillance, epidemiological investigations, and outbreak response. Each organization also recognizes the need to track such efforts to maintain field epidemiology programme graduates' credentials as defined by country-level programmes. CE should also increase One Health competencies among existing field epidemiologists who were previously trained in sector-specific topics and help address any competency gaps in the current workforce.

Although independent organizations have established relevant field epidemiology training programmes and field epidemiology training programmes for veterinarians (FETP/FETPVs) in public health (1,2), animal health (3), and environmental health (4), no internationally accepted CE guidance exists for current graduates of country-level programmes. Additionally, no guidance exists on how to provide CE that focuses on the interactions of the sectors to promote field epidemiologists who can function and collaborate in a One Health space. This guidance draws on established practices to deliver CE programming for various sectors, including physicians and veterinarians. Given the vital role of a field epidemiologist in detecting and reporting zoonotic, emerging, and transboundary animal diseases and supporting ecosystem health, FAO, WHO and WOAH recommend the following guidance for the development and implementation of a One Health field epidemiology CE programme.

This document provides a framework to develop and track high-quality learning activities that could qualify as continuing education contact hours (CECHs) within a One Health field epidemiology CE programme. This guidance is also meant to accompany the *Competencies for One Health field epidemiology (COHFE) framework* developed by FAO, WHO and WOAH. While these documents can be used to guide CE content selection and development, they predominately focus on the technical aspects of CE delivery since there will be variability in content needs between programmes. This guidance is also meant

to depict a fully established CE programme, with the understanding that development and implementation of a CE programme may take years.

1.2 How the guidance was developed

A literature review for continuing education methods from existing field epidemiology training programmes was conducted. Based on limited information, review of continuing education methods from other sectors informed the development of this *Guidance for One Health field epidemiology continuing education programmes*. Review of continuing education parameters from three other sectors were assessed by a team of multisectoral experts from FAO, WHO and WOAH. The team reviewed each of the parameters for CE methods and determined which criteria would be most conducive for field epidemiology training programmes and would align with the *COHFE framework*. Guidance for CE administration and governance, CE programming and learning activities, CE programme approval and quality management were developed. Subsequently, a One Health continuing education roadmap toolkit (Annex 1) was developed to provide additional information for development of a CE programme at the country level.

The purpose of this guidance is to:

- provide the process and requirements for becoming a One Health field epidemiology continuing education provider (CEP)
- describe the process for the competent country-level authority (ministry, accreditation committee, etc.) to award continuing education contact hours for field epidemiology CE activities with a One Health approach
- establish guidance for renewal and maintenance of CEP status
- define the criteria a training event must meet to be approvable as a CE learning activity.

1.3 Scope of work

This document details the guidance for criteria to develop CE programming in field epidemiology. The document provides information for minimum guidance to implement a CE programme at the country level.

The need for field epidemiologists to strengthen a country's capabilities in disease surveillance, outbreak investigation and response is recognized by the global health sector. Several countries already have applied epidemiology training programmes (e.g., FETP, FETPV, ISAVET) to develop or strengthen these capabilities. FAO, WHO and WOAHA recognize that One Health is an integral part of these programmes, in accordance with the definition of One Health from the One Health High-Level Expert Panel.

1.4 How to use this document

This document is intended to be used by countries and training providers when developing and implementing One Health CE activities for their field epidemiology training programmes. This guidance includes six chapters that cover the recommended FAO, WHO and WOAHA guidance, processes and implementation practices for CE that emphasize One Health for field epidemiologists at the frontline, intermediate and advanced levels. Chapter 1 provides an overview of FAO, WHO and WOAHA One Health field epidemiology CE guidance. Chapter 2 provides guidance for the development and implementation of a CE programme. Chapter 3 provides guidance on CE programming and learning activities. Chapter 4 presents provider approval steps and awarding CE contact hours. Chapter 5 outlines the CE quality management process. Finally, Chapter 6 includes templates to assist with planning and implementation of CE.

The *COHFE framework* and *Guidance for One Health field epidemiology continuing education programmes* are accompanied by three additional supplemental manuals:

- *Guidance for One Health field epidemiology curriculum development*
- *Guidance for One Health field epidemiology mentorship*
- *Guidance for One Health field epidemiology learning evaluation and certification*

1.5 Definitions

The following definitions were specifically developed for use in the *Competencies for One Health field*

epidemiology (COHFE) framework and supplemental guidance manuals. The terms may be used differently in other contexts or publications. Additional terms are defined in the One Health glossary in Annex 1 of the *COHFE framework*.

Domain: A broad topic or subject area from the *Competencies for One Health field epidemiology (COHFE) framework* that is divided into subdomains

Subdomain: In the *COHFE framework*, a narrower topic or subject area than a domain. Subdomains consist of knowledge, skills, and competencies.

Knowledge: Assimilation of information through learning. Knowledge is the body of facts, principles, theories, and practices related to a field of work or study. It is described as theoretical and factual.

Skill: Ability to apply knowledge and complete tasks and solve problems; skills are described as cognitive (involving the use of logical, intuitive, and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools, and instruments)

Attitude: A person's feelings, values and beliefs, which influence their behaviour and the performance of tasks

Competency: Proven ability to apply knowledge, skills and personal, social and methodological abilities (attitudes and behaviours), in work or study situations and in professional and personal development in terms of responsibility and autonomy. It is not limited to cognitive elements (involving the use of theory, concepts, or knowledge), as it also requires the use of interpersonal skills (e.g., social or organizational skills) and ethical values where relevant. A core competency is the minimum level of competency expected to be achieved by the participants in a training programme.

Core: A required knowledge, skill or competency for a specific level of training (frontline, intermediate or advanced) for One Health field epidemiologists

Optional: A knowledge, skill, or competency that a country programme can choose to include in their programmes based on a country needs assessment but which is not considered a required core competency for One Health field epidemiologists

Training levels

Frontline³: A 3–4 month mentored in-service applied training programme for field staff from human, animal or environmental health sectors to strengthen epidemiologic capacity at the community to the district level. It aims at improving competencies to conduct data collection, disease monitoring, and investigation and response to health events across the One Health spectrum.

Intermediate: A 9–12 month mentored in-service or fulltime applied training programme for staff from human, animal or environmental health sectors who provide epidemiologic services, usually at the district to provincial levels. It includes additional training in surveillance, data analysis and interpretation, and management of investigations and responses to health events, across the One Health spectrum.

Advanced: A two-year mentored fulltime intensive training programme for experienced staff from human, animal or environmental health sectors to prepare them for applied epidemiology leadership roles at provincial and national levels. It includes advanced training in designing and managing surveillance programmes, complex epidemiologic methods and management of investigations and responses to health events, across the One Health spectrum.

Additional definitions

Continuing education (CE): Education provided within a field epidemiology training programme to health professionals or graduates with an environmental background at a frontline, intermediate or advanced programme level, to improve postgraduate skills and competencies in One Health field epidemiology.

Continuing education activity (CEA): An activity approved for CE that is obtained through a programme, seminar, lecture, course or other accepted offering (face-to-face or virtual) from a continuing education service provider.

Continuing education contact hour (CECH): A clock hour-based credit awarded to trainees, trainers and

mentors for successful participation in an approved learning activity.

Continuing education service provider (CEP): An approved provider who has met all requirements and guidance to provide CE for a One Health field epidemiology training programme.

Country programme coordinator (CPC): The individual who administers the One Health field epidemiology CE programme in a country. Duties associated with this position should include collection of fees, maintenance of CE programme databases, oversight of programme applications, records and reports, along with an assessment of the performance of any approved country CEPs.

Category I One Health field epidemiology continuing education provider: A One Health CEP who has been approved by a country programme coordinator.

Category II One Health field epidemiology continuing education provider: A One Health CEP who has been a Category I One Health CEP for at least 1 year and has submitted and received approval for at least 2 CE approved activities in the previous year.

One Health field epidemiology continuing education logo: A logo used to designate an approved One Health CEP or to advertise an approved learning activity.

One Health field epidemiology continuing education programme: The country-level framework setting the requirements for the establishment and accreditation of learning activities and training providers to provide One Health-related CE to field epidemiologists.

On-the-job training: Instructions or guidance provided as part of a person's employment. This type of training is provided by the employer (e.g., ministry) during the employee's regularly scheduled worktime.

Just-in-time training: This approach to learning and development promotes need-related training.

Training: The process of learning the skills needed to do a particular job or activity.

³ The term Frontline with regards to health workers is controversial because its meaning is unclear, may be unintentionally divisive or militaristic, and translates poorly in some languages. However, we use this term to align with structures and practices of existing training programmes.

2. Administration and governance of continuing education

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2.1 Overview

Criteria for a One Health field epidemiology CE programme should include planned high-quality educational activities intended to further develop and train field epidemiologists and to enhance the competencies, knowledge and skills required for daily activities of a frontline, intermediate or advanced worker.

Although FAO, WHO and WOAHA are not accrediting bodies, they suggest the following methods be included for accreditation of CE programme activities.

2.2 Qualifying categories for One Health field epidemiology continuing education

The *Guidance for One Health field epidemiology continuing education programmes* are intended for all three levels (frontline, intermediate and advanced), with programme recommendations for graduates, trainers, and mentors.

- **Graduates:** graduates of field epidemiology programmes (e.g., FETP, FETPV, ISAVET);
- **Trainers:** experienced personnel who provide training to participants of field epidemiology programmes;
- **Mentors:** established personnel who act as mentors for participants in field epidemiology programmes, see the *Guidance for One Health field epidemiology mentorship* for additional information regarding mentoring.

2.3 One Health field epidemiology continuing education programme purpose, objectives and scope

The main purpose for developing a One Health field epidemiology CE programme is to establish and maintain criteria that recognize, promote, and encourage quality, up-to-date learning activities (see also Chapter 3) for the One Health field epidemiology frontline, intermediate and advanced workforce. Such programmes help ensure that field epidemiologists working globally:

- are able to use approved learning activities to acquire, maintain, and update their credentials
- are able to acquire, maintain, and update competencies in One Health applications for field epidemiology.

The objectives of a One Health field epidemiology CE programme should:

- support development of field epidemiology competencies applicable in the One Health context
- provide guidance to service providers as they develop and improve One Health learning activities that are applicable to field epidemiology programming in a country
- ensure all learning activities are developed and delivered according to country-level CE programme criteria that target One Health principles
- ensure field epidemiology graduates, trainers and mentors have access to approved CE learning activities
- encourage development of a network of approved CE providers for overall enhancement of field epidemiology personnel (i.e., graduates, trainers and mentors) globally
- facilitate field epidemiologist mobility across countries, based on mutual recognition of their competencies.

The CE programme should also incorporate information that addresses the Quadripartite *One Health Joint Plan of Action* and capacity building of a competent One Health workforce.

Field epidemiology One Health continuing education programme criteria

One Health field epidemiology CE programmes should be developed with reference to this guidance and focus on the training and education needs of all categories of field epidemiologists, including country programme trainees, trainers, and mentors and may include a range of topics and activities based on level and category. These learning activities may come from a variety of sources, including, for example, courses, eLearning, and workshops.

Country-level CE programmes should include documented:

- requirements and responsibilities of training providers
- requirements and responsibilities of trainees, trainers, and mentors for each level (frontline, intermediate and advanced)
- requirements for learning activities
- requirements for documentation of learning activities
- requirements for course audits and provider quality management
- requirements for accreditation by country-level competent authorities.

Institutional capacity for a One Health field epidemiology continuing education programme

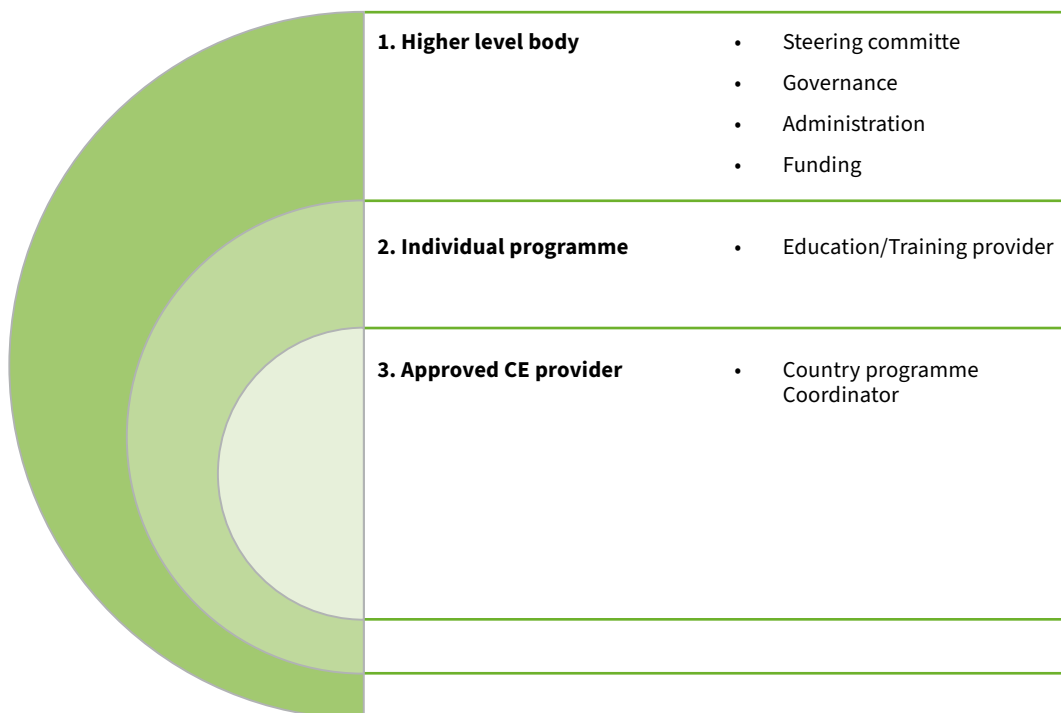
A country should implement a learning needs assessment prior to developing a One Health field epidemiology CE programme. Additional tools for program assessment can be found in the One Health continuing education roadmap toolkit (Annex 1).

2.4 One Health field epidemiology continuing education programme accreditation levels

Accreditation for a One Health field epidemiology CE programme is defined on three different levels (Figure 1). The first is higher or country-level oversight of a programme. At this level, governance, administration and funding parameters for the programme should be discussed by within-country accrediting bodies. The second level is individual programme accreditation, including provider accreditation categories. The third level is CE provider approval by the country programme coordinator.

Country-level accreditation

Each country’s programme should determine appropriate CE content. It is recommended that each country develop a working group or committee to establish the process for reviewing and approving whether a learning activity meets the One Health field epidemiology CE programme criteria. The working



^aTraining Programmes in Epidemiology and Public Health Interventions Network

Figure 1.
Levels for a One Health field epidemiology continuing education programme

group (or committee) should serve as the governing body for the in-country programme and also provide input on CE programming fees and monitor the overall performance of the CE programme. The working group (or committee) will establish programme policies (template for application submission, development of an official logo, audit requirements, etc.) and decide on the appointment of continuing education review panel (CERP) members. The CERP should include individuals who represent the One Health sectors in the country. These individuals should have expertise in development, administration and evaluation of field epidemiology training programmes.

Funding should be determined based on whether there is a public or private requirement for a One Health field epidemiology CE programme. Some countries may provide CE funding as a public good, whilst others may choose to utilize user fees. If fees are collected, each country-level programme should set a fee schedule and post it on their country programme website.

One Health field epidemiology continuing education programme accreditation

Technical and industry associations, consultants, non-governmental organizations, colleges, universities and training companies can become One Health field epidemiology CE providers. This guidance provides minimum criteria needed to be recognized as a Category I or Category II One Health field epidemiology CE provider.

All applicants requesting designation as Category I One Health CEPs should complete and submit a provider application. This application should include general background information and information regarding the types of CE content the applicant expects to offer as a Category I One Health CEP.

All applications should include:

- a summary of the applicant's capabilities and experience providing field epidemiology instruction
- a description of a training approach the applicant plans to implement
- a description of one or more courses that would be offered, including description, learning outcomes, and assessment methods
- level of training (i.e., frontline, intermediate or

advanced) for each CE activity

- types of learners expected to enrol in the CE activity (i.e., graduate, trainer or mentor)
- an overview of how the provider plans to ensure that content is regularly reviewed, updated, and aligns with trainee needs.

The application for a Category I One Health CEP should be reviewed by the governance group at the country level and the country programme coordinator (CPC) (see below). These entities will assess the applicant's ability to successfully perform the requirements associated with a One Health field epidemiology CE programme. Any country that develops a One Health field epidemiology CE programme should consider the status of a Category I One Health CEP valid for one year, with status renewable on an annual basis.

To apply for Category II One Health CEP status, the provider must have been a Category I One Health CEP for a minimum of one year. A Category I One Health CEP may choose to become a Category II One Health CEP if they received approval for at least two CE activities during the previous year. Approval and maintenance of Category II One Health CEP status are contingent upon an organization's compliance with country-level programme criteria.

Approved continuing education providers

The country-level programme CPC should administer the One Health field epidemiology CE programme. Duties associated with this position should include the collection of fees, maintenance of CE programme databases, oversight of programme applications, records and reports, along with an assessment of the performance of any approved country CE providers.

All approved One Health CEPs should notify the in-country CPC in writing in the event of:

- change in provider address
- request to withdraw as a provider
- dissolution of provider organization or cessation of CE activities
- merger of provider organizations.

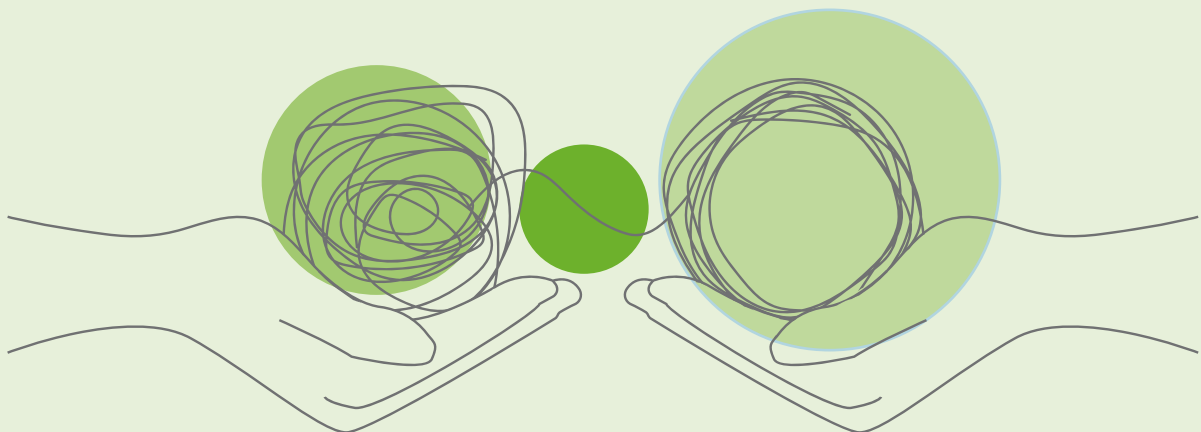
2.5 Donors and sponsors

Any entity, whether public or private, that is acting as a donor or sponsor for a learning activity may secure the services of a Category I or Category II One Health CEP by contract or by an informal agreement to assist with the development, delivery and evaluation of learning activities. The donor or sponsor is responsible for ensuring the activity meets all criteria for awarding continuing education contact hours.

A country-level One Health field epidemiology CE programme can recognize several types of approved learning activities, including individual, group, in-service and eLearning activities. The common element for any type of learning activity is that it is structured and conforms to all One Health field epidemiology CE guidance and criteria outlined in this document.

3. One Health field epidemiology continuing education programming and learning activities

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3.1 Types of learning activities

Table 1 lists types of learning activities that are considered eligible under a country’s One Health field epidemiology CE programme, in addition to select criteria which FAO, WHO and WOAHA view as disqualifying an activity for CECHs.

Continuing education plan, content, delivery and communication

One Health field epidemiology CEPs should include a readily available schedule or statement of how their approved CE learning activities will be structured for the successful completion of learning outcomes for a graduate, trainer or mentor.

3.2 Continuing education learning activity criteria

To be eligible for approval, proposed learning activities should contain the elements depicted in Figure 2.

Learning outcomes for continuing education programming

Approved learning activities should be based on relevant *COHFE framework* learning outcomes and have measurable outcomes that are achievable for a graduate, trainer or mentor. Each CE learning activity should have clear and concisely written learning outcomes that utilize Bloom’s taxonomy (or equivalent). These should represent what graduates, trainers or mentors are expected to achieve as a result of completing the learning activity. Objectives should be measurable and observable for the selected method of assessment based on the framework.

One Health field epidemiology CEPs should adopt the following minimal requirements for a learning activity.

- There should be an outline or brief description of the information provided in each section of the approved learning activity.
- All developed content should be consistent with *COHFE framework* learning outcomes.
- Providers should include practical exercises, materials and delivery systems that are current, technically accurate, and effectively designed, with consideration given to utilization in low resource settings.
- All learning activity materials should be planned, developed, and presented in accordance with learning outcomes and assessment tools.
- Providers should review the instructional materials on an annual basis to ensure accuracy and consistency with currently accepted field practices in epidemiology and recognized country-level policies and standards that relate to learning activities for country-level programmes.

Table 1
Criteria for eligible continuing education activities

Eligible continuing education activities	Activity disqualification
<ul style="list-style-type: none"> • Face-to-face courses/trainings • In-organization training curricula • Online or distance learning courses/ eModules/ webinars • Seminars • Workshops • Simulation exercises/role-plays • Specialized learning activities (e.g., on-the-job training, just-in-time training and field visits) 	<ul style="list-style-type: none"> • The activity is missing one or more required components specified by the guidance referenced in this manual • Unstructured self-study or other forms of independent learning with no defined or assessed learning outcome • Self-study learning activities that only require reading general professional literature or peer-reviewed publications. • Any activity that awards CECH for time allocated to social activities, receptions, luncheons or dinners • Any activity that awards CECH for time allocated to committee or staff meetings • Any activity that awards CECH time when no demonstrable learning takes place (e.g., time spent traveling between facilities).

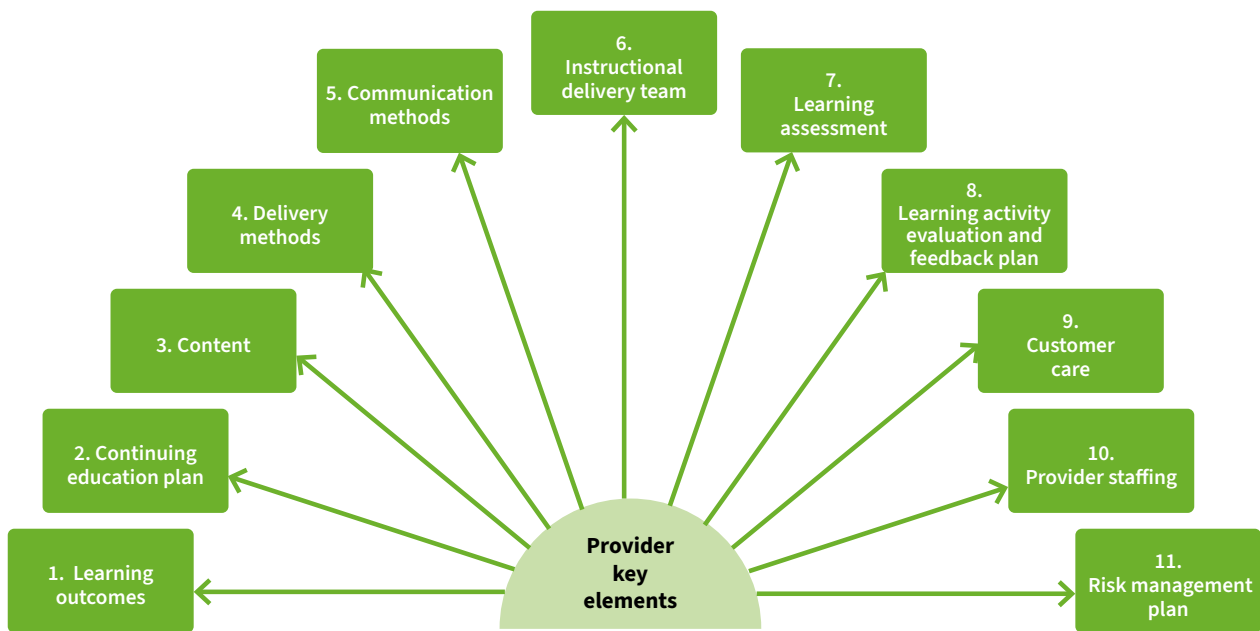


Figure 2
Recommended key elements for continuing education programming

- Providers should include the pedagogical practices used to approach the CE learning activities when applying for programme approval.

For CE delivery, each provider should include:

- a description of the instructional methods used to accomplish the stated learning outcomes
- a statement indicating why the instructional methods are appropriate for the learning activities and audience
- a description of the learning activities and group dynamics.

Providers may use their ministry or programme logos to advertise their status as an approved One Health field epidemiology CEP or to advertise an approved learning activity, upon authorisation of the Competent Authority.

Instructional design and delivery team

An instructional design team that is knowledgeable in the subject matter should be used to develop learning activities. Subject matter expertise should be demonstrated through education or practical experience. Members of the instructional design and delivery team will need to be able to successfully

design and deliver a CE learning activity, address participant questions and evaluate learning progress.

Trainers and mentors are key components of the continued learning process for One Health field epidemiologists. Therefore, instructional personnel for these groups should have the qualifications to provide CE content related to acquiring additional education in training, delivery, facilitation, and communicating effectively and providing an environment that is conducive to learning and mentorship.

Learning assessments for One Health continuing education programming

Learning assessment measures the extent to which a CE activity achieved its objectives and improved the learner’s competencies. Several assessment tools have been designed by country-level programmes to measure what participants have learned during a field epidemiology programme activity. Regardless of the method used, any assessment method must relate coherently and directly to the learning outcomes of the CE activity to measure the participant’s achievement. Field epidemiology programming may include on-the-job assessment to evaluate the trainee’s competencies after completion of training. No programmes currently have CE-related assessments, so a toolkit with

assessment templates was developed (see Annex A). Country-level One Health field epidemiology CE programme assessment criteria are listed in Table 2.

Overseeing assessment integrity

For any approved self-study learning activity, a system should be in place to ensure that the person being awarded the CECHs is the same person who actually participated in the learning activity.

Learning activity evaluation and feedback

Feedback should be obtained from country-level programme graduates, trainers and mentors regarding their perception of a learning activity’s effectiveness. Evaluations, either written or electronic, should be obtained from participants for each learning activity session to determine whether measures specific to the CE learning activity were achieved. All CEPs should review evaluation results to assess learning activity effectiveness. CEPs should also review and consider any feedback during the design, development, delivery, and evaluation of future CE learning activities.

Example templates for learning activity evaluation are included in Annex A.

Risk management plan

A risk management plan should be included for all CE programmes. It should include information on the sources of risk, negative consequences, preventive measures and corrective actions that should occur. A plan should also be developed to provide recognition. An example risk mitigation matrix is illustrated in Table 3, which lists risk events, provides a negative consequence, with corresponding preventive measures and corrective actions. Actual risk management plans should be country dependent based on the vocational requirements of a country’s CE programme.

3.3 Compliance

Any group that administers an approved CE learning activity should comply with the following guiding principles.

- There is an identified organizational unit that administers all CE learning activities.
- There are defined review processes to ensure that One Health field epidemiology CE programme criteria are met and improvement processes are in place, including after-action reviews.

Table 2
Example assessment criteria for a One Health field epidemiology continuing education programme

Learning assessments	On-the-job assessments
<ul style="list-style-type: none"> • must include a passing score (or equivalent) which represents the level of knowledge or performance required to successfully master an associated CE learning activity • are based solely on the subject matter delivered and directly related to the approved CE learning outcomes • are specified at the start of the approved CE learning activity. • ensure that participants in a group activity are assessed on their role within the group. • include criteria for successful performance of learning activities. • are based on assessment tools that align with the type of competency being evaluated. 	<ul style="list-style-type: none"> • consist of a performance test of a hands-on demonstration of a learned skill • are given and evaluated by a qualified individual • use an evaluation standard to determine whether a participant has successfully completed a skill • participant knowledge may be assessed prior to, during or following skill completion • include three steps: <ol style="list-style-type: none"> 1. Discuss with participants how they will be evaluated. 2. Conduct assessment. 3. Provide feedback to participants after completing assessment.

Table 3
Example risk management matrix for One Health field epidemiology continuing education programme risk management

Risk event	Impact (negative consequence)	Preventive measure	Corrective action
Learning outcomes for CE programming	<ul style="list-style-type: none"> Lack of coordination within country for expected outcomes of CE programming 	<ul style="list-style-type: none"> Robust CE programme plan that clearly defines the roles/responsibilities for structured workflows related to content development, delivery and communication of CE programming at the country level 	<ul style="list-style-type: none"> Strong communication by CE programme point of contact to ensure the country level plan is delivered, implemented and communicated with requested solutions
CE plan, content, delivery and communication	<ul style="list-style-type: none"> Ineffective coordination causing a delay in content, delivery and communication of CE activities 	<ul style="list-style-type: none"> The CE programme point of contact discusses with all stakeholders in the content, delivery and communication of services and activities 	<ul style="list-style-type: none"> Immediate meeting with all stakeholders involved in the issue to clarify and identify options for solutions
Instructional design and delivery	<ul style="list-style-type: none"> Unexpected unavailability of personnel to deliver learning activities 	<ul style="list-style-type: none"> List of support staff who can act as stand-in reserves 	<ul style="list-style-type: none"> Information provided to the CE programme point of contact for a solution of replacement personnel with equivalent skills/background
Learning assessments and evaluation	<ul style="list-style-type: none"> Incomplete or late evaluation reports 	<ul style="list-style-type: none"> Process includes a timeline for regular development of evaluation reports from learning assessments of the country CE programme 	<ul style="list-style-type: none"> CE programme point of contact ensures that all evaluation assessments are completed within the constraints of the CE programme plan

- There is a system, at the country level, to record a participant’s satisfactory completion of an approved CE learning activity.
- There is a record for each participant, and a One Health field epidemiology CE provider can provide a copy of the record upon request.

Definition of continuing education contact hours

A continuing education contact hour is a clock hour-based credit awarded to trainees, trainers or mentors for successful participation in an approved learning activity.

Determining total continuing education contact hours for approved learning activities

One CECH should be equivalent to 60 minutes of participation in an organized learning activity. This

may include breaks, with a maximum of 10 minutes per contact hour (i.e., a minimum of 50 minutes of instruction per one CECH). Eligible learning activities include the presentation, discussion and testing of materials.

The Category I or II One Health field epidemiology CEP will award CECHs based on successful participation in an approved CE learning activity. Non-classroom learning activities, including field activities or eLearning may be included if the activity is approved and meets the country’s One Health field epidemiology CE programme criteria.

Allocating continuing education contact hours

For in-person activities, one CECH is equivalent to 60 minutes (one CECH) of participation in an organized learning activity, typically in a classroom environment. In-person educational activities may include

3. One Health field epidemiology continuing education programming and learning activities

presentations, discussion sessions, and assessments. CECHs may also be awarded for self-study activity if it meets all CE programme criteria. Self-study activities may include, but are not limited to, computer-based training (i.e., eLearning), mailed material, home study, and pre-recorded broadcasts. Attendee participation

in a self-study activity must be confirmed via a post-course activity assessment. The assessment must include a minimum of five questions for each CECH, with credit awarded if the attendee receives a grade of 70% or higher on the assessment.

4. Programme approval and awarding continuing education hours

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The higher-level accreditation body provides notice of approval or rejection of both Category I and II One Health field epidemiology CE programme applications. The notice, as well as any additional information, is sent to the provider's contact person using the information from the application. Programme reviewers may provide feedback and request necessary revisions. Individuals selected as reviewers should meet pre-defined education and experience qualifications for field epidemiology. Reviewers may recommend that a course or other in-person content undergo further review or can deny approval if programme criteria are not met. A non-refundable content review fee may be assessed.

4.1 Submitting continuing education activity information

Category I and II One Health field epidemiology CE providers must provide transcript data to the higher-level accreditation body in a timely manner. Table 4 lists recommended documentation for CECHs and activities along with submission timeframe requirements.

Table 4
Documentation requirements and time frame for CE hours

Documentation requirement	Time frame
Upload transcript data	Within 60 days after roster date
Retain documentation	3 years
Course approval validity	1 year
Upload supporting documentation for audit	30 days

4.2 Continuing education review, approval and renewals

CERP members should meet and review applications at least annually. Where applicable, CERP members can also assist in conducting audits of approved CE learning activities.

5. Continuing education and quality management

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5.1 Quality system

One Health field epidemiology CE providers should develop and maintain a quality management system to assure their capacity to design, deliver, and assess effective and fit-for-purpose training.

The quality management system should demonstrate the implementation of a continuous improvement cycle for performance and the capacity to control related processes to satisfy the expectations of all stakeholders.

In particular, the CEP should:

- identify the scope of the quality management system, defining the design, delivery, and assessment of One Health field epidemiology continuing education programmes
- understand the internal and external factors that can impact the quality of the training services provided and describe the internal and external context, including the needs and expectations of interested parties such as learners, regulatory bodies, employers
- demonstrate strong commitment to quality and involvement in establishing the quality management system; define the quality policy, its objectives, and strategic direction, and assure they are communicated, understood, and implemented within the organization; ensure quality policy includes commitment to satisfy customer requirements; provide necessary resources to maintain the quality management system
- develop a quality management plan that outlines the processes, resources, and controls required to deliver effective One Health field epidemiology CE programmes; set measurable quality objectives, aligned with the organization strategic goals, which consider the needs of learners and other stakeholders, and legal requirements; assure objectives are periodically reviewed, monitored, and updated as needed
- ensure availability of necessary resources, infrastructure, and competent personnel to deliver high-quality One Health field epidemiology CE programmes; define job requirements and assure trainers have the necessary competencies, qualification, and experience to design, deliver and assess training; identify learning needs and provide training for trainers and staff to enhance their skills and competencies; maintain record of competencies
- describe processes for designing and developing CE programmes and courses which meet the expected learning outcomes; define clear objectives, learning outcomes, and assessment criteria; use instructional design principles and methodologies to create engaging and effective training materials
- establish procedures to deliver training programmes, including selection of appropriate instructional methods, resources, and facilities; ensure delivery of training is consistent and meets learner requirements
- implement assessment and evaluation process to measure effectiveness of training and programmes; develop appropriate assessment methods, evaluate learner performance, and provide feedback and guidance for improvement
- establish a mechanism to gather feedback from learners and other stakeholders; regularly collect and analyze feedback to identify areas for improvement and take corrective actions as necessary; monitor effectiveness of training and instructional methodologies
- implement a risk-based approach to identify and mitigate risks that could impact training service quality; assess potential risks, defining the sources and negative consequences impacting the system; identify opportunities, develop mitigation strategies, and incorporate risk management into training processes; develop a systematic approach to manage risks and opportunities associated with training services
- maintain accurate and up-to-date documentation related to training processes, including policies, procedures, work instructions, training materials, and records of training activities; ensure accessibility and security of documented information
- conduct regular internal audits to assess compliance and effectiveness of the quality management system; identify non-compliance and areas for improvement, and implement corrective actions
- conduct periodic management reviews to evaluate the performance of the quality management system; review data and information on customer satisfaction, training outcomes, and process performance; use the management review to make informed decisions and drive continuous improvement.

Table 5
Provider responsibilities for maintaining CE records

Training/education provider	Responsibilities
Category I and II	<ul style="list-style-type: none"> • provide all transcripts to the country CE Programme Coordinator within 45 calendar days of the delivery date for any approved learning activity • ensure provider learning activities conform to the One Health field epidemiology CE programme criteria within the country • maintain documents for each learning activity for at least three years, to include <ol style="list-style-type: none"> 1. accurate records^a of all participants 2. learning content^b 3. assessments/evaluations^c 4. documentation retention requirements^d

^a include course number, delivery dates, participant names and certificate numbers for the attendees

^b include copies of all training materials used to deliver learning activity and all reference or support documents, as needed

^c include summaries and copies of all evaluation learning assessments, along with sample assessment tool used

^d include accurate and complete electronic records of all approved learning activities, training materials and support documents

5.2 Continuing education records maintenance

All graduates, trainers and mentors are responsible for selecting and participating in One Health field epidemiology CE activities that meet the country's requirements. Each graduate, trainer and mentor must maintain CE records (e.g., certificates of completion) that document attendance and indicate number of CECHs awarded. Records should be maintained for a minimum of 3 years.

Proof of successful completion of CE must contain the following minimum information:

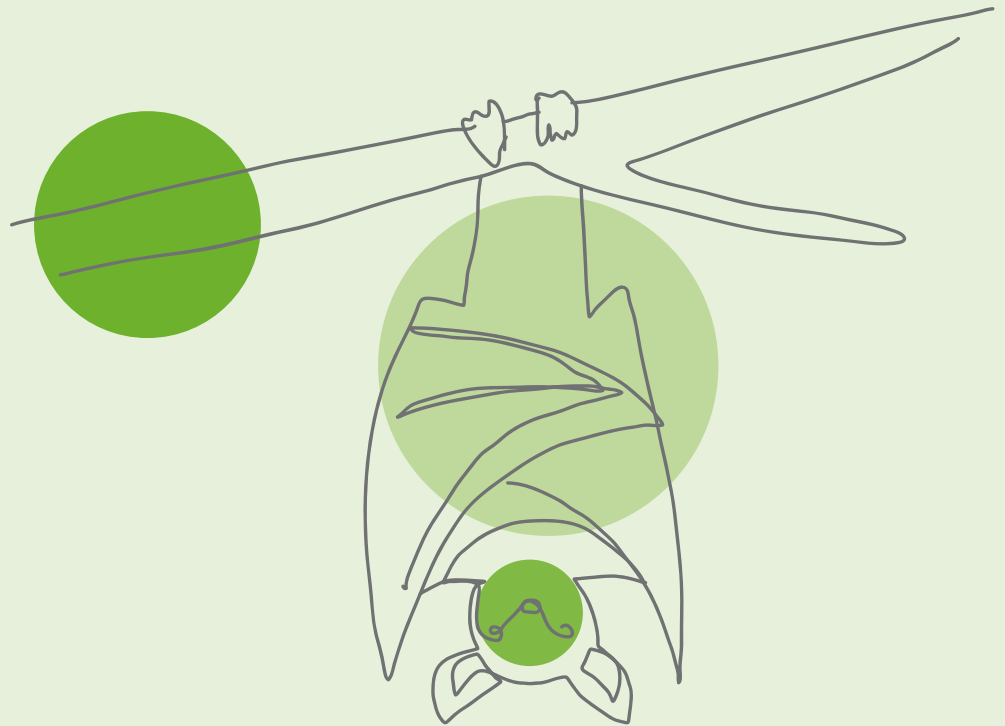
- name of provider
- programme/course title, date and location
- number of CE contact hours
- name of higher-level accreditation body within the country.

The responsibilities of One Health CEPs are outlined in Table 5.

5.3 External audit process

Unless an audit is requested by the country's One Health field epidemiology CE programme, graduates, trainers and mentors do not need to submit proof of compliance. However, a country may choose to conduct an audit to determine compliance with CE requirements by selecting a random sample of graduates, mentors or trainers.

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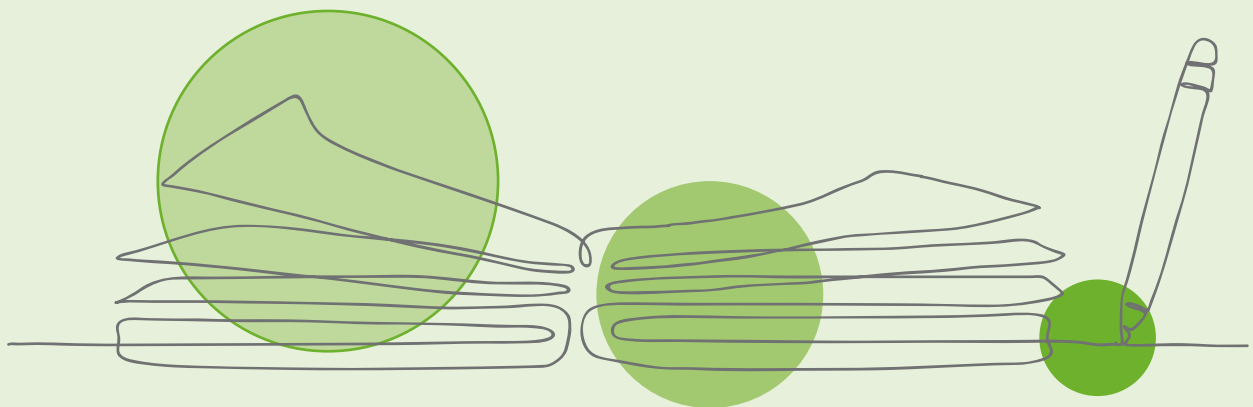
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Annex 1

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Annex 2

One Health continuing education roadmap toolkit

This annex provides suggestions on how to develop at country level a One Health CE programme, emphasizing the relevance of evaluation and assessment.

Section A
Overview of evaluation and assessment

Introduction

Training evaluation is a key component of a CE programme that enables trainers to rate whether learning outcomes are achieved and the extent to which a learner's knowledge or skills have improved as a result of participation in the CE activity.

CE assessments and evaluations can take a variety of formats, including traditional learning assessments, like quizzes, on-the-job-assessments, or different types of surveys and questionnaires. It is critical that assessments are directly linked to the learning

outcomes of the CE activity. This annex is intended to help CE developers determine the appropriate assessment method based on the goals and objectives of the CE activity.

The Kirkpatrick Model

The Kirkpatrick Model is an internationally recognized framework for evaluating the effectiveness of training programmes. It looks at training programmes at four levels: reaction, learning, behaviour, and results (see Figure A1.1).

This model can be used to develop assessment and evaluation materials for a CE activity by helping determine at which level(s) the activity should be assessed based on the learning outcome(s). The following sections review each of the levels and provide suggestions and examples of methods for assessment and evaluation.

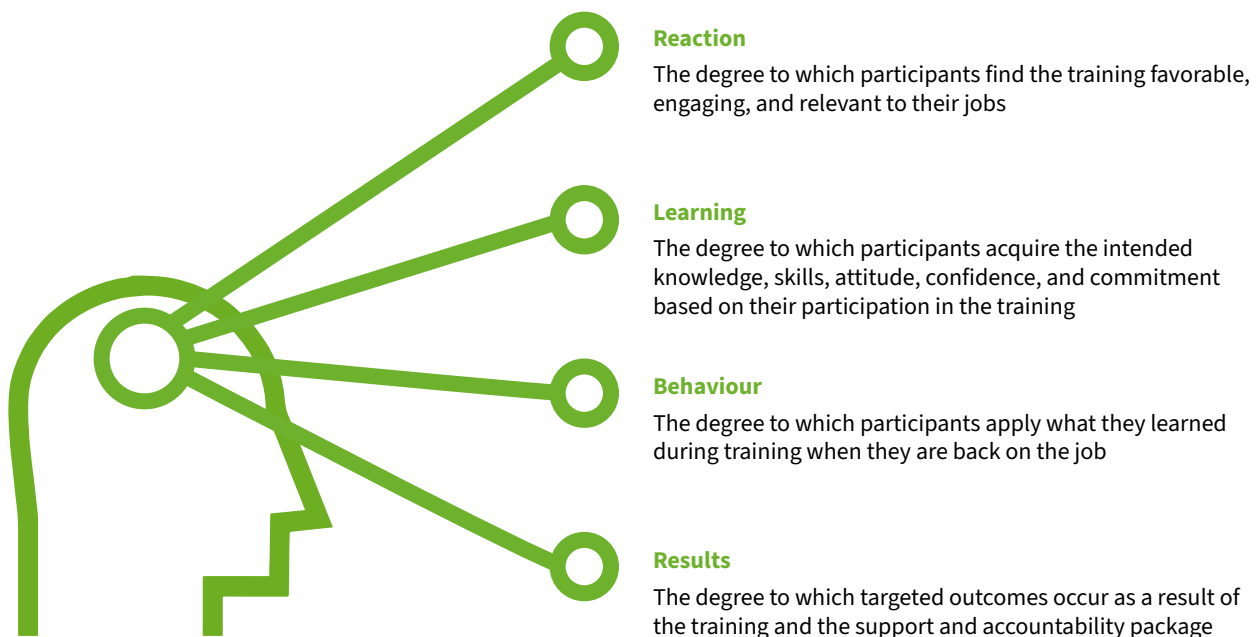


Figure A1.1
The Kirkpatrick Model's four levels for evaluating training programme effectiveness

Reaction

The reaction level indicates the extent to which the learners enjoyed the training, were engaged with the material, and found it relevant to their jobs. This is the most common type of training evaluation and can be assessed via a survey given at the end of a course or lesson. It can be delivered electronically or on paper. While these evaluation questionnaires should be tailored for each CE activity, a basic survey to measure reaction is provided in Section B of this annex.

Learning

The learning level determines the degree to which learners acquire the intended knowledges, skills, and competencies based on the CE training they receive. Based on how the learning outcome is phrased, an appropriate assessment method can be determined.

Assessing knowledge: A knowledge-based learning outcome, for example, “Roles and responsibilities of multisectoral surveillance information and their importance for One Health are understood”, can be measured by a written assessment using multiple-choice questions. Section C of this annex explains how to develop good multiple-choice questions.

Assessing skills: A skill such as, collecting samples or reporting an outbreak can be measured through practical demonstration or a problem-solving exercise.

Assessing competencies: A learning outcome such as “Prepare and deliver an oral presentation” is competency-oriented and would be better assessed through a performance test given by a mentor or a role play. Instruments for scoring performance or assessing skills can take a variety of formats, and they should be customized for each CE activity. An example checklist for scoring an oral presentation is provided in Section D of this annex.

Behaviour and results

The behaviour level examines the degree to which participants apply what they learned during training once they are back on the job, while the results level pertains to the overall impact of the learning activities. Therefore, these levels of training evaluation may not be applicable for a single CE activity and instead may constitute the evaluation of the culmination of FETP and CE activities over time. Evaluating training and CE at this level may be outside the scope of the CE programme.

Where applicable, these levels are measured via targeted surveys, interviews, or focus groups of trainers, mentors, and learners to examine how training is applied in the workplace and the effects of increased field epidemiology knowledge and skills on surveillance, reporting, outbreak investigation or other functions.

Section B

General course evaluation template

Instructions: For each of the following statements, please indicate your level of agreement by placing a check mark in the appropriate box.

Statements	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The course allowed me to achieve the expected learning outcomes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The course contents were well organized.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The course was an appropriate length for the topics covered.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The trainer was knowledgeable about the course topics and presented them clearly. (one line for each trainer)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The interactions and group activities were adequate to support learning.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The trainer was skilled in managing the training activities and group dynamics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I received help when I had difficulties or questions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was encouraged to participate in discussions and group activities and ask questions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The course developed or strengthened my competencies.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I learned a great deal in this course.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The skills I obtained from the course will help me perform my job better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Instructions: Please provide your honest responses for the following questions:

1. Please describe how you plan to use the knowledge and skills you have acquired from this course after returning to your job:

.....

2. What changes would you suggest for this course to make it more effective?

.....

Section C

Best practices for multiple choice questions

High-quality knowledge assessment questions are vital for accurate measurement of knowledge transfer resulting from training or education programmes. High-quality questions measure specific learning and thus help to measure the actual knowledge of the learners, rather than their ability or inability to guess the correct answer.

Good assessment questions:

- are tied to learning outcomes
- foil good test takers and do not hinder poor test takers
- discriminate those who know from those who do not.

Table A1.1
Anatomy of a multiple-choice question

Element	Definition
Stem	This is the part where the question or problem is posed, or where a statement is made.
Options	These are all the possible answers presented as options for a particular test question. The term refers to the correct as well as the wrong answer(s) which may be further distinguished as distractors or keys.
Distractor	This term refers to the options representing the wrong answers.
Key	This term refers to the correct answer.

General guidelines

- All questions on a knowledge assessment should be multiple-choice questions. Avoid using true/false questions whenever possible.
- Each question ideally measures only one learning outcome, although two would also be acceptable.
- For statistical validity, it is important to have no less than three, and ideally five, questions related to each learning outcome.
- There must be at least four options, consisting of one key and three or four distractors.
- All questions should be independent of each other. Avoid situations where students need to get one question correct in order to be able to find the answer to the following question.
- Validate questions by asking trainers or subject matter experts to evaluate items. Ensure the key is clearly the best answer.
- The position of each correct answer in the list of alternatives should be as random as possible. Try to have each position be the correct answer an equal number of times.

Stem guidelines

- The stem should be clear, brief but comprehensive, and easy to read.
- The stem can take the form of a direct question or an incomplete statement but should contain only one clearly defined problem.
 - Although items may be simpler and clearer when formulated as incomplete statements rather than direct questions, beginners perform better with direct questions.
 - If an incomplete sentence is used, put the missing information towards the end rather than in the middle of the sentence. This is easier to read.
- State the stem in a positive form. Avoid using negatively worded questions, like except, but or not.
 - This confuses students, or they overlook the negative word.
 - If a term must be formulated in a negative form, draw the student's attention, for example, by capitalising key words such as NOT or EXCEPT.
 - Do not use negative options in conjunction with a negative stem.

- In questions that assess definitions, place the word or term in the stem and use definitions or descriptions as options.
- The stem should make sense before you read the options.
- Include repeated or redundant phrases in the stem instead of in the options.

Key guidelines

- There must be only one correct or best answer to a multiple-choice question.
- Make sure the answer is a grammatically correct response to the stem.
- Make the key and distractors of approximately the same length.

Distractor guidelines

- Learners should not be able to derive the correct answer from the wording of the question.
 - All distractors should be plausible. Avoid silly distractors a student can instantly eliminate based on common sense.

- Avoid giving clues to the answer. For example, statements using always, never, all, every, or none are usually false.
- All options should be similar in form and length, so the key does not stand out from distractors.
- Avoid using vague adjectives and adverbs. Words such as frequent, a few, some, or typically can be interpreted differently by different people.
- If possible, use common student misconceptions for distractors.
- Each distractor should be a grammatically correct response to the stem.
- Arrange the alternatives in a logical or meaningful order, for example, numerically, in chronological sequence, by size of objects (L, M, S or S, M, L), or alphabetically if no order exists among the items.

Examples:

A good multiple-choice question

1. The iceberg principle states that most diseases will remain hidden until:

- a. Aggressive active case finding is applied
- b. Mortality rates are right
- c. An epidemiological approach is applied
- d. A spillover event occurs

Acceptable number of options

- All options create a grammatically correct sentence
- All options are feasible
- All options are of similar length

A bad multiple-choice question

1. Questionnaires are pre-tested:

- a. Whenever it is possible
- b. By aliens on Mars
- c. To be clear and understandable
- d. In order to provide adequate review of the validity and reliability of the questionnaire for use in epidemiological practises.
- e. Never
- f. Two of the above

Too many options

- Impausible distractor
- Distractor noticeably longer/more complex than other options
- Clue to the answer: "Never" is usually false
- Key refers to multiple options

References

1. Davis, B. *Tools for Teaching*, San Francisco: Jossey-Bass Publishers, 1993.
2. The Virginia Commonwealth University Center for Teaching Excellence, *Writing Multiple Choice Questions*. http://www.vcu.edu/cte/resources/nfrg/12_03_writing_MCQs.htm
3. Burton, S., Merrill, P., Sudweeks, R., Wood, B. *How to Prepare Better Multiple Choice Test Items: Guidelines for University Faculty*, Provo: Brigham Young University Testing Services and The Department of Instructional Science, 1991. <http://testing.byu.edu/info/handbooks/betteritems.pdf>.
4. Vanderbilt University Center for Teaching, *Writing Good Multiple Choice Test Questions*, <http://cft.vanderbilt.edu/teachingguides/assessment/writing-good-multiple-choice-test-questions/>
5. Kirkpatrick, D. L. (1959). Techniques for Evaluation Training Programs. *Journal of the American Society of Training Directors*, 13, 21-26.

Section D
Example oral presentation review template

Name of Trainee:	Date:
Name of Technical Reviewer:	Country:
Recommendation (pass/amendment required/fail):	Group:

Did the presentation adequately address each of the criteria?	Yes=2 Somewhat=1 No=0
1. Does the title clearly and concisely describe the subject and scope of the field study?	
2. Why is this study important?	
3. How is the study objective(s) related to the main issue of importance?	
4. Is the study design, including the data source(s), study timeframe and study location linked to the objective?	
5. What are the most important measures of disease occurrence and disease impact used in the study?	
6. How are the results of the study directly related to the objective(s) of the study?	
7. How could the display of results be improved?	
8. What were the main limitations of conducting the study?	
9. What new findings did the study find that were not previously understood?	
10. Was the oral presentation clear and audible?	
11. Was the presentation delivered within the time allotted?	
12. Did the presenter demonstrate good command of the subject during the presentation and in answering questions afterwards?	
TOTAL	
Reviewer notes:	
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