# Field Epidemiology Training Program Development Handbook

Department of Health and Human Services
U.S. Centers for Disease Control and Prevention
Coordinating Office for Global Health
Division of Epidemiology and Surveillance Capacity Development

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# Foreword

It is a pleasure to introduce this new version of the Field Epidemiology Training Program (FETP) Development Handbook. Designed for public health professionals who want to implement or strengthen their FETPs, the handbook delineates the key factors that contribute to a sound and effective applied epidemiology training program.

For purposes of this handbook, the term FETP will refer to all public health training programs that share FETP core competencies and service goals, including Public Health Schools Without Walls, Field Epidemiology and Laboratory Training Programs, and other similar capacity development programs.

FETPs are competency-based training and service programs in applied epidemiology and public health that build public health systems capacity in the countries where they are implemented, by recruiting promising young health workers and building their competencies through on-the-job mentorship and training. The trainees work in active public health teams that are tackling the most serious and acute problems of their populations, leading to improvements in program implementation even as the trainees are learning. For example, in 2004, the first introductory course of the Kenya program was interrupted when the Ministry of Health (MOH) requested that staff and trainees investigate a large epidemic of aflatoxicosis. Because the trainees quickly produced data on the size and scope of the outbreak, as well as evidence suggesting that poisoning was caused by eating moldy maize, the MOH was able to advocate for emergency food shipments to the affected areas and destruction of contaminated food, which led to a quick decline in cases. Next, the trainees worked with experts and communities to determine culturally appropriate ways for villagers to safely store maize.

FETPs provide service and strengthen capacity in public health systems in many ways. For example, FETPs

- **Strengthen response to acute problems** such as outbreaks and natural and man-made disasters,
- **Strengthen the scientific basis for program and policy decisions** to prevent and control diseases and conditions, the key to public health impact,
- **Strengthen surveillance systems** through evaluations, managing ongoing or new surveillance systems, and training of local health staff,
- **Strengthen the communication of epidemiologic information** by contributing to the national epidemiology bulletin, publishing journal articles, and presenting surveillance data to decision makers. An epidemiology or public health bulletin is an important method of communicating epidemiologic information among health workers, public health professionals, and other key partners. In some cases, the FETP has taken full responsibility for publishing the bulletin.

The FETP model has been applied successfully in countries throughout the world. In recent years, large countries, such as China and India, have begun programs. Also, the Central Asian countries and the Central American countries have banded together to develop regional programs. FETPs and allied programs of the world have

partnered together in a network alliance, Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET). It is our hope that TEPHINET members and partners, including CDC and the World Health Organization, can work together to help foster new and existing programs around the world and build the capacity to improve public health systems.

Patricia M. Simone, Director
Division of Epidemiology and Surveillance Capacity Development
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# About this Handbook

## Audience

This handbook is intended for persons who

- Plan, develop, and implement field epidemiology training programs (FETPs),
- Manage existing FETPs, and
- Evaluate FETPs.

These persons include resident advisors appointed by CDC and their host country counterparts, program managers, and country directors. University or MOH counterparts, field coordinators, and field supervisors may also find value in this handbook.

## Purpose

In addition to providing information to our previously described audience, this handbook should also be of assistance to persons who wish to advocate for an FETP and for persons developing competency-based epidemiology training programs that do not fully meet the definition of an FETP. Each section of this handbook will guide you through the process covered in that section, and we have included various tools and references to help with this on the enclosed CD-ROM.

## Organization

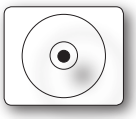
The handbook is organized into the following chapters:

1. Introduction to FETPs
2. Readiness Assessment
3. Planning
4. Implementation
5. Curriculum and Training
6. Administration
7. Service
8. Monitoring and Evaluation

The enclosed CD-ROM contains an electronic copy of this manual and appendices which supplement the text. The appendices provide useful tools and references to assist with the development of an FETP. Appendices are listed by the appropriate chapter title and then by number. On the CD-ROM, click on the chapter title link to view all appendices for that chapter.

## Symbols Used

Below is a list of symbols used throughout the handbook.



This symbol refers to the CD-ROM which contains more information.

This symbol appears at the start of each chapter and delineates the content of the chapter.

This symbol refers to lists of questions that may be useful.

This symbol points to tips that may be useful.

## Commonly used acronyms

Below is a list of acronyms used throughout this handbook.

| | |
|---|---|
| CDC | Centers for Disease Control and Prevention |
| COGH | Coordinating Office for Global Health |
| CQI | Continuous quality improvement |
| EIS | Epidemic Intelligence Service |
| Epi-X | Epidemic Information Exchange |
| FELTP | Field Epidemiology and Laboratory Training Program |
| FETP | Field Epidemiology Training Program |
| MOH | Ministry of Health |
| MPH | Master of Public Health |
| NGO | Non-Governmental Organization |
| PHSWOW | Public Health Schools Without Walls |
| RA | Resident advisor |
| TEPHINET | Training Programs in Epidemiology and Public Health Interventions Network |
| UNDP | United Nations Development Programme |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| WHO | World Health Organization |

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# 1 Introduction to FETPs

This chapter describes

- Characteristics of FETP programs
- Competencies
- Common terms used throughout the manual
- Partners of FETP programs
- The goal of an FETP
- Key principles of FETPs
- The diversity found in FETP programs

Field Epidemiology Training Programs (FETPs) are competency-based training and service programs in applied epidemiology and public health that build public health systems capacity in the countries in which they are implemented. Several practices distinguish FETPs:

- **Providing service:** Both the residents as individuals and the FETP as a program are expected to provide service to the Ministry of Health (MOH) and to improve the health of the population.
- **Implementing competency-based training:** Graduates of each program are expected to demonstrate proficiency in a defined set of competencies. In most programs at least 75% of the training period is devoted to practicing epidemiology in the field under the guidance of a mentor.
- **Building systems capacity:** The two-year training program takes place in the host country and is sponsored or cosponsored by the MOH. The U.S. Centers for Disease Control and Prevention (CDC) or other partners may participate in implementing the program, but the programs are intended to become self-sustaining programs within the host country's public health system.

## 1.1 Competencies

Throughout the handbook you will see references to competencies and competency-based training. A competency is an integrated set of knowledge, skills, and attitudes that support successful performance. In regard to FETPs, this refers to successful performance in the public health service context. A competency-based training program integrates demonstrated ability to identify and prioritize problems, choose the appropriate skills, apply them, and produce useful output in the context of a service-providing organization.

The following table provides an example to illustrate several competencies and the concepts of knowledge, skills, and attitudes that make up these competencies.

**Table 1: Levels of Learning**

| Levels of Learning | Public Health Example | Surgical Example | How Learned |
|---|---|---|---|
| **Knowledge** | Describe the uses of cluster surveys | Memorize anatomy of the abdomen | Lectures, reading |
| **Skills** | Calculate variances and confidence intervals from an active public health database | Dissect a cadaver in a laboratory | Practice |
| **Attitude** | Work productively with a health team in Ministry of Health or in the field | Work productively in a hospital surgical team | Mentoring, observation |

| Levels of Learning | Public Health Example | Surgical Example | How Learned |
|---|---|---|---|
| **Competency** | Design, supervise, and implement a cluster survey in the field to address an important issue in immunization, then report the results to the immunization program manager | Diagnose appendicitis correctly and perform a successful appendectomy on a patient in a hospital | Mentored teamwork with measurable output in a public health service institution |

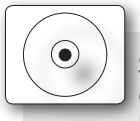
In 1951, CDC created the Epidemic Intelligence Service (EIS) to provide training and epidemiologic service on the model of a clinical residency program. In 1975, the Canadian government, in consultation with CDC, developed a competency-based field epidemiology training program that evolved into the Canadian FETP. The success of the EIS program led to requests from other countries to assist them in developing epidemiologic capacity. In 1980, CDC, in collaboration with the World Health Organization (WHO), assisted the Kingdom of Thailand with developing an FETP. A CDC technical consultant was assigned to the program.

FETPs have since been modeled after these programs.[1] According to Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) member data, as of June 2006, there were over 30 similar programs addressing the needs of almost 40 countries. More than 85% of the programs initiated have been sustained for at least five years, and more than 75% of the graduates of programs in developing countries work for MOH after graduation.[2]

FETPs are seen as a valuable resource for the following reasons:

- **Service.** The program provides service to the country. FETP trainees remain in the MOH during the course of the program and provide essential public health services as they learn.
- **Training and trainee retention.** During the two years of training in typical public health schools, all services of the trainee are lost to his or her host country. Services lost during this time include 1) those that could have been performed during training time; and 2) those lost because, while abroad or through recruiting, trainees find employment found outside of their home country. In an FETP, the trainee is providing services to the country during their time in training and, to date, over 95% of graduates of FETPs in developing countries remain in their countries working in public health after graduation.[3]
- **Systems capacity and relevancy.** FETPs provide training that builds systems capacity in the country because it is directly and immediately relevant to the public health needs of the country. It is not always clear that the skills obtained in academic training outside of the country setting, which is often research-based, truly prepare graduates for public health practice. Graduates of foreign programs also may have a difficult re-entry into the MOH as they must apply new skills developed in an academic setting to the MOH setting in the context of the country. The lack of practical training and problem-solving in real-life situations hinders graduates from using their theoretical knowledge in jobs after graduation.

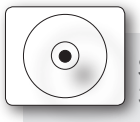
1.White ME, McDonnell SM, Werker DH, Cardenas VM, Thacker SB. Partnerships in international applied epidemiology training and service, 1975–2001. *Am J Epidemiol* 2001;154:993-9.
2. Betts CD, Abed JP, Odell Butler M, Gallogly MO, Goodman KJ, Orians C, et al. *Evaluation of the Field Epidemiology Training Program (FETP)* [unpublished]. Arlington, Virginia: Battelle Centers for Public Health Research and Evaluation. 1998.
3. Music S, Schultz M. Field epidemiology training programs: new international health resources. *JAMA* 1990;263:3309–3311.



See "Introduction: Appendix 1" for a more comprehensive presentation of the history and development of FETPs, in the following article: Partnerships in International Applied Epidemiology Training and Service, 1975-2001. *Am J Epidemiol* 2001;154:993-9.

## 1.2 A Few Terms

This handbook uses the term **FETP** (Field Epidemiology Training Program), but it is recognized that this type of training program has many names. Examples include the Public Health School Without Walls (PHSWOW) Master of Public Health (MPH) Program in Uganda, or Master's Degree Program in Applied Epidemiology in Australia, or the Field Epidemiology and Laboratory Training Program (FELTP) in Kenya.



See "Introduction: Appendix 2" for a list of FETP training programs and "Introduction: Appendix 3" for a world map of the programs.

Staff of an FETP will vary according to the needs of the country where the program is located. Some FETPs have a **resident advisor** (RA) who is CDC-appointed and provides technical assistance. The RA will have host country counterparts from different sponsoring institutions (i.e., MOH, university) of the FETP. Not all FETPs have CDC-appointed RAs. The **program manager**, or program director, is a host-country national who manages the general functioning of the program. This person is generally involved in a technical capacity as well. There may also be a field coordinator, field supervisor, or a technical leader. For the purposes of this manual, we will use the term **country director** to refer to whomever heads the country's FETP.

Also, this handbook will refer to participants in these programs as **trainees**, although individual programs may use other names, such as officers, fellows, residents, students, or scholars.

## 1.3 Partners

Many organizations have been involved in developing and sustaining FETPs. Foremost among them are the MOH and universities in the host countries. International partners include the WHO, United States Agency for International Development (USAID), Rockefeller Foundation, World Bank, United Nations Children's Fund (UNICEF), Merieux Foundation, Nuclear Threat Initiative, Ellison Medical Foundation, Bill and Melinda Gates Foundation, European Union, and CDC.

Of special note is the creation of the TEPHINET in 1997. TEPHINET was created by FETPs, WHO, and CDC representatives to support FETPs and similar programs. The mission of TEPHINET is to strengthen international public health capacity through supporting, networking, and initiating field-based training programs that enhance competencies in applied epidemiology and public health interventions. TEPHINET provides a voice for the programs on the global stage and a venue for developing shared curriculum, national and regional training programs, and quality assurance. The network coordinates participation in multinational and WHO-sponsored outbreak response teams. It also provides technical assistance to improve surveillance, disease prevention, and health promotion programs. In 2000, TEPHINET held its first independent FETP global conference in Ottawa, Canada, which included 50 oral presentations and 44 posters. Subsequent

global conferences have been held in Madrid, Spain (2002); Beijing, China (2004); and Brasilia, Brazil (2006). Information about TEPHINET and its conferences can be found at www.tephinet.org.

See "Introduction: Appendix 4" for background and contact information for TEPHINET.

## 1.4 Goal of an FETP

The primary goal of an FETP is to improve the health of a country's or region's population by

- Providing essential public health **services** to the country,
- **Training** a cadre of public health workers who work on priority issues in the country,
- Strengthening the public health **systems** capacity and infrastructure of the participating country.

## 1.5 Key Principles

The fundamental principle of applied epidemiology is the application of evidence-based science to achieve public health objectives. The use of epidemiologic skills to identify public health problems, measure risk factors, and design and evaluate public health programs contributes to improving the health of the public.

FETPs provide service and strengthen capacity in public health systems in many ways. For example, FETPs do the following:

- **Strengthen response to acute problems** such as outbreaks and natural and man-made disasters
- **Strengthen the scientific basis for program and policy decisions** to prevent and control diseases and conditions—the key to public health impact
- **Strengthen surveillance systems** through evaluations, managing ongoing or new surveillance systems, and training of local health staff
- **Strengthen the communication of epidemiologic information** by contributing to the national epidemiology bulletin, publishing journal articles, and presenting surveillance data to decision makers. An epidemiology or public health bulletin is an important method of communicating epidemiologic information among health workers, public health professionals, and other key partners. In some cases, the FETP has taken full responsibility for publishing the bulletin.

Additional information about these service activities can be found in Chapter 7: "Service."

The principles described above may be illustrated through a logic model. A logic model describes what a program is expected to achieve and how it is expected to work. It is based on an expected chain of events that links inputs, processes, outputs to outcomes and ultimately to impact on public health. See the FETP logic model on the following page.

The logic model is also located in "Introduction: Appendix 5."

Another key principle of FETPs is competency-based training. FETP training is competency-based so that graduates of FETPs are prepared to make a positive contribution to the public health

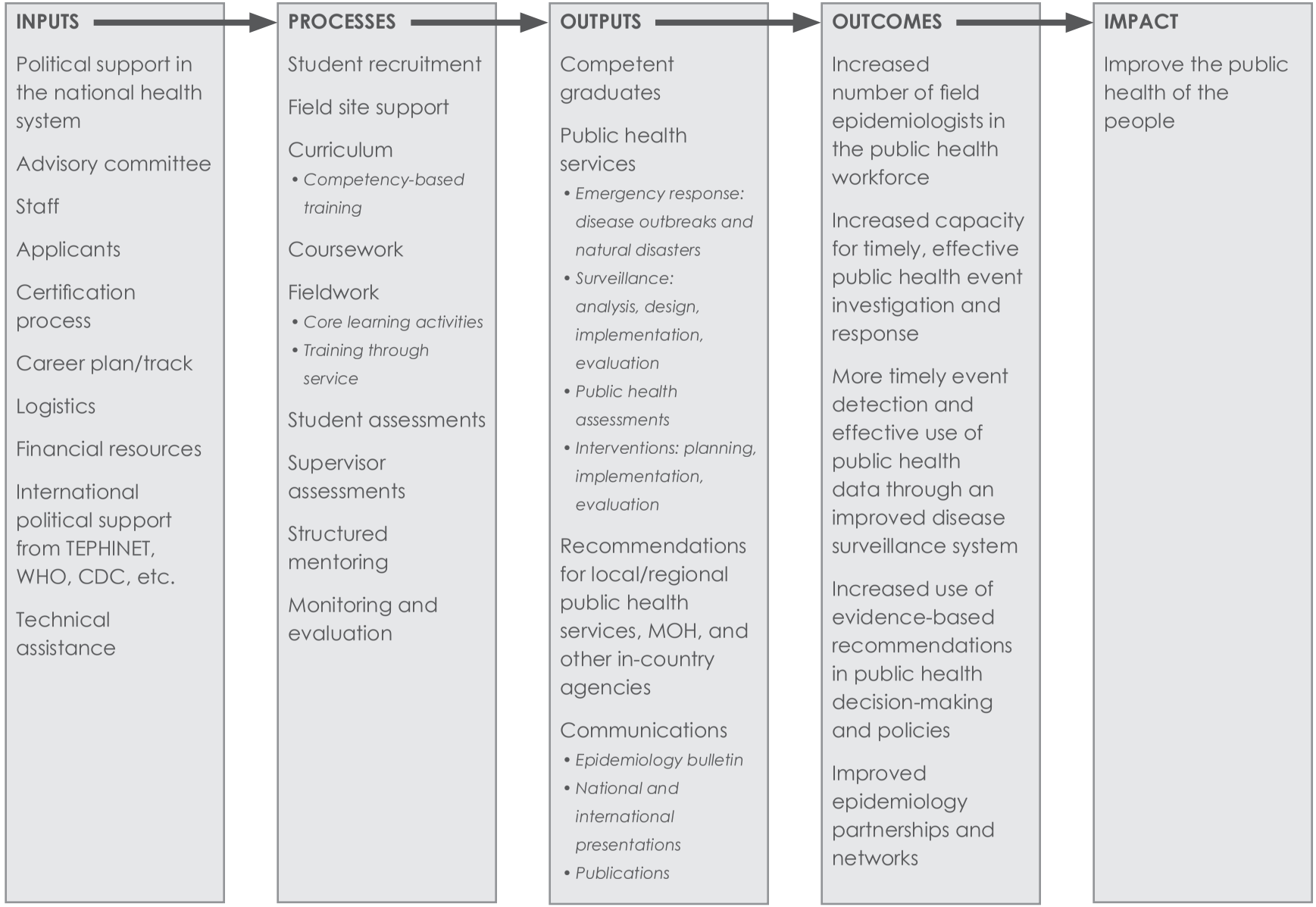



**Figure 1: FETP Logic Model**

workforce immediately upon graduation. Competencies can best be acquired through a combination of sound classroom training methods and closely supervised practical experience where trainees actively address and solve real problems. Additional information on the design and implementation of competency-based training is in Chapter 5: "Curriculum and Training."

## 1.6 Diversity

One of the strengths of FETPs is that, within the parameters outlined above, there are many ways to implement a program. Some of the options are briefly described below. A fuller discussion of each will be presented in Chapter 3: "Planning."

- **Accreditation or degree.** As noted above, many of the programs are a collaborative effort between the MOH and a local university and offer an academic degree to graduates from that university. A certificate from the MOH or a diploma that applies toward specialty board certification requirement are two variations.
- **Field placements.** The location of the office that the trainee works out of during the apprenticeship varies. In several of the programs the trainees work out of the central MOH and the FETP is often closely affiliated with the national program responsible for communicable disease surveillance, communicable disease control, or epidemiologic services. In some FETPs the trainees are placed in state, provincial, or district health departments under a local supervisor, but with technical consultation and oversight still coming from FETP staff or university faculty.
- **Inclusion of short courses.** Certain programs have begun based on an initial request to develop short courses in applied epidemiology or public health management for the MOH. These programs and others may provide short courses to pubic health personnel in addition to those participating in the FETP.
- **Regional/National.** Most programs have been developed to primarily serve the needs of a single country, but several regional programs have been established, and several of the national programs accept international participants.
- **Priorities of content taught.** The FETPs have also shown diversity in the subject areas covered by the training. All programs include the basic principles and methods of applied epidemiology, but many programs include much more. This is a reflection of the positions and responsibilities that the program graduates will be expected to assume. In many countries they will be expected to do more than communicable disease epidemiology—for example, they may have to manage financial and human resources; plan, implement and evaluate intervention programs; and address problems in non-communicable diseases and environmental health based on country priorities.
- **Proportion of time spent in classroom.** The amount of time spent in formal training activities, usually in a classroom, ranges from 2 to 10 months. The programs that are affiliated with a university and result in a degree usually require a greater amount of time in the classroom.
- **Location of program management.** Most programs are managed by the MOH, but those offering a degree may be managed by the degree-granting authority.
- **Qualifications of recruits.** Although most trainees are physicians, several programs have admitted veterinarians, dentists, pharmacists, nurses, and microbiologists. Participants from these other disciplines have performed well as trainees, and have moved on to appropriate positions in public health. Sometimes the qualifications of the trainees reflect the type of persons who are already working in public health epidemiologist positions in their country.

See a brief description of the various FETP models in "Introduction: Appendix 6."

# 2 Readiness Assessment

This chapter describes

- Assessing the readiness of a country or region to host an FETP
- Conducting a planning assessment
- Developing a country plan

Interest in developing an FETP usually results from a large health event such as an infectious disease outbreak or an environmental exposure that has recently occurred within the country. Such an event often highlights the need for more trained applied epidemiologists within a country. An example of this is the 1996 E. coli O157:H7 outbreak in Japan that infected approximately 6,000 school children and led public health officials to identify the need for an FETP and create a program in 1999. Following Hurricane Mitch in 1998, many countries in Central America decided to address the need to improve general epidemiological skills as well as disaster planning and response competencies among their public health staff. So, the Central American FETP was started in 1999. In some countries, public health professionals in a country learn of the value of this type of program through conferences, the scientific literature, or through colleagues and want to try it in order to enhance the skills of their public health workforce and improve their services.

Once a need is identified, someone from the MOH within a country typically contacts CDC, TEPHINET, or WHO, and expresses an interest in developing an FETP. Following informal discussions, the country's MOH may formally request technical assistance from CDC and other partners.

The first step in preparing for an FETP is to conduct a readiness assessment.

## 2.1 Assess Readiness for an FETP

Prior to initiating a planning visit, is it crucial to determine the readiness for an FETP in a country or region. The initial assessment can usually be accomplished through telephone interviews and then further confirmed in the initial planning assessment (see Section 2.2). There are four criteria for determining a country's readiness.

### 2.1.1 Ministry of Health commitment

Commitment of the MOH is vital for development of an FETP. Political, financial, and programmatic support are needed from the MOH to begin and sustain the program. Generally, interest for the program comes from someone within the MOH. However, if the consideration of an FETP was not initiated by someone within the MOH, it is imperative at this point to explore contact persons within the MOH who will support the program through the development process and act as a liaison between the ministry and other development partners.

Additionally, ministry support is needed as it is often the ministry which employs FETP trainees and field supervisors. The ministry must support these current and prospective employees and allow adequate resources for the program to be conducted, particularly at field sites. The MOH should be comfortable demonstrating the following:

- A need for surveillance, response, and applied epidemiology within the MOH to make better public health interventions
- Willingness to establish guidelines and provide access to data and resources for conducting outbreak investigations and epidemiologic studies in the field
- Willingness to commit substantial administrative resources to make the program work. For a developing country, this might be staff and office space, with donors contributing the rest.
- Willingness to commit promising young and mid-level health workers to a two-year course. Additional short courses can involve many health workers beyond those chosen for the two-year training, but short courses and workshops will not meet the need for developing competency that an FETP will.
- Openness to working with CDC and other colleagues in TEPHINET and willingness to allow publication of surveillance data and investigation reports

### 2.1.2 Physical security

Physical security is of utmost importance to the program's trainees and staff. A country or region should have reasonable physical security in the capital and rural areas within which trainees and staff may be traveling to conduct investigations and studies. If there is general stability in the country but a single region has some physical security issues, it may be reasonable to begin a program while delaying the development of field sites in the less secure area.

### 2.1.3 Political stability

While no country is completely without political concerns, it is necessary that there be a certain level of political stability in the country in order to establish an FETP. The country or region should be stable enough that, while new elections will occur and political and governmental offices may change, there is overall general stability to the structure of the government. This lessens the likelihood that the program will be disrupted due to political change or that the program will be modified to such a degree that a quality program is no longer viable. Stability for the purpose of an FETP can be characterized by

- Political commitment in the ministry and agreement in how the FETP will fit into the bureaucracy,
- A political backer, or champion, of the program within the MOH and other partnership organizations (such as a university or neighboring governments),
- A technically skilled host country national who can head the program. Optimally, this person should be available full time, and be a graduate of an FETP or EIS. A person who is trusted by top management, understands science, and is enthusiastic about the program will be a good candidate, even if they are only available part time.

### 2.1.4 Availability of funding

Readiness to start an FETP relies on the availability of funding. Sources for the majority of funding should be readily identifiable before beginning an FETP. However, other potential sources may also be identified and can be pursued once a detailed workplan and budget for the program have been developed (see Chapter 3: "Planning"). Organizations and entities which have supported the development of FETPs in the past include the Rockefeller Foundation, USAID, and the World Bank, among others.

Funders must agree with the proposed FETP model and be willing to support competency-based training, which requires that trainees are provided the opportunity to apply their skills and

knowledge by producing quality public health service products. Workshops and narrow categorical courses are not enough to build a sound human capacity, though they may be very useful as continuing education once a solid FETP exists.

## 2.2 Conduct an FETP Planning Assessment

The purpose of the FETP planning assessment is to establish the goals and objectives of the MOH and document information needed to proceed with planning for the FETP. This includes determining the burden of disease in the country, documenting the need for applied epidemiology competencies, identifying potential partnerships, and establishing a career path for graduates. This assessment is conducted after the questions of MOH commitment, physical security, political stability, and potential sources of funding have been addressed.

To provide the information needed, the assessment should cover the following major themes:

- Public health environment
- Logistics
- Surveillance
- Epidemiology
- Laboratory
- Communication
- Training
- Higher Education

An example of an FETP planning assessment tool is included in "Assessment: Appendix 1."

The following sections cover the process and purpose of the assessment in more detail.

### 2.2.1 Assemble assessment team

Typically, if a program is being developed in conjunction with CDC, personnel from CDC will travel to the country to jointly conduct the assessment with the MOH. Personnel from CDC or other collaborating organizations, such as TEPHINET, who will participate in conducting the assessment include one or more experienced epidemiologists and may also include laboratory, management, and training personnel. These personnel will work with designated MOH staff with similar experience to conduct the planning assessment. If the program is being developed without CDC assistance, the parties involved, including the MOH, should conduct a similar planning assessment.

### 2.2.2 Identify persons to interview

The priority persons to interview for the FETP planning assessment include the following:

- National epidemiologist
- Epidemiologist in charge of national surveillance systems
- National disease prevention/control program chiefs
- Human resource development personnel in the MOH
- Faculty at universities and other academic institutions

Persons from medical, research, educational, and public health institutions who may have an interest or provide support for the FETP may also be interviewed, such as the following:

- Public health staff at research institutions
- Staff and members of medical societies
- Staff of credentialing councils or boards

- Staff of international agencies within the host country (WHO, USAID, UNDP, World Bank)
- Staff of non-governmental organizations (NGOs)

### 2.2.3 Determine ministry goals and document infrastructure

The first area of concern in an FETP planning assessment is to determine the overall goals of the ministry as they relate to public health. In addition, the assessment should document the following infrastructure resources:

- MOH organization
- Epidemiology services
- Surveillance and health information system
- Public health laboratory structure and services
- Public health or epidemiology bulletin
- Organization of the health care and the public health system
- Human resources for health and public health services

In addition to describing the current infrastructure, the country will need to address certain infrastructure issues related to establishing the FETP.

**Infrastructure issues**

- Which program or office would host an FETP?
- Who would supervise and mentor trainees?

### 2.2.4 Review and determine burden of disease

The assessment should include a review of the burden of disease within the country.

Topics to review include the following:

- Health status of the population
- Health concerns and risks
- Demographics
- Population
- Socio-economic status
- Geography

Geography may or may not affect the burden of disease, but may be necessary to review in order to have an idea of accessibility of an area or region.

### 2.2.5 Document a need for applied epidemiology competencies

To determine the need for applied epidemiology competencies within the country, the following systems, activities, and organizational interests should be reviewed:

- Educational system
  - Number of universities, medical schools, public health schools, etc.
  - Number of graduates per year in medicine, nursing, and public health
  - Post-graduate specializations for physicians in community health, community medicine or public health
- Public health training system
- Other non-university epidemiology training and educational activities in the country
- Local interests of other organizations and agencies such as WHO, UNICEF, UNDP, World Bank, USAID, and local and international NGOs

This information will provide a background of the current training capacity within the country that will clarify the need for training within the country as well as identify potential partners and stakeholders. Next, the epidemiologic training needs at each organizational level should be ascertained.

- Describe the current responsibilities for health workers requiring epidemiologic skills and expertise at all organizational levels.
- Describe the general level of training and experience of health workers performing epidemiologic activities at all organizational levels.
- Describe deficiencies or gaps in the epidemiologic activities needed at each organizational level because of lack of training and/or experience among health workers at each of those levels.
- Describe the types of training available to health workers at each organizational level, including:
  - University degree programs
  - Short courses
  - Computer-assisted courses
  - Satellite downlink courses
  - Self-taught courses
  - Internet-based training

### 2.2.6 Identify potential partnerships

Readiness to begin an FETP also depends on establishing potential partnerships for several reasons. First, identify other training programs established within the country that provide public health training and, specifically, epidemiology training. Where no program similar to an FETP exists, this information helps establish the need for a unique training program such as an FETP with funders and other supporters. It also assists the program in identifying sources of guest faculty and potential trainees. Second, it is important to identify other organizations with an interest in public health. These organizations may assist with identifying trainees, funding, and providing future career opportunities for trainees.

**Table 2: Potential Partnerships**

| Partnerships | Examples | Issues to Discuss |
|---|---|---|
| Universities and other academic institutions | • Schools of public health<br>• Medical school departments of community medicine or health<br>• Technical schools, such as nursing or sanitarian | • Present degrees and diplomas offered<br>• Options for credentialing of FETP graduates<br>• Participation of academic staff in training offered by the MOH, and possibility of adjunct faculty positions for MOH professionals<br>• Interest in adding CDC-type field competencies to its repertoire of teaching methods |
| Research Institutions | | • Sponsorship of trainees and projects<br>• Support in supervision of trainees<br>• Possibility of field placement of trainees |
| NGOs | • CARE<br>• Save the Children<br>• FHI<br>• PATH | • Opportunities for collaboration<br>• Sponsorship of trainees and projects |
| UN agencies | • WHO<br>• UNICEF | • Opportunities for collaboration<br>• Support in supervision of trainees<br>• Sponsorship of trainees and projects |

| Partnerships | Examples | Issues to Discuss |
|---|---|---|
| National laboratories | | • Possibilities of field placement<br>• Support in supervision of trainees<br>• Career opportunities<br>• Sponsorship of trainees and projects |
| Medical societies and other scientific organizations | | • Possibilities of field placement<br>• Long-term projects<br>• Sponsorship of trainees and projects |

In broader terms, the assessment may address with the MOH its interest in sharing resources or contributing toward a regional FETP.

### 2.2.7 Establish a career path for graduates

The success and sustainability of an FETP hinge on providing a career path for trainees. Trainees should be able to use their skills upon completion of the program and advance in their career. A lack of a career path will discourage potential trainees from participating in the program.

The following should be addressed in the FETP planning assessment:
- Expected qualifications of preferred candidates
- Ministry support in creation of positions for FETP graduates
- The general career pathway for epidemiologists in the MOH

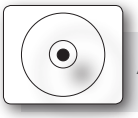
A clear statement to potential trainees, agreed upon by the MOH and other partners, of how participation in the FETP could lead to career advancement will be crucial when recruiting trainees (see Chapter 3: "Planning," Sections 3.8 and 3.9).

## 2.3 Develop a Country Plan

After a strategic planning assessment is completed, the assessment team meets to discuss their findings and write a country plan for developing an FETP. Often a draft is completed while the team is still in-country for the host country's review.

The country plan summarizes the assessment process and the information that was collected during the assessment. It will include the following:
- Background information on the country detailing the need for an FETP
- Logic model for the program
- Goals of the program
- Plan for implementation
- Funding information
- Budget
- Monitoring and evaluation
- Planned competencies and curriculum

The country plan is used to develop a more detailed workplan (described in Chapter 3: "Planning").



An example of a country plan is provided in "Assessment: Appendix 2."

**Alternatives to proposing an FETP**

While the FETP planning assessment is conducted based on the premise that an FETP will be developed, it is possible that a recommendation may be made to postpone or decline to develop an FETP, or to use an alternate training methodology to achieve the ministry's goals.

The assessment may recommend that an FETP not be started due to financial or political reasons, a lack of interest, a lack or resources, or a lack of need for FETP training. Other recommendations may include implementing short courses or other focused training activities if they are more suitable to the need. The proposal can describe concerns and what indicators were used to arrive at the recommendations.

For example, in one country, there was significant disagreement between different governmental organizations so the assessment team recommended waiting before beginning an FETP. In another situation, there was very limited infrastructure and public health expertise. There was no career ladder for graduates and little support for the program. The assessment team recommended that prior to the development of an FETP, other types of public health short courses and trainings be delivered.

# 3 Planning

This chapter describes

- Key questions to address in planning an FETP
- Developing program goals and objectives
- Developing a workplan and a timeline
- Developing an advisory committee
- Determining program management locus
- Determining program staffing and responsibilities
- Defining service functions of the FETP
- Agreeing on competencies
- Addressing certification of graduates
- Deciding on curriculum components and schedule
- Selecting trainees and developing a support plan
- Establishing career structure and opportunities
- Establishing program monitoring and evaluation
- Addressing budget and other administrative issues

Once a country plan has been approved, there are a number of in-depth planning activities to conduct. To plan a successful FETP, many program parameters must be addressed and decisions made, some of which have several acceptable options. Most decisions (e.g., program goal and objectives, competencies, curriculum components and schedule, advisory committee, budget) should be made before training commences for the first class, but others can be delayed until after the program gets started and relative benefits of the different options become clearer.

This chapter provides a series of questions and issues that should be addressed in planning a new program. Objectives here are related to the formation and management of a successful program. They will not necessarily be addressed in the order presented, although we have tried to present a somewhat logical sequence.

The FETP planning assessment tool and country plan, introduced in the Assessment chapter, are useful guides through this process. See "Assessment: Appendix 1." An example country plan from Kenya is in "Assessment: Appendix 2."

The development of this plan is an iterative process. Answers to later questions may force a reconsideration of answers to previous ones. For example, it may initially be decided that it is essential for graduates of the program to get a Master's degree. Later, it may be determined that there is no degree-granting authority that will award a degree, or that the government civil service commission will consider successful completion of the FETP as equivalent to a Master's degree for hiring and promotion purposes.

## 3.1 Key Questions

Some of the key questions that need to be addressed follow:

**Program goals and management**

- What are the goals and objectives of the program?
- What is the plan of work and timeline for implementation?
- Will there need to be any special committees to support the program?
- Where will the management of the program be located?
- Will there be an expatriate RA? If yes, who will be his/her counterpart? Who will manage the program? How will the program be staffed?
- What service functions will the FETP provide to the MOH?

**Training**

- What competencies will be expected of the graduates?
- What certification will graduates of the program receive?
- What will be the duration of the training program? What will be included in the curriculum and how will it be taught? How will the time be split between the didactic and field components?
- What will be the target and maximum size for each class? Who will be selected to participate in the program? Will recruits already be MOH employees? How will trainees be supported during the training?
- What are the career opportunities for graduates? Is there a career ladder for epidemiologists in the MOH?

**Monitoring and evaluation**

- What program data will be collected on an ongoing basis to monitor activities and progress? When will the first external evaluation be held?
- What are the career opportunities for graduates? Is there a career ladder for epidemiologists in the MOH?

**Budget and administration**

- What financial resources are needed?
- Will the FETP have its own budget and authority to spend funds?

In addition, once the program begins implementation, other questions regarding field placement, field supervision, and providing a network for graduates will need to be addressed. You will find more details on these questions in Chapter 4: "Implementation."

The rest of this chapter provides details addressing the key questions noted above.

## 3.2 Develop Program Goals and Objectives

***What are the goals and objectives of the program?***

Reviewing the public health and field epidemiology needs of the country and draft goals and objectives from the country plan will assist in keeping the planning process focused. It may be helpful to list some of the outputs and outcomes that are expected from the program. Examples of these follow.

**Program goals**

- Develop a self sustaining institutionalized capacity to train public health workers in applied field epidemiology.
- Provide epidemiological services to improve public health at national, regional, and local levels.

**Program objectives**

*Primary objectives*

- Training: Train leaders in applied epidemiology; emphasizing problem solving.
- Service: Provide epidemiologic services to national, regional, and local health authorities throughout the country.

*Secondary objectives*

- Strengthen surveillance systems.
- Strengthen capacity to respond to public health emergencies such as outbreaks and natural and man-made disasters.
- Deliver short courses in epidemiology.
- Publish a national epidemiology bulletin.
- Strengthen international affiliations with CDC, International Clinical Epidemiology Network (INCLEN), International Epidemiological Association (IEA), and other FETPs.

Once goals and objectives are identified, the logic model introduced on page 5 of this manual can provide guidance in developing short- and medium-term objectives for FETP as it progresses toward its long-term goal. A customized logic model will assist in describing what the program is expected to achieve and how it is expected to work based on a projected chain of events.

See an example of how Kenya customized the standard FETP logic model to describe how it will achieve its goal and objectives in "Planning: Appendix 1." The unique features of the Kenya program are highlighted in yellow.

This chain of events links input, processes, and outputs to outcomes and can support the creation of indicators for program monitoring and evaluation. Indicators are discussed further in Section 3.13: "Establish Program Monitoring and Evaluation" in this chapter, and also in Chapter 8: "Program Monitoring and Evaluation."

## 3.3 Develop Workplan and Timeline

***What is the plan of work and timeline for program implementation?***

A workplan is a document that functions as a road map for planning, implementing, and monitoring FETP and project activities. It will assist planners in the successful management of an FETP.

A workplan consists of

- Goals
- Objectives
- Activities
- Timeline

A workplan also includes a budget (see Section 3.14: "Address Budget and Other Administrative Issues").

### Goals

The first step in developing a workplan is determining the goals of the FETP. A goal is a general statement that describes the result or achievements to which efforts are directed and thus need not be specific. FETP goals are generally determined by the MOH and possibly other partner organizations, such as universities.

### Objectives

Once FETP goals are established, develop objectives for each goal. The objectives together should allow the program to achieve the established goals. Objectives can be short- or long-term and should answer the question of "how much" and "by when." They should be stated in measurable terms so that they can be used in monitoring and evaluating the program.

Objectives are more useful when they are SMART. SMART objectives are

- **S**pecific in stating the state the FETP wants to achieve by a certain date,
- **M**easurable by stating the level of output, effort or impact the FETP wants to reach,
- **A**chievable, given the available resources and conditions, but challenging at the same time,
- **R**elevant by supporting the FETP's main goals and strategies and will result in achieving these goals,
- **T**ime-phased by stating the date when the objective will be met.

### Activities

Once objectives are established, specific activities need to be designed to reach each objective. Activities are basically work statements describing how resources will be used to achieve an objective. They are short-term, less than a year, and designate who is responsible for carrying out and implementing each activity and when. A certain activity may need to be completed before another begins.

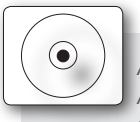
Objectives and activities can be organized and displayed in a number of ways. A table can be used to list the activities related to each objective, who is responsible for its completion, and when. Computer programs like Excel or Microsoft Project can be used to graphically present objectives and activities and identify resources needed to accomplish them.

Activities then are assigned a cost and become an element in developing a budget.

See an example from the China FETP's workplan illustrating how a program goal and objectives have been linked to specific activities that will be carried out to achieve the goal and objectives in "Planning: Appendix 2."

### Timeline

Draft a timeline showing activities and milestones for the planning and implementation of the program.



A template for this timeline is available on the CD as an Excel worksheet in "Planning: Appendix 3." A planning checklist for assigning responsibility and start and end dates for FETP activities is in "Planning: Appendix 4 ."

## 3.4 Develop Advisory Committee

***Will there need to be any special committees to support the program?***

To use the available expertise of the epidemiology community, to maintain broad-based support, to ensure that the program is meeting needs, and to help the program move toward institutionalization, it is useful for the FETP to have an advisory or steering committee. This committee will be very important in helping the FETP over the inevitable start-up hurdles and to ensure sustained broad-based support.

An MOH-based program where the participants, funding, and certification all come from the MOH may not need an advisory/steering committee. However, an advisory committee can still be useful to help keep the program focused on its goals and objectives and can function as an advocacy group. Programs where multiple organizations are involved, such as with a MOH-university partnership, can usually benefit from a steering/advisory committee.

The advisory committee is an oversight committee that addresses the overall goals and policies of the FETP. This committee does not manage the FETP. Rather, they support the resident advisor and the country director of the program.

An advisory/steering committee will help with the following:

**Program quality**
- Maintain scientific standards
- Help determine best human subject protection activities
- Maintain educational standards
- Help to implement recommendations from FETP trainee studies
- Ensure that the trainee selection process is fair
- Serve as technical experts

**Program objectives**
- Establish and review policy
- Ensure that program goals are met
- Guide the FETP to address important public health problems
- Address the public health priorities of the country

**Finances**
- Raise money
- Provide financial oversight

**Advocacy**
- Maintain relationships with the community

- Provide suggestions for marketing the program
- Advocate program needs with the MOH

The optimal number of persons for the committee will vary, but a small committee is preferable. A committee of nine or less is generally more efficient than a larger committee. There should be a balance among committee members who have applied epidemiology experience and those with academic training.

The committee generally meets once or twice a year. Some FETPs have both permanent and rotating membership. For example, there may always be a member representing the MOH but a member representing community public health may rotate among various other agencies. Meetings may occur in person or on the telephone via conference call.

The following organizations, agencies, or groups might be represented on the advisory committee:
- MOH (high-level management and senior-level technical experts)
- University departments of community health or clinical medicine
- Schools of public health
- Community public health
- National laboratories
- National research institutes
- International agencies
- Sponsors/donors

The members of the committee need to appreciate and support the key principles of FETPs—that is, the development competencies by practicing epidemiology in service to public health under the guidance of a mentor.

## 3.5 Determine Program Management Locus

***Where will the management of the program be located?***

### 3.5.1 Program location options

There are several organizations that could be considered as possible primary locations for the FETP. The primary location is where the local staff for managing the program is located. The RA and his/her counterpart would be located there, but each of them may also spend part of his/her time visiting trainees in their field placements. Following are some possibilities:

**Table 3: Options for Program Location**

| Option | Description |
|---|---|
| Option 1 | In, or attached to, the MOH unit that is responsible for surveillance and outbreak response. |
| Option 2 | At a higher level in the MOH, such as the office of the Director of Medical Services or the Chief Medical Officer |
| Option 3 | Managed primarily by a university faculty or department, such as a school of public health (Uganda) or a department of community medicine in a faculty of medicine (Zimbabwe). There could be shared responsibility between the university and the MOH; for example, the university is responsible for the didactic component of the training and the MOH is responsible for the field placements and field supervision. |

### 3.5.2 Recommendation

Option 1 is generally best because it ensures that the program will be directly linked to service and will be responsive to public health needs in timely fashion.

Option 3 can work, but there is a danger over time that the MOH will become less directly involved with the program and it will cease being competency-based and providing timely service. The field experience may become more research oriented and protocol-based. An advisory committee with strong MOH involvement may be necessary for this option to succeed as intended.

### 3.5.3 Discussion

**Questions/issues to consider when making this decision**

- What is the relationship of this location or facility to the programs responsible for surveillance and outbreak response for the country? Will the program learn about outbreaks quickly and be able to respond in a timely fashion?
- What is the relationship of this facility to national disease control programs? Will the program and trainees have access to routine surveillance data?
- What transportation is available from program headquarters to provincial or district health departments? This is especially important if provincial or district offices will be used for field placements.
- Is the sponsoring organization committed to teaching to the competencies and the importance of the field placements?
- Will this facility be able to provide services to the MOH other than the training, e.g.,
  - Publish or contribute to a national epidemiology bulletin
  - Manage a surveillance system
  - Teach basic epidemiology courses
- Is there adequate office and classroom space for the staff and trainees?
- Is the sponsoring organization experienced in collaborating across program and organizational boundaries?
- Are there educational resources for trainees?

If the program is managed by an organization outside of the MOH, it may be especially important to have an advisory committee chaired by a high-level MOH member, such as the Director of Medical Services. The MOH must be actively involved in the planning and ongoing oversight of the program.

Being based in a MOH unit does not preclude the granting of a degree or diploma (e.g., Saudi Arabia, Egypt, and Italy). However, the FETP may have to meet certain accreditation requirements prescribed by the certifying organization. This may mean thorough written documentation of all FETP trainee activities, frequent documented evaluations of the trainees, and periodic external evaluations of the program. Even if accreditation is not currently sought, detailed records of courses and activities are recommended for evaluation purposes (see Chapter 8: "Monitoring and Evaluation") or for future accreditation.

## 3.6 Determine Program Staffing and Responsibilities

***Will there be an expatriate RA?***

***If yes, who will be the RA's counterpart?***

***Who will manage the program?***

***How will the program be staffed?***

There are many ways to effectively staff an FETP. In many programs an expatriate RA is recruited to provide technical expertise, usually for several years. Sometimes there is a national FETP manager of the program and the RA functions as a technical advisor only. Other times there is no national manager of the FETP and the RA functions as this as well. In this latter case, there must be a national counterpart (country director and/or program manager) for the RA who can devote at least part of his/her time to support the development and activities of the FETP, and act as its supporter within the government or host institution.

The program will need support in developing and implementing training, writing of manuscripts and communications, and in supervising trainees' activities in the field. While the RA and counterpart may perform some of each of these duties, the program needs to plan long-term how to support these activities for a sustainable program. The program will also need administrative and secretarial support, which is usually provided by locally-hired national staff.

In developing a staffing plan for the FETP, it may be best to consider the various functions that are needed, then to think about who will fulfill those functions initially and over time as the program matures.

**Table 4: Functions of Staff Members**

| Function | Staff |
|---|---|
| Program leadership and management | Country director, program manager, resident advisor, public health advisor |
| Technical leadership | Resident advisor, country director, program manager |
| Training development and implementation | Resident advisor, other MOH or university faculty, instructional designer |
| Field supervision | Resident advisors, field supervisors |
| Professional and administrative support | Writer/editor and administrative, secretarial, and transport staff |

The sections below provide information on responsibilities of these functions and additional recommendations on staffing.

### 3.6.1 Program leadership and management

A good program leader is necessary to

- Provide overall leadership and management of the program,
- Represent the program to outside organizations,
- Advocate for the implementation of recommendations resulting from trainee and FETP activities.

The MOH should recruit or assign one health professional staff person (preferably a physician) to work full-time, without competing responsibilities as the FETP country director, who fulfills the duties described above. It would be desirable if the country director is a graduate of an FETP or has attended one of the introductory courses for an FETP. In some cases the country director also acts as the program manager, providing management for the general functioning of the program. In other

cases, the program may hire staff who focus on general management, while the country director provides advocacy and overall leadership for the program.

In CDC-sponsored programs, CDC support will often include the assistance of a public health advisor who assist with program management, finance, and budgeting. Programs that no longer are provided direct support though CDC will need to ensure their management and administrative support staff fulfill these duties.

### 3.6.2 Technical leadership

The technical leader (e.g., the RA)

- Facilitates the development and implementation of the curriculum,
- Maintains scientific excellence of the training,
- Supervises trainees,
- Consults on epidemiologic methods,
- Supervises the evaluation of trainees,
- Provides technical support to the field supervisors.

This person needs to be an experienced field epidemiologist and trainer. Usually he/she will be a graduate of CDC's EIS program or another FETP. Because one of the major goals of an FETP is to become a sustainable program within the MOH, a new program being provided technical leadership by an expatriate RA will need to plan for a future date when the MOH (perhaps in collaboration with a university) will take over the technical leadership of the program. The pool of graduates of the program will be an excellent resource from which to select technically qualified individuals for this position.

Sample position descriptions for program and technical leadership staff can be found in "Planning: Appendix 5."

### 3.6.3 Field supervision and mentoring

Field supervision is necessary to

- Monitor trainee activities,
- Evaluate trainee activities,
- Help trainee develop project ideas,
- Troubleshoot barriers to completion of projects,
- Implement or help facilitate the implementation of recommendations.

Host country epidemiologists who have the time, interest, and qualifications to supervise one or more field epidemiology trainees may be located anywhere in the country. This is a part-time responsibility. A trainee could be assigned to work directly with the supervisor, or could be assigned to a public health program in the same city. The RA, working with the country director, will try to identify these persons, and recruit them to participate in the program as field supervisors.

In the first few years of a program, the RA may be the primary supervisor for all the trainees, especially if their field placement is in a central MOH program such as the national surveillance and epidemiology unit or communicable diseases program. As the program matures and graduates of the program take up positions around the country, they may be recruited to serve as field supervisors/mentors.

Workshops can also be held to orient and provide mentoring training to new field supervisors as was done in China. They can be especially useful for field supervisors who are not graduates of the FETP, or for new graduates who are immediately expected to be field supervisors.

Additional discussion of field supervision appears in Chapter 4, Section 4.2: "Organize Field Placements."

### 3.6.4 Training development and implementation

Training development and implementation may be conducted by several staff members. Training staff will

- Design and develop new training materials,
- Modify existing training materials for the country-specific context,
- Facilitate classroom training,
- Manage courses,
- Lead field exercises,
- Lead field investigations,
- Evaluate training courses and activities.

In the long term, most of these functions are met by MOH and university epidemiologists and professors. However, in the first years of a new program this function may be provided primarily by the RA.

In addition to the country or program director and RA, some programs have other academic and scientific staff who serve as faculty for didactic courses and/or facilitators for case studies or field exercises. For example, in India there are several faculty members in addition to the RA who assist in presenting courses and working with trainees on their field activities. Additional paid faculty may be more common in programs that are associated with universities. In addition, some programs, such as the China FETP, have hired graduates of the program to assist with training. This is especially useful in programs that are transitioning to sustainability and need to develop in-country expertise in provide training. This staff has an important role in making training successful and ensuring that trainees achieve objectives.

Training involves more than conducting lectures on scientific materials. Instructional design assistance will be needed. TEPHINET and CDC can provide resources for training materials. Those programs associated with CDC will also receive instructional design support. However, the program should otherwise plan for providing support in designing, developing, and evaluating the curriculum and accompanying training and support materials as this represents a significant activity in developing a scientifically sound program and is not one that can be done by the RA alone.

### 3.6.5 Editor

A writer/editor will

- Help trainees write articles for publication,
- Provide training in writing/editing to trainees,
- Help trainees prepare for oral presentations,
- Manage and/or edit a national epidemiology bulletin.

An editor, at least part-time, can make a big difference in the quality of the outputs from the program. If the FETP is responsible for editing or publishing the national epidemiology bulletin,

then a full-time editor may be required. While no programs to date have employed a full-time editor, several have requested this assistance from CDC and donors. The program may want to consider sharing or coordinating with other sectors of the MOH to develop this type of assistance even if only on a referral basis. This may be especially important to non-English speaking programs that hope to publish trainees' works in international journals or present at international conferences.

### 3.6.6 Administrative support

Staff is needed to conduct the following administrative functions:

- Manage the budget and funds
- Develop and monitor the agreements with field sites
- Ensure salaries and benefits for the trainees
- Purchase equipment and supplies
- Support the field activities
- Manage monitoring and evaluation database
- Support the field supervisors

Initially, support for various administrative activities may only be needed on a part-time basis. Depending on the growth of the program, a full-time administrator may be required at a later date to allow the RA and the country director or program manager to focus completely on training and supervisory activities.

A full-time secretarial support staff will be required to accomplish these tasks:

- Type
- File
- Maintain the databases
- Maintain the library

The program may need a part- or full-time driver and vehicle to

- Transport teams for field activities, such as outbreak investigations,
- Transport trainees and staff between offices, especially if the FETP office is not near the MOH headquarters,
- Transport trainees and staff between the FETP office and classrooms (e.g., if training functions are shared between the MOH and one or more universities).

## 3.7 Define Service Functions of FETP

***What services will the FETP be expected to provide to the MOH?***

In addition to the training of field epidemiologists and the impact these epidemiologists will have on public health, both during training and after graduation, most of the FETPs also contribute to managing or supporting other activities in the MOH and strengthening public health in the country. Some examples follow and several of these are described in greater detail in Chapter 7: "Service."

**Strengthening surveillance systems.** FETPs strengthen surveillance through evaluations, managing ongoing or new systems, and training of local health staff.

**Strengthening the national epidemiology bulletin.** FETPs contribute to national bulletins in many ways: providing articles, editing articles, presenting surveillance data, and in some cases taking full responsibility for publishing the bulletin.

**Sponsoring scientific seminars and meetings.** Most FETPs sponsor regular scientific seminars that are open to other health professionals. Some also cosponsor annual scientific conferences where the work of the FETP trainees and other epidemiologists can be presented and critiqued.

**Providing consultation in epidemiologic methods.** FETP staff often provide informal consultations to MOH programs for epidemiologic, biostatistical, and field methods. They also may be asked to edit and comment on manuscripts. FETP libraries are also seen as valuable resources.

**Providing focused training courses in surveillance and outbreak response to provincial and district health workers who work with the epidemiologists.** FETPs may conduct and organize short classroom courses to introduce the principles of field epidemiology to groups of health workers such as physicians, nurses, sanitarians, and environmental health officers. These persons either do not need the depth of training offered by the two-year program, or do not have the time to devote to a two-year program. These courses vary from a few days to a couple weeks in length and cover topics such as basic epidemiology, surveillance, surveys, Epi Info, and the control of specific diseases. This could be similar to an introductory FETP course and also could be split into several shorter courses. Sometimes trainees will attend only the FETP introductory course and not participate in the full program.

Some programs also offer an intermediate length training program combining classroom and fieldwork, for example, a six-month program for health inspectors and community health nurses that combines several weeks of classroom work with five months of field experience working alongside the FETP two-year trainees. Other programs have developed courses for public health managers that combine basic descriptive epidemiologic and surveillance training with public health management skills, as in the Jordan Data for Decision Making program.

**Strengthening link between epidemiology and laboratory.** FETPs strengthen laboratory services and strengthen the epidemiology-laboratory link through 1) conducting laboratory assessments, 2) including laboratory personnel on field teams, 3) using laboratory data for surveillance purposes, and 4) improving biosafety and specimen collection and transport in the field.

## 3.8 Agree on Competencies

***What competencies will be expected of the graduates?***

Consensus must be reached on the required competencies. The 15 competencies below are recommended for an FETP (see Chapter 5: "Curriculum and Training").

**Table 5: FETP Core Competencies**

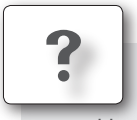
| FETP Core Competency: Use science to improve public health.<br>Supported by the following competencies: | |
|---|---|
| **Epidemiologic Methods** | 1. Use epidemiologic practices to conduct studies that improve public health program delivery<br>2. Respond to outbreaks |
| **Biostatistics** | 3. Analyze epidemiological data using appropriate statistical methods |
| **Public Health Surveillance** | 4. Manage a public health surveillance system |
| **Laboratory and Biosafety** | 5. Use laboratory resources to support epidemiologic activities |
| **Communication** | 6. Develop written public health communications<br>7. Develop and deliver oral public health communications |

| FETP Core Competency: Use science to improve public health.<br>Supported by the following competencies: | |
|---|---|
| **Computer Technology** | 8. Use computers for specific applications relevant to public health practices |
| **Management and Leadership** | 9. Manage a field project<br>10. Manage staff and resources<br>11. Be an effective team leader and member<br>12. Manage personnel responsibilities |
| **Prevention Effectiveness** | 13. Apply simple tools for economic analysis |
| **Teaching and Mentoring** | 14. Train public health professionals<br>15. Mentor public health professionals |
| **Epidemiology of Priority Diseases and Injuries** | 16. Evaluate and prioritize the importance of diseases or conditions of national public health concern |

## 3.9 Address Certification of Graduates

***What certification will the graduates of the program receive?***

This question needs to be answered early in the planning process as it may affect who will be involved in this process. The answer may introduce certain constraints on program content and configuration, and on trainee evaluation.



**Questions to consider when making a decision regarding certification**

- How important is a degree to the success and sustainability of the program?
- How will it affect career opportunities and advancement? How will it affect the number and qualifications of applicants?

### 3.9.1 Certification options

The FETP was developed in order to raise the standard of quality for epidemiologists and outbreak investigations around the world. Providing graduates with certification recognizes the commitment to excellence they have made and adhered to as trainees. Several different certification options are listed below, along with examples of institutions that have chosen to use that particular option to certify its FETP graduates.

**Table 6: Options for Certification**

| Option | Description | Example |
|---|---|---|
| Option 1 | Diploma or other non-degree certification from a department of community medicine which will count toward specialty requirements | King Saud University, Saudi Arabia |
| Option 2 | Master of Public Health from a local school of public health | Institute of Public Health, Makerere University, Uganda and the University of Zimbabwe |
| Option 3 | Certificate from the host country MOH, possibly co-signed by CDC. This could be offered alone or in addition to one of the academic credentials listed above. | EIS, Thailand, and the Philippines |

| Option | Description | Example |
|---|---|---|
| Option 4 | A new degree, such as a Master of Applied Epidemiology | Australian National University, Australia; Sree Chitra Tirunal Institute for Medical Sciences and Technology, India; and Jomo Kenyatta University for Agriculture and Technology, Kenya |
| Option 5 | Credit toward specialty board certification in public health | EIS, Thailand, and Saudi Arabia |
| Option 6 | Step-wise approach. For example, start with only a certificate from the MOH. Later, after the FETP is firmly established and the graduates have "proven" themselves, set up a relationship with a university or specialty certificate-granting authority. | Egypt and Italy |
| Option 7 | Combination of two or more of the above | |

### 3.9.2 Recommendation

Because each country has its own needs, there is no one best method. If a degree or diploma from an education institution is not necessary, then the program is usually set up entirely within the MOH and the program planning decisions are made by the Ministry. This can be the best way to ensure that the following needs of the MOH are being met: first, the best candidates are chosen to enter the program; second, the graduates have competencies that will be of value in their future jobs; and finally, the program provides service to the MOH as an integral part of the training process.

If it is decided that it is important for program graduates to receive a degree, meet with as many universities as possible before making a decision regarding with which one to affiliate.

**Questions/issues to consider when assessing the relative merits of each university**

1. Is the university located near the MOH (at least in the same city)?
2. Will the university regulations allow at least 75% (18 months) of the training time to be in a field placement?
3. Does the university have experience in competency-based training and evaluation, and do they support this approach to education?
4. Does the faculty have experience with field-based training?
5. Is there a history of working closely with the MOH?
6. Are they willing to teach to the agreed-upon competencies and to have the didactic components prepare the trainees for the field activities?
7. Is there enough flexibility that trainees can participate in outbreak investigations that may occur at the same time that classroom sessions are scheduled?
8. Will the university allow the MOH to decide on the topics for field projects?
9. Will the university allow MOH professionals to be adjunct faculty for the program?
10. What will be the university fees, and how will they be paid?

If the majority of the answers to questions 1-9 are "no," a collaboration with the university may not be successful. A successful program will require the involvement of high-level university and MOH officials in the planning discussions, and the advisory committee should be chaired by a high-level MOH official to ensure that MOH needs will continue to be met by the program. (Refer to Section 3.4 "Develop an Advisory Committee.")

All this said, there are many FETPs that grant degrees and are managed by a university or have a formal relationship with a university. If managed properly, an FETP that is jointly supported by the MOH and a university can benefit both organizations.

See "Introduction: Appendix 2" on the CD for program summaries.

## 3.10 Determine Curriculum Components and Schedule

***What will be the duration of the training program?***

***What will be included in the curriculum and how will it be taught?***

***How will the time be split between the didactic and field components?***

In this chapter only some of the more general issues related to the curriculum will be considered. See Chapter 5: "Curriculum and Training" for a comprehensive presentation of this topic.

### 3.10.1 Duration of training program

A full-time trainee commitment of at least two years is necessary in order to achieve the recommended competencies. Some programs are part-time and extend the training for more than two years.

### 3.10.2 Schedule for training

**Consider the following questions when determining the training schedule**

- When will the first class start?
- Does the starting date need to be coordinated with other activities and events?
- How will the subsequent cohorts of trainees be coordinated? How will overlap between the two cohorts scheduled?
- Has enough time been allowed to accomplish all the pre-training tasks such as finalizing the curriculum and identifying faculty?

### 3.10.3 Content and methods

The FETP is primarily an apprenticeship which is supplemented with didactic educational activities and courses. Its objective is to train public health professionals to be competent applied epidemiologists by reinforcing their knowledge and behaviors while they are actually practicing epidemiology.

Typically, an FETP is a series of short classroom courses separated by longer stretches of field placements. Some programs have chosen to provide the majority of the classroom training at the beginning of the program. The training begins with an introductory course to introduce the basic concepts of biostatistics, epidemiology, and field investigations. This course is usually between three and six weeks in duration. Subsequent courses include surveillance, scientific writing and communications, and advanced epidemiology and biostatistics topics. Further, some programs

choose to include additional training or seminars on management and leadership, prevention effectiveness, teaching and mentoring, laboratory and biosafety, and teaching and mentoring topics.

After the initial classroom training, the trainees are then assigned to work in one or more public health service organizations in the MOH that are responsible for collection and analysis of surveillance data, and for responding to requests from regional and local health authorities for epidemiologic assistance. Each trainee has a mentor, or a technical supervisor, to guide him/her through this educational process.

For more on field placements, see Chapter 4, Section 4.2: "Organize Field Placements."

### 3.10.4 Evaluation of trainees

It is very important to set up a system for monitoring and evaluating trainees before the program begins. Trainee evaluation can occur through exams, papers, projects, or trainee participation, among others. Evaluation should be composed of several different methods. Applicants for the program should know how they will be evaluated, and evaluation of the trainees should start on the first day of their training.

The trainee evaluation process and tools will depend somewhat on the certification offered. Some FETPs have evaluated and graded each field investigation and report in which a trainee participates. Another program has each trainee submit a "thesis" near the end of the two years. This is composed of monthly activity reports, publications in the national epidemiology bulletin, a peer-reviewed journal publication or manuscript, copies of visual aids and handouts from seminars given, field investigation reports, surveillance evaluation reports, and visual aids for a 10-minute scientific presentation. A panel drawn from the collaborating organizations evaluates this compilation and the trainee defends his/her work before them.

See Chapter 5: "Curriculum and Training," and Chapter 8: "Program Monitoring and Evaluation" for additional information on evaluation of the trainees and monitoring of their progress.

### 3.10.5 Faculty considerations

As much teaching as possible should be done by locally available instructors. Usually the teaching responsibilities are shared by the MOH, local universities, and the RA, if there is one, with some outside assistance during the first few years.

In selecting faculty, it is important to consider education and experience as well as an understanding of the local and regional environment. It is important that faculty be able to provide relevant examples to the trainees as much as their academic qualifications.

Characteristics of faculty

- Knowledge of and experience with subject matter
  Faculty should be knowledgeable about their subject matter and successful practitioners of the application of that subject.
- Credibility
  Faculty's credibility is demonstrated through their position, background, and presentation. Trainees are more likely to accept the material when presented by a faculty member with high credibility.
- Enthusiasm for the subject matter

- Commitment to teaching
- Commitment to the applied model of training
- Creativity in presenting material
- Ability to organize material so that trainees may learn effectively and efficiently

More discussion on qualifications and information on faculty orientation is provided in Chapter 5, Section 5.4: "Delivering Training."

## 3.11 Select Trainees and Develop Support Plan

***What will be the target and maximum size for each class?***

***Who will be selected to participate in the program?***

***Will recruits already be MOH employees?***

***How will trainees be supported during training?***

### 3.11.1 Size of an FETP class

Initially, the maximum recommended program enrollment is five trainees for each class, which means a total of up to ten trainees in the program once the second class starts. This relatively small size ensures that the trainees get adequate supervision and mentoring. As qualified field supervisors are identified or FETP graduates become available to supervise trainees, the size of the class may be increased.

In addition to the availability of high-quality mentoring, the following factors can also affect the size of class that can be supported:

- Level of funding
- Availability of appropriate field placements
- Space for training
- Size of recruiting pool
- Availability of career opportunities

### 3.11.2 Qualifications of trainees

Qualifications required of the incoming trainees will depend somewhat on the relationship of the program with academic institutions and the credentialing available to the graduates of the FETP. Initially, it is recommended that the program focus on training persons who will be field epidemiology leaders at regional and national levels. This would most likely be physicians, but veterinarians, nurses, microbiologists, and statisticians, for example, may also be considered for enrollment.

In many countries, FETP trainees are recruited from among MOH employees, are supported by the MOH during their training, and then return to technical or management positions upon graduation. Other programs review and accept applicants from both the public and private sector. Most important is to select trainees on the basis of merit, commitment, and potential.

Groups to focus on for recruiting could include the following:

- National public health program staff
- Regional and local health staff, especially in underserved areas
- Recent graduates of medical schools

- Hospital infection control doctors
- Public health school graduates

Procedures for recruitment and selection of trainees are discussed in Chapter 4, Section 4.1: "Recruit and Select Trainees."

### 3.11.3 Trainee positions and support

Several options exist to fund trainee participation in FETPs.

**Table 7: Options for Funding Trainees**

| Option | Description | Example |
|---|---|---|
| Option 1 | Sponsored trainees enter the FETP with their own position and salary. Salary may need to be supplemented because of dislocation or maintenance of two households. This is the usual way in FETPs, in contrast to the EIS Program. Program trainees are usually already government employees, often working in a public health position at the national, regional, or local level, and are detailed to the FETP for one to two years. | Philippines, Kenya, Italy |
| Option 2 | Ministry funded time-limited two-year positions for trainees. These would be non-permanent positions reserved for trainees only. Trainees would assume the position for two years (like an academic scholarship or grant), then move on to another one after the training. | United States, European Programme for Intervention Epidemiology |
| Option 3 | Third-party scholarships for trainees, e.g., from another branch of the government such as the Ministry of Agriculture or the military, or from a donor organization such as WHO, UNICEF, or USAID. When these agencies support an FETP, it is usually to provide general funding for the project, salaries for staff, equipment purchases, fellowships for graduates, and salary supplements for trainees. | |
| Option 4 | Self-pay. For some programs an individual may choose to pay his/her own way through the program. This applies especially to university-based degree-granting programs. | |

Recommendation

No one way is clearly best. A combination may be possible, even necessary. If a combination of methods is used, be aware of possible inequities of salary and benefits among trainees.

Details of budgeting for the trainee appear in Section 3.14 of this chapter.

## 3.12 Establish Career Structure and Opportunities

***What career opportunities are available to graduates?***

***Is there a career ladder for the epidemiologists in the MOH?***

FETPs are established to meet the needs of the MOH and of the public health system. Some of that need is met by the program itself, but proper placement of graduates where they can continue to have a positive impact on public health practice is at least as important. Beyond initial placement after graduation, it is also important that graduates are part of a system with a career structure that will allow them to advance, providing an incentive for them to participate in the program and to remain within the public health system.

A career path (sometimes called a career "ladder") is the opportunity to advance to job positions of increasing responsibility based on increased experience and skill. It can be thought of as a progression of positions from an entry-level job to the highest position within a professional series. A career path for promotion is an important predictor of the quality and sustainability of an FETP. A well-designed career path serves as a framework for career development and helps employees to map out their professional ambitions.

The MOH or other governmental agency responsible for personnel matters and health manpower planning is responsible for creating and implementing a career ladder for epidemiologists. The FETP country director and the RA should work with the MOH to develop a plan that rewards experience and training with reasonable salaries, benefits, a variety of job opportunities, and continuing professional education opportunities to encourage epidemiologists to remain in the MOH.

To ensure that FETP graduates will have appropriate epidemiologist positions to advance within the MOH, new technical positions for epidemiologists may need to be created. Salaries for these positions should be at levels sufficiently high to attract program graduates. One suggestion is to include FETP completion as one of the requirements for consideration for advanced epidemiology positions. For example, titles in a series of jobs within a career path for epidemiologists might be: junior epidemiologist, epidemiologist, senior epidemiologist, consultant epidemiologist, and chief epidemiologist. Another career ladder may include positions such as directors of programs (chronic disease, infectious disease, FETP), undersecretary of health, and minister of health.

Examples of appropriate placements for FETP graduates include the following:

- Full-time epidemiologists in national disease prevention and control programs
- Managers of national disease control programs
- Full-time epidemiologists in regional, state, or provincial health departments
- Regional, state, and provincial health program managers
- Epidemiologists or managers in large city health departments
- District health officers

## 3.13 Establish Program Monitoring and Evaluation

***What data will be collected on an ongoing basis to monitor the activities and progress of the program?***

***When will the first external evaluation be done?***

Ongoing monitoring of program activities and periodic comprehensive evaluations are both important activities to help the FETP to achieve and maintain high-quality training and to be effective in improving public health.

### 3.13.1 Monitoring

A system for documentation and monitoring should be set up prior to the entry of the first class into the program. Ongoing monitoring can help with advocating for resources, identifying problems (or potential problems) early, and ensuring the periodic full evaluation is a relatively easy process.

A **file system** should be developed and maintained with support of the administrative and secretarial staff.

The database should keep track of trainees and graduates as well as monitor the program and trainee activities. Epi Track is a database which has been developed using Epi Info specifically for this purpose. See Chapter 8: "Monitoring and Evaluation" for details of the training and program activities and information to be monitored.

The Monitoring and Evaluation chapter deals with issues related to monitoring data from the program. An example of this type of database can be found in "Monitoring and Evaluation: Appendix 5."

### 3.13.2 External evaluation

The first external evaluation is usually scheduled after the program has graduated two or three classes. The evaluation can

- Document success of a program towards achieving its goals and objectives,
- Identify and help address areas that need to be strengthened,
- Provide information to help other countries initiate FETPs,
- Create or strengthen established FETPs,
- Provide credibility nationally to the government and internationally,
- Provide evidence of success that can be used in fundraising,
- Provide documentation needed for credentialing.

See Chapter 8: "Monitoring and Evaluation" for more information regarding the recommended process for and content of this evaluation.

## 3.14 Address Budget and Other Administrative Issues

***What financial resources will be needed to initiate and sustain the program?***

***Will the FETP have its own budget and authority to spend funds?***

After developing a workplan for the program with objectives and activities, the next step is to develop a budget and budget justification. The purpose in developing a detailed budget, plus the budget justification, is to show to the funder(s) how, why, and where you plan to spend financial resources in order to meet program objectives.

### 3.14.1 Budget

The budget should take into consideration any costs associated with the initiation and sustainability of the program, as well as include any financial resources necessary to carry out the activities in the workplan.

As stated at the beginning of this chapter, in some instances, the level of financial support for the program is already known. However, it is still important to go through the process of determining the financial resources needed for the program. Developing a detailed budget for the program is not only a useful tool in negotiating and justifying the need for additional financial resources if the amount of resources pledged is less than the amount required to adequately support the program, but can also be a reality check for the workplan developed. Additionally, having a detailed budget at hand should greatly facilitate the search for additional financial resources for the program when required.

What are the costs associated with the implementation of the program? When developing the budget, the following items should be considered:

### Salary and benefits for in-country program staff

The salary and benefits of each staff should be clearly stated, including the time in terms of percentage of time per year that each staff will dedicate to the program. If the budget is for more than one year, potential salary and benefit increase in subsequent years should be added.

*Note:* This line item is usually funded by the MOH. However, these costs should be outlined in the budget shared with both the ministry and other funders to provide a clear understanding of the full cost of the program for planning and funding purposes.

### Salary and benefits for the expatriate resident advisor

External funders usually cover the cost of this position. Again, these budget costs should be shared with all funders to make clear the full cost of the program.

### Trainee support

The following allowances and benefits may be appropriate for the trainees:

- Displacement allowance
- Monthly training stipend
- Living allowance for trainees who are in field placements distant from their home and family, especially if the trainee must maintain two homes
- Vacation and sick leave
- Laptop computer or computer-use allowance
- Internet access
- Health insurance
- English language lessons

Salaries and benefits should be such that FETP trainees will not need an outside job to support themselves or their families. It is important that trainees be available to participate in all training activities and field investigations.

### In-country travel

In this line item, include any costs associated with participation of trainees and program staff in outbreak investigations and attendance at meetings or national conferences. Travel costs should include per diem, including lodging allowance if required, transportation such as bus ticket or gas reimbursement, conference registration fees, and other miscellaneous travel-related expenses, such as anticipated business center or phone costs. The per diem rate should be in accordance with the published government per diem.

### International travel

In this line item, costs associated with the travel of trainees or program staff to international meetings or conferences should be included. Because such costs can be high, it is important to determine in advance the essential meetings or conferences that trainees or program staff should attend. Travel costs should include per diem including lodging allowance, airline ticket, airport tax, taxi transportation, conference registration fees, and any other miscellaneous travel-related expenses. Per diem rate for international travel should be set so that trainees or program staff can stay at an adequate hotel and have enough money to have breakfast, lunch, and dinner.

### Short-term consultants (national or international)

This line item should be linked to the workplan. If the program plans to conduct workshops by using the services of external instructors, the program should plan to support all of the travel costs including transportation, per diem, and consultancy fees of each consultant.

### Rent plus utilities

If necessary, this line item should include any costs associated with the rental of adequate office space for the program including utilities such as electricity, phone service, and Internet connection.

### Equipment

This line item should include any costs associated with the purchase of desktops for the program staff, laptops for the trainees, printers, copier, fax machine, audio-visual equipment, software, and information technology support. A lot of those costs will be incurred during the first year of the program. However, in subsequent years, the program will need to plan for replacement of this equipment, particularly computers which often must be updated every 3-5 years.

### Furniture, books, and office supplies

This line item should include any furniture initially needed to set up the office such as desks, file cabinets, and chairs. Also included under this line item are reference books for the program library or books to be given to the trainees, as well as any office supplies for the proper operation of the office (e.g., paper, pens, binders, calculators).

### Contracts

This line item should include any contract the program anticipates to award (e.g., laboratory support, purchase of laboratory reagents). This item may differ depending on whether you are developing the budget for the MOH or an external funder because a number of potential contracts may be the responsibility of the ministry.

### Printing

In this line item, include any cost associated with the maintenance of the photocopier and the cost of printing training material, etc.

### Mailing and shipping costs

In this line item, include any cost associated with the mailing or shipping of communications, documents, and training material.

### Other costs

In this line item, include any other program-related costs such as any costs not previously listed but necessary to carry out successfully any program activities. For example, to conduct a workshop, a conference room may need to be rented.

These items are comprehensive but do not represent an exhaustive list. Other items may be added to budget as required to meet the needs of the program.

Once a detailed budget has been developed, it is always good to create a budget justification. The budget justification is a written explanation and rationalization for each line item in the budget to the funder(s) or potential funders.

See "Planning: Appendix 6 and 7" for detailed budget and budget justification examples.

### 3.14.2 Budget authority

The program needs its own budget, and authority to spend it, for supplies and field activities. This is especially important in order for the program to make timely responses to acute public health problems such as epidemics.

### 3.14.3 Pre-authorized arrangements for travel

A rapid response to epidemic problems is essential for prompt identification of the source of an outbreak and its control to prevent additional cases. It is therefore important to avoid possible administrative delays by arranging advance standing authorization and funds for in-country travel by trainees and staff. In addition to the transportation costs outlined in the budget, the program should have funds available for purchase of fuel for use in vehicles borrowed from departmental or local health agencies for official purposes by trainees or staff on approved investigations.

### 3.14.4 Provision of suitable office space and services

Office space sufficient for bookcases, filing cabinets and desks for the consultant epidemiologist, FETP staff, and trainees should be provided. Telephones should be provided for exclusive FETP use and capable of international dialing. Internet access should also be made available.

# 4 Implementation

This chapter describes

- Recruiting and selecting trainees
- Organizing field placements
- Developing a network of graduates

## 4.1 Recruit and Select Trainees

Selection of suitable trainees is critical for project success. A main objective of most FETPs is to strengthen epidemiologic capacity in regional and local health authorities. Trainees should be selected on the basis of both objective and subjective assessments of their (a) likelihood to make careers in regional or local health departments, (b) motivation to work in epidemiology, (c) interest in public health, (d) location and relevance of their previous work experience, and (e) intelligence, character, and technical qualifications.

The recruitment and selection of trainees may be accomplished by

- Solicitation and selection through an open application process,
- Selection from those nominated by senior public health officials or supervisors,
- Assignment by senior public health officials or supervisors.

The recommended process is the first: solicitation and selection through an open application process. A candidate who is competing to enter the FETP may be more motivated to accept the responsibilities of the traineeship compared to someone who is assigned as a trainee.

Regardless of the selection method, a successful trainee should possess an appropriate skill level and, at least as important, the motivation to take on a demanding training program. In addition, the process of trainee recruitment and selection should be clearly stated to ensure fairness.

### 4.1.1 Convene selection committee

Many FETPs convene a formal selection committee to review applications, interview applicants, select trainees, and assure balance and equity in the selection procedures.

The membership of the selection committee could be drawn from the following groups: MOH counterparts, the RA, the FETP director, the FETP advisory committee, and a university counterpart (if the FETP is linked to university credit). A representative from the MOH usually serves as the head of the selection committee.

The following are functions of the selection committee:

- Establish recruiting procedures and requirements
- Promote the program and solicit applications
- Consider use of questionnaire to assess knowledge or aptitude
- Review applications
- Develop an interview questionnaire
- Select applicants for interviews
- Interview candidates
- Select trainees

### 4.1.2 Develop expectations for incoming trainees

The FETP advisory or selection committee should decide what criteria trainees must meet to be accepted into the program and disseminate those as part of an announcement about the program. This decision should be based on MOH needs and program goals and objectives. In a structure where the goal is to make a broad-based team in the MOH, applicants from other fields in addition to epidemiology (e.g., behavioral sciences, communications, nutrition, health economics) will be important to consider. If the goal is to place graduates after graduation, it may be important to consider geography as well.

Criteria for acceptance might include the following:
- Type of degree
- Type of experience
- Written statement by applicant
- Language skills
- References or letter from a sponsor

Application materials should include a clear description of the FETP goals and responsibilities. In particular, selected trainees should be given materials detailing how they will be evaluated over the course of the two-year program. Clear lists of specific training objectives and activities should be discussed with the trainee prior to starting the training program. Some programs have developed contracts for the trainee's signature as a way to document that the trainee has been informed of responsibilities and benefits. See Chapter 5: "Curriculum and Training" regarding recommended training competencies.

### 4.1.3 Organize application process

The application process allows time to announce the program, distribute and receive applications, select applicants, and inform the applicants of the decisions. This may require several months. There should be adequate time between acceptance into the program and beginning the program so that accepted trainees have time to finish their current work prior to entering the FETP.

A well-organized application process includes these steps:
- Determine application process that the FETP will follow
- Set deadlines for application and selection
- Define criteria that trainees must meet for acceptance
- Develop the application form

An application form and specific instructions should be developed and distributed to all applicants. A standardized form will ensure that all applicants submit the same type of information and may be judged equally on the same criteria. It may be helpful if the application forms are available on the website so that applicants can print the forms themselves.

Application forms should include the following:
- Description of the program
- Criteria for acceptance
- Documents needed for application; examples include
  - Curriculum vitae or resume (limit the number of pages)
  - Reference letters (indicate how many and from what type of people the references should be from)

* Personal statement (define length; suggest that applicant state why they want to work in field epidemiology, what experiences have led them to this and what would they like to do in the future)
* Transcripts from all educational institutions attended
* Proof of professional licensure and degrees

### 4.1.4 Recruit trainees

To recruit well-qualified trainees, a marketing or advertising strategy is essential. In the same way that a company markets its product, it is important for an FETP to develop a strategy to market its program to potential trainees of high quality. Universities or local agencies should also be used to identify possible trainees.

Establishing a process for recruitment and marketing is also helpful if the program has any policies that require targeting certain population groups to ensure a diverse trainee cohort in terms of minority populations, gender, and geographic regions. If the FETP has an advisory committee, this group can provide oversight to ensure that recruiting is fair and open (see Chapter 3, Section 3.4: "Develop an Advisory Committee").

To market the program, develop a plan to contact agencies and persons who can reach appropriate candidates. According to the 1998 FETP evaluation by Battelle, 55% of trainees learned of their FETP through their employers, 11% heard about it through friends or colleagues, and 10% saw announcements in professional publications.[4]

The Battelle Report can be found in "Implementation: Appendix 1." An example of a written announcement from WHO's Global Leadership Programme is in "Implementation: Appendix 2."

Below is a list of ways in which some FETPs have marketed their programs. Some of these strategies may require a financial investment and thus should be an item in the budget.

- Develop professional and appealing recruiting materials that describe benefits for the trainee.
- Meet with directors and other staff of the agencies from which trainees will be recruited (national, regional and local public health agencies, universities, research organizations).
- Attend public health, medical, veterinary, nursing and allied health conferences and talk with faculty, staff and potential trainees.
- Post information on websites or in journals relevant to potential trainees.
- Prepare press releases for the media to highlight activities and investigations of FETP trainees.
- Contact WHO, UNICEF, other UN agencies, USAID, or other agencies.

Often a program starts by recruiting medical professionals such as physicians and nurses. Other candidates to consider include these:

- National, regional, and local public health staff
- Laboratorians
- Staff from research organizations or academia
- Veterinarians
- Public health school graduates

4. Betts CD, Abed JP, Odell Butler M, Gallogly MO, Goodman KJ, Orians C, et al. *Evaluation of the Field Epidemiology Training Program (FETP)* [unpublished]. Arlington, Virginia: Battelle Centers for Public Health Research and Evaluation. 1998.

Recruitment may also be directed at persons from certain geographic areas or population groups to make the class representative of the population being served. Policies and funding regarding benefits will need to be developed and agreed upon by the MOH, funding agencies, FETP staff, and the personnel department in the MOH. Examples of benefits used by FETPs are listed below:

- Salary supplement or stipend
- Degree, diploma, or certificate awarded at the end of training
- Attendance at international meetings
- Authorship opportunities in scientific journals
- Individual and/or family medical coverage
- Moving allowance
- Ability to work part-time during training to supplement income
- Days of vacation and sick leave allowed
- Career and promotion opportunities through an organization's career ladder (see Chapter 3, Section 3.12: "Establish Career Structure and Opportunities" for additional information on career ladders)

### 4.1.5 Receive applications

FETPs may receive many applications. To maintain a systematic process, develop a procedure to log in applications as they are received. It is helpful to develop a folder for each applicant and attach a log to list the documents received for an applicant. A log-in form will help reviewers of the applications to quickly scan and determine what materials are missing.

### 4.1.6 Screen applications

FETPs generally receive many more applications from candidates than there are available openings (new FETPs generally begin with five trainees per year). Many FETPs screen all application materials to make sure applicants meet the minimum requirements for admission. Only those candidates who are well-qualified are invited for an interview.

FETP staff or selection committee members may conduct the initial screening. It is important to develop a checklist based on the minimum criteria for admission. This checklist should be maintained in case applicants ask why they were not selected for an interview. Those candidates who are not selected should be sent a brief letter thanking them for their application but informing them that they were not selected. The director may wish to add a note to promising candidates explaining what additional courses or training they might take to make them a more competitive candidate and to encourage them to apply later.

Some FETPs, such as Brazil, use a training course to screen applicants. Because they have a limited number of openings but a large number of applicants, they invite applicants to attend an introductory training course. Staff of the FETP observe and interact with the applicants during the course. Based on the quality of the applicants' work during the course and other factors such as motivation, leadership skills, and ability to work in a team, the strongest applicants are accepted for the FETP. This course may also be part of a training opportunity for public health professionals throughout the country.

### 4.1.7 Interview applicants

After a review of the applications, the strongest candidates should be invited to an interview. These candidates should be interviewed preferably in person, or over the telephone. A standardized questionnaire for interviews should be developed.

Interviewers may include the staff of the FETP, members of the selection committee, and other public health professionals who work closely with FETP.

The interview form used by the EIS Program is on the CD-ROM in "Implementation: Appendix 3."

### 4.1.8 Select trainees

Each FETP will develop their own criteria for acceptance based on objective and subjective assessments of the applicants' submitted documents and interview. The selection process should be transparent and should include all major stakeholders in the process. In selecting trainees it is important to remember that one of the goals of the FETP is to strengthen epidemiological capacity in regional and local health agencies. The results of the selection should be documented and kept for any future reference.

Examples of selection criteria were listed in Section 4.1.2; other factors to consider include the following:

- Willingness to work to improve the health of the people of their country
- Probability of success in a career in regional or local health departments
- Interest in public health
- Locations and relevance of their previous work experience
- Intelligence and technical qualifications
- Character
- Good communication skills
- Commitment beyond a desire for stipends

### 4.1.9 Inform applicants of their status

Applicants should be notified of their status immediately upon a decision so they can make plans if a move is involved or if other employment offers are pending. The FETP may keep a waiting list of strong candidates who were not accepted due to the size of the FETP class. This list may be used if any selected candidates decide not to enroll in the FETP.

## 4.2 Organize Field Placements

Key activities in organizing field placements are outlined in this section. First, the program must decide on its field placement strategy. Where will the trainee be located during field placement? Will the trainee rotate among locations or remain in the same location throughout the program? Next, the program must select field sites adequate for the program needs and then match trainees to specific sites. Finally, the program needs to orient those selected at the sites to be the trainee's field supervisor to the FETP model and their duties as a field supervisor.

### 4.2.1 Determine field placement strategy

There are several options for organizing the field placement component of an FETP. First, decide whether the trainees will stay in the same field placement for the duration of the training program or will change sites.

**Table 8: Options for Field Placement**

**Stay in the same field placement for two years**

| Option | Description | Example |
|---|---|---|
| Option 1 | In the FETP unit or in the program to which FETP is attached | Philippines |
| Option 2 | In a central MOH disease control program | United States |

In these centrally located assignments, technical supervision will be shared by the RA, the host country FETP director, and other supervisors identified in the MOH at national level. The key point is that trainees in these assignments receive at least part of their day to day technical supervision from the RA.

| Option | Description | Example |
|---|---|---|
| Option 3 | In a state, provincial, or district health office | Uganda, United States, Australia, and Zimbabwe |

For Option 3, the primary day-to-day supervision will be with a field supervisor and then the RA or program manager provides supervision through field visits and communication by telephone and e-mail.

**Change field placement site after the first year of training**

| Option | Description | Example |
|---|---|---|
| Option 4 | First year centrally, second year in a field site other than the office where they came from when entering the training program | Kenya (second year in a provincial site) |
| Option 5 | First year in a central program, second year back in the program or agency that sponsored them. This is usually a provincial or state health department. | Italy and Taiwan |

**Rotate among several field placement sites**

| Option | Description | Example |
|---|---|---|
| Option 6 | Rotate among several central MOH programs in the first year, then spend the second year in one program or in a provincial/state health department | Thailand |

Recommendation

For a new program options 1 and 2 are generally the best for ensuring high-quality supervision and mentoring. As graduates of the program assume positions in provincial/state/district health departments they can become mentors for field placements away from the central ministry. If it is necessary to have trainees in field placements where the supervisors have not been through an FETP, then it would be useful to plan a mentoring workshop for these supervisors (see Chapter 6, Section 6.3: "Develop Staff and Field Supervisors").

Trainees are usually assigned to a fieldwork site that they have not worked in prior to their FETP experience. This is important so that they will learn a different set of skills and knowledge and not be distracted by the daily operations, politics, and other non-FETP related duties. Sometimes, it

may be necessary to have trainees remain at their former job or return to it after one year. If this is unavoidable, it is important to work closely with the trainee's supervisor to ensure that he/she understands the training philosophy of the FETP and allows the trainee to complete the activities and projects needed to develop the new competencies.

### 4.2.2 Select field sites

Field experiences allow trainees to learn through doing, as well as provide public health services to the communities in which they are working. The RA must collaborate with the country director or program manager to identify sites where trainees will have access to routine surveillance or programmatic data, be able to participate in outbreak investigations, and provide field supervision that will facilitate the trainees' ability to complete their FETP training objectives.

After deciding on a field placement strategy it will be necessary to choose specific sites for the placement of trainees.

**These factors should be considered when deciding whether a site is appropriate**

- Is there access to surveillance systems and data?
- Is this office responsible for responding to outbreaks, and/or will the trainee be able to participate in outbreak investigations?
- Will this site offer an opportunity for the trainee to complete all the requirements for the competencies?
- Is this site responsible for the public health of an administrative area, such as a district, or is this site responsible for the control of disease or group of diseases for the country?
- Is there an available field supervisor interested in mentoring a trainee?
- Does the field supervisor have the time to mentor?
- Does the field supervisor have the necessary experience to mentor a trainee? If not, is there some other person who can provide this mentoring?

A sample guideline for evaluating new field sites is included in "Implementation: Appendix 4."

The FETP should establish a written agreement to be signed by representatives of the field site and the FETP. Persons signing for the field site may be either field site administrative personnel or the selected field site supervisor. For the FETP, the agreement may signed by the country or program director. If the field agreement is completed after a specific trainee has been selected, the trainee may also sign the agreement.

A template for a field placement memorandum of understanding is on the accompanying CD, "Implementation: Appendix 5." Instructions for completing the template are at "Implementation: Appendix 6."

### 4.2.3 Match trainees to field placement sites

It is critical that each trainee is assigned to an appropriate field site that provides him/her with adequate opportunities to develop the competencies and to provide service applicable to projects that will improve public health.

**Table 9: Options for Matching Trainees to Field Placements**

| Option | Description | Example |
|---|---|---|
| Option 1 | All trainees go to the same site, such as to the FETP unit itself or to the program to which the FETP is attached. This could be for the full two years, or possibly just for the first year. If it is just for the first year, then trainees could go through a matching process for their second year placement, or could return to the program from which they originally came. | Italy |
| Option 2 | Recruit trainees for the program and match them to available positions. This can happen after their acceptance into the program and before the training starts; or it can happen during the introductory course. Either way, trainees should interview with staff from possible field sites. Program staff then matches trainees to assignments based on the program's evaluation of the trainee and on trainee preferences. | United States, Australia, Kenya, Zimbabwe, and Uganda |
| Option 3 | Recruit trainees for specific positions. The trainee will know where he/she will be doing their apprenticeship at the time they accept a position in the FETP. | |

#### Recommendation

No matching option is better than the others. Most important is access to the right kind of field activities, and good quality mentoring and supervision.

#### Matching process

The following steps are used by some FETPs to match trainees and sites:

- Write summaries of each assignment and distribute summaries to trainees
- Have trainees indicate their preferences based on the summaries
- Arrange for trainees to interview with representatives of several of their preferences
- Review the trainees' previous experience (e.g., application materials, curriculum vitae)
- Determine an appropriate match
- Sign an agreement between fieldwork site and FETP (see "Planning: Appendix 4")

#### Considerations in matching

- MOH and field site needs
- Trainee needs, interests, and background; many FETPs consider whether the trainee has worked in a site previously and try to provide a different setting than he or she had before entering the training program
- Quality of supervision at a specific site
- Geography (Is there a region of the country that needs trainees more than others?)
- Funders' requests (For example, a funding agency may request trainees specifically for an HIV program.)

Some programs may need a matching process to determine which field site a trainee will go to during the field assignment if the field placement strategy is one that identifies a specific field site upon recruitment. Other programs may match trainees to field sites after the introductory course.

Programs may use a match process to pair trainees with field sites based on mutual interest after an interview with the onsite supervisor. The following are steps used by some FETPs to match trainees and sites:

- Write summaries of each assignment and distribute summaries to trainees
- Develop a questionnaire for trainees to indicate their preferences
- Arrange for trainees to interview with supervisors from several field sites
- Review the trainees' experience
- Determine appropriate match
- Sign agreement between fieldwork site and FETP (see Section 4.2.2)

Field placement is a critical issue for the success of an FETP. Fieldwork provides practical learning opportunities for trainees to implement the concepts they learn in the classroom and to develop and demonstrate established competencies. Creating effective field placements is often one of the most difficult parts of developing the curriculum. It is easy to focus on the didactic part of the curriculum and forget that the fieldwork accounts for 75% or more of the trainees' time, depending on the program. Field placement may be one of the main limiting factors to class size.

### 4.2.4 Orient field supervisors

Field supervisors are a critical part of the day-to-day life of a trainee. To be effective it is essential that the supervisor is

- Informed of their role in the trainee's activities,
- Motivated to facilitate the activities of the trainee.

A field supervisor should collaborate with the national counterpart and the RA in the following activities:

- Meet regularly with the trainees during their field placement
- Identify projects in which trainees can contribute to their agency
- Identify resource persons with whom trainees can collaborate or who can help trainees to implement needed investigations or studies
- Introduce trainees to public health professionals throughout the public health system to help the trainee broaden his/her network of professional colleagues
- Facilitate the accomplishment of trainees' projects
- Provide feedback to trainees on their projects
- Locate funding for trainees, if necessary, to allow them to complete their projects
- Help trainees avoid political or administrative difficulties
- Help guide trainees in the implementation of recommendations made in their field studies
- Encourage publication and presentation of the trainees' projects (and not compete with trainees for authorship, presentations, or projects)

Ideally, supervisors can also benefit professionally by having a productive trainee under their guidance.

A specially designed short-course for supervisors can help clarify expectations and develop FETP mentorship skills for field supervisors. The training may cover the following topics:

- Overview of an FETP
- Responsibilities of field supervisors
- Overview of trainees' required field activities and responsibilities
- Relationship of the field to the resident advisor and/or program manager

For programs where field supervisors have a sufficient amount of skill in field epidemiology to provide technical guidance to trainees, the training should teach supervisors how to mentor a trainee in each field activity the trainee must complete in the field (e.g., field study, outbreak investigation). For programs where field supervisors have less epidemiology experience, it will be important to provide an overview of what is required of the trainees in their field activities and to teach the supervisors how to identify other experts who can provide technical feedback to the trainee.

See "Implementation: Appendix 7" for an overview and sample syllabus of mentor training presented in China.

The field placement memorandum of understanding, discussed in Section 4.2.2, also serves the purpose of establishing an agreement between the FETP and the field supervisor regarding supervisory duties and responsibilities. See Chapter 6, Section 6.3: "Develop Staff and Field Supervisors" for more information on field supervision and orientation and training of field supervisors.

### 4.2.5 Evaluate field sites

During the course of the traineeship, it is important for the FETP to monitor the progress of the field placement and make changes if necessary. Field sites should be evaluated periodically to determine if the sites continue to offer valuable opportunities for trainees to apply the skills they learn in the classroom.

#### Methods for gathering information about a field site

- **Site visits:** In programs where trainees work regularly in a field site, the RA or program manager periodically visits the trainee to provide additional supervision and support of field activities. During a site visit, the FETP staff member may also visit facilities in which the trainee works, outbreak investigation sites, and local public health agencies and laboratories to gather additional information about the field site in regard to how well it provides appropriate resources and opportunities for trainees.
- **Surveys or interviews:** It is helpful to discuss the field site with trainees, supervisors, and other staff working with trainees. It is preferable to conduct the interview in person, but a telephone interview or written survey can also be valuable. An interview does not have to be formal, but it is helpful to develop a list of questions prior to the interview or discussion.

**Information to gather about a field site**

- Is there adequate space for the trainee?
- Is there a computer assigned to the trainee?
- Is there adequate software available for the trainee to complete assignments?
- Are there adequate office supplies for the trainee to complete assignments?
- Is there office support available (telephone, fax machine, photocopier, secretarial support)?
- What are the qualifications of the supervisor?
- Is there a back-up supervisor?
- Does the supervisor understand the duties and time required for supervision? What percentage of his/her time does a supervisor spend in direct supervision of a trainee? Is there a process for identifying, implementing and completing projects?
- Is the supervisor committed to applied training?
- Does the supervisor provide timely oral and written feedback to the trainee?
- Does the trainee have the opportunity to respond to the supervisor's feedback?
- What investigation and research opportunities are available through the fieldwork site? How have the results of previously completed projects been used?
- Does the site have enough opportunities for the trainee to learn a variety of skills and fulfill their competencies?
- Is there organizational commitment to hosting a trainee?
- Are there adequate opportunities for the trainee to achieve the FETP competencies?

See "Chapter 8: Monitoring and Evaluation" for more details on the processes of monitoring and evaluation.

## 4.3 Develop Network for Graduates

An active network of FETP graduates can help facilitate continuing professional development by sharing experiences in field epidemiology. Besides informal sharing of employment opportunities, a strong epidemiology network can help develop career paths and attract future support of FETP activities. National conferences are one forum of maintaining communication among FETP graduates. The network can also be a source of developing policy recommendations for improving public health surveillance and related practices.

As previously mentioned, TEPHINET is an international organization dedicated to the support of FETPs and related professional development. TEPHINET has biennial international conferences where FETP and related programs' trainees and graduates gather to share professional experiences and strive to improve the development of epidemiology capacity. During the years when the global conference is not held, six regional TEPHINET groups put on their own conferences. These six regions include Africa, the Americas, the Eastern Mediterranean, Europe, Southeast Asia, and the Western Pacific.

These national, regional, and global conferences play an increasingly important role in strengthening the development of field epidemiology, and raising the status of the profession while advancing epidemiologists' ability to improve public health.

# 5 Curriculum and Training

This chapter describes

- Basic training models used by the training programs
- Design of the training program to produce a complete curriculum
- Development of lesson plans for the didactic (classroom) and field portions of the program
- Delivery methods and logistics for the didactic and field portions of the program
- Evaluation of the curriculum and training, learners, field activities and system development

## 5.1 Training Models

The common theme to all field epidemiology training programs is that each is competency-based—meaning these programs provide training and experience in the knowledge and skills that enable the trainee to demonstrate the competence to be a field epidemiologist.

However, several variations of the FETP training model exist. Within the programs one of the most common variations is in the choice of when to present the body of the didactic (classroom) content. Some programs present most of the classroom material as one course at the beginning of the program and some present classroom content as modules throughout the two years.

Another common variation in programs is where the trainees are placed in the field portion of the program. Often trainees are placed in field assignments dispersed throughout a country or region, where they spend significant time interacting with field supervisors. They are visited on occasion by the RA or counterpart with communication by phone or e-mail in the interim. In some cases trainees remain in a central location and primarily interact with the RA or counterpart.

The table below provides examples of some of these variations.

**Table 10: Examples of Different Training Models within FETP**

| Program | Program | Type of Didactic | Placement |
|---|---|---|---|
| Central America | FETP (university associated) | Four modules of about 2 weeks each | Dispersed throughout region, but centralized within the country |
| Central Asia | FETP | Introductory module of 10 weeks with three additional modules of 2 weeks each | Dispersed |
| Jordan | FETP | Introductory module with lectures and short courses throughout the program | Central |
| Kenya | FELTP (university associated) | Five modules of about 2 weeks each | Both central and dispersed |
| Zimbabwe | PHSWOW (university associated) | One course of 7 months | Dispersed |

## 5.2 Designing the Curriculum

In a competency-based training program, the design of the curriculum begins with developing competencies and associated instructional goals and learning objectives. These instructional goals and

learning objectives provide the basis for the training activities that develop the skills and knowledge required for competence.

### Definitions of competencies, instructional goals, and learning objectives

Competencies, instructional goals, and learning objectives are summarized below.

**Table 11: Competencies, Goals, and Objectives**

| Term | Purpose | Definition | Example |
|---|---|---|---|
| **Competency** | Describes the expectations for job performance and for evaluation of the individual | An integrated set of knowledge, skills, and attitudes that supports successful performance in public health service context | Use epidemiologic practices to conduct studies that improve public health program delivery |
| **Instructional Goal** | Guides the development of an instructional activity and provides the starting point for subsequent planning | A broad statement of intent of a formal instructional plan that describes learning outcomes | Design and conduct analytic studies |
| **Learning Objectives** | Frames specific lessons within an instructional goal and provides guidelines for content development, delivery method, and evaluation | A specific statement of what a learner will be able to accomplish on completion of a lesson or instruction activity | Construct a 2 x 2 table, tabulating the occurrence of disease and exposure in study participants |

### Purposes of competencies, instructional goals, and learning objectives

- Create the foundation for a training program
- Serve as guidelines for faculty and trainees to identify the purposes and specific expectations of training
- Provide the basis for evaluating trainees and a program
- Ensure that learning activities encourage acquisition of competencies
- Guide instruction

Instructional goals and learning objectives are based on competencies and provide information for trainees, instructors, and partners.

Instructional goals and learning objectives for the **trainee**:

- Organize the content that is presented to them
- State expectations for what they need to accomplish
- Guide self-study activities, readings and additional learning opportunities
- Establish accountability between the program and the trainee
- Clarify the trainee's responsibility for the competencies which they are to acquire

Instructional goals and learning objectives for the **instructor**:

- Establish what is to be taught in a session
- Guide preparation, selection of material, activities and field experiences
- Guide preparation of assessment tools to measure learning
-

Instructional goals and learning objectives for **partners** (staff, colleagues, funders):

- Specify the training content covered by the program, providing a basis of comparison with other programs or to establish credit for university-based programs
- Make it possible to identify possible overlaps or gaps between sessions within a course and between courses
- Ensure the program, for each subsequent training cohort, provides a common set of learning experiences for all trainees
- Provide a consistent message about the design and delivery of instruction

A complete curriculum including a set of instructional goals (and accompanying learning objectives) for each suggested competency is included in "Curriculum and Training: Appendix 1."

The following sections will describe competencies, instructional goals, and learning objectives.

### 5.2.1 Agree on competencies

One of the first tasks that must be conducted when implementing an FETP is to agree on the competencies that students will demonstrate upon completion of the program.

#### Competency review process

1. Review the suggested competencies (see Section 3.3).
2. Determine if these competencies adequately meet the needs of the country.
3. Develop competency statements for any additional competencies the country wishes to include in the program.

#### Competency areas

The competency areas and the statements defining the activities required to achieve the competencies of a typical program are listed in Section 3.3. If additional competencies are needed for your program, it will be necessary to develop each new competency and the accompanying instructional goals and learning objectives.

See "Curriculum and Training: Appendix 2" for more on developing new competencies, instructional goals, and learning objectives.

### 5.2.2 Review competency-based instructional goals

Once competencies are established, instructional goals are developed for each specific competency. The second task after reviewing competencies is to complete a review of the instructional goals.

#### Instructional Goals Review Process

1. Review the suggested instructional goals.
2. Determine if these adequately fulfill the competency statements for the country's needs.
3. Add additional instructional goals to competencies if needed.
4. Develop new instructional goals for any added competencies.

If a new competency has been defined or if the program needs to add an instructional goal to one of the previously described competencies, define a new instructional goal to accompany it.

See "Curriculum and Training: Appendix 1."

### 5.2.3 Review goal-based learning objectives

For each instructional goal, learning objectives are developed to describe with precision what will be learned during the course of instruction. From the objectives, begin the development of content rather than breaking down the element further. For example, "Define epidemiology" would not be broken down further. The definition of epidemiology can be written as the content for that learning objective.

#### Learning Objectives Review Process

1. Review the suggested learning objectives for each instructional goal.
2. Determine if these adequately fulfill the instructional goals that meet your country's needs.
3. Add additional learning objectives to instructional goals if needed.
4. Develop new learning objectives for any added instructional goals.

### 5.2.4 Finalize curriculum

The competencies, instructional goals, and learning objectives agreed upon (or newly developed) will be used to finalize a full curriculum for the FETP. The curriculum will consist in the following:

- Competency statements
- Instructional goals
- Learning objectives organized into topics or sessions
- A description of the activities to assess the learner

Curriculum content will depend on the public health needs of the country and the needs of the trainees. Developing the curriculum for an FETP is an ongoing process. Changes may be needed to respond to the following:

- Changes in the public health needs of a country (for example, the Central American FETP added sessions in disaster epidemiology after earthquakes in that region)
- Changes in trainee skill levels (trainee backgrounds and skills may vary between classes and an FETP will need to adapt the curriculum accordingly; this may be determined through the curriculum evaluation process)
- Changes in funders or donors (the interests of a specific funding source can have an impact on the content that is taught)

Methods that can be used to determine whether the curriculum, as designed, is going to meet these changing needs include conducting self-assessments and/or pre-tests prior to the start of a cohort. Both will provide a practical assessment of knowledge and skills and can be used to identify whether changes in the curriculum need to be made.

To determine if public health needs within the country are changing, it may be beneficial to use a section of the FETP Planning Tool entitled "Public health environment," (included in "Assessment: Appendix 1") which concentrates on priorities of the MOH and the burden of disease within the country, to reassess the country's needs. This information will also assist in identifying specific gaps in the curriculum that may need to be developed.

#### Organize learning objectives into topics

After competencies, instructional goals, and learning objectives are established, the learning objectives can be organized into topical areas. Sometimes a single instructional goal can serve as a topic area and all the learning objectives within that instructional goal will make up the topic area. Other times an instructional goal may be too broad and the learning objectives will need to be organized into a logical grouping.

Following are two rules of thumb that may be helpful in establishing what might be contained in a topic:

- Does each learning objective relate to each other? All the learning objectives will relate to the instructional goal, but sometimes these learning objectives may themselves break down into a logical group.
- Can I present the content within a timeframe that will provide continuity to the learner? A one to two-hour time frame to present content and examples is usually a good rule of thumb.

Create a title for the topic area—this often serves as the presentation title used later when creating the lesson plan. The grouping of learning objectives will serve as the content as outlined in the lesson plan (mentioned later in this section).

For example, designing and conducting analytic studies is one of the instructional goals in the FETP standard curriculum. The learning objectives for that goal have been broken down into four topics—Analytic Study Design, Introduction to Sampling, Measures of Association and Impact, and Causation.

#### Sample topic

| Topic | Measures of Association and Impact |
|---|---|
| **Related Instructional Goal** | Design and conduct analytic studies<br><br>(*Note*: Measures of association is one of several topics within this instructional goal.) |
| **Learning Objectives** | 1. Construct a 2 x 2 table, tabulating the occurrence of disease and exposure in study participants<br>2. Describe two ways to determine an excess risk of disease in persons exposed to a certain agent<br>3. Calculate absolute risk (risk and rate difference), relative risk, rate ratio, and odds ratio<br>4. Describe the impact of differential and non-differential misclassification of subjects for exposure and disease<br>5. Determine the attributable risk<br>6. Determine the preventive fraction<br>7. Determine which measures of association or impact are appropriate for a cohort of case-control study design<br>8. Describe in non-technical terms the interpretation of measures of impact and association |

### 5.2.5 Create instructional plan

Planning instruction involves identifying training delivery methods, outlining training activities, identifying training techniques to use with each activity, and creating a lesson plan.

#### Identify delivery methods

After establishing competencies, instructional goals, learning objectives, and topics, the next step in developing the curriculum is to identify methods of delivery for the didactic portion of the program.

Training delivery methods are the mode and technology by which training is delivered. Common delivery methods are

- Instructor-led classroom training,
- Self-paced training, such as self-study workbooks or computer-based tutorials,
- Distance learning methods, such as satellite or Web-based broadcast of lectures or demonstrations.

Many FETPs rely on the classroom for structured instruction, but there are an increasing number of options for alternate delivery methods. CDC's modular learning components ("mini-modules") offer content, examples, and practice to achieve specific learning objectives. Each program can determine its best training delivery methods. Successful programs combine a variety of training delivery methods to achieve instructional goals.

### Outline the training activity

Once a delivery method is chosen, it is important to include these primary elements of a training activity:

- Content
- Examples
- Practice
- Assessment

For each learning objective, curriculum planners and instructors should strive to include each of these elements, which make up a complete training. Training that only includes lectures and examples from an instructor will not allow the trainee to achieve competency. The trainee must have guided opportunities to practice what is taught. The program also needs to assess that the trainee has learned what has been taught and practiced. Additionally, the program must be able to assess that the trainee has indeed learned what has been taught.

Next we will discuss a variety of training techniques that can be used to present content and examples to provide practice for, and assess the trainee.

### Identify Training Techniques

A variety of techniques are available to achieve learning and, ultimately, competency. Common training techniques familiar to FETPs are lectures and case studies. However, there are many other training techniques available and some of these will be discussed further in this section.

Note that these training techniques differ from delivery methods. A lecture can be delivered in person by an instructor in a classroom or via the Internet in a Web broadcast. Also note that a lecture via the Web could be broadcast live or it could be recorded and available to trainees at any given time. While most of the training techniques discussed are most often used in a classroom, several can be modified to be used though distance-based delivery or in self-study format.

**Types of Training Techniques**

The following section describes some common training techniques, the elements of training (content, examples, and practice) for which the technique is usually appropriate, and some advantages and disadvantages of each technique. These techniques are used most often in the classroom setting, but you may find opportunities to use these techniques with other delivery methods, such as a self-paced practice exercise. The learning objectives, together with teacher and participant background and experience, may influence which of these techniques may be most effective in a given setting.

- **Lecture**
- **Assigned reading**

- **Panel discussion—**A panel of experts may be invited to present on and discuss various aspects of a topic.
- **Demonstration—**An instructor may demonstrate a skill, such as how to collect specimens. Trainees can then perform the same demonstration as a practice activity.
- **Group discussion—**Discussion among trainees can encourage critical thinking and elicit examples with which the trainees are familiar.
- **Role play—**Trainees are given a problem or scenario and assigned a role to act out. Role plays work well with objectives that intend to teach interaction with others, such as how to conduct interviews.
- **Case study—**This method, commonly used in FETPs, involves a multi-part scenario with questions for trainees to answer as a group.
- **Brainstorm—**Trainees are given a problem or topic and asked to think of multiple solutions or responses. No response is incorrect although advantages and disadvantages of each may be debated.
- **Problem-solving or practice exercise—**Problem-solving exercises may be simple to complex and intended for individual or group response. A simple, individual activity might be to calculate a series of proportions and rates. A complex group activity might involve designing a mock surveillance system.
- **Field exercise—**In FETPs it is common to include a field exercise within the didactic portion of the course. This usually involves conducting a survey or study in the field to provide complete, real-world experience.
- **Simulation—**Similar to a field exercise, this may involve a scenario that would normally not be possible without simulation, such as disaster preparedness.
- **Quiz or exam**

Training techniques may be used for more than one of the elements of a complete training. The following table provides a brief summary.

**Table 12: Training Techniques**

| Technique | Content | Example | Practice | Assessment |
|---|---|---|---|---|
| Lecture | ☑ | ☑ | | |
| Assigned Reading | ☑ | ☑ | | |
| Panel Discussion | ☑ | ☑ | | |
| Demonstration | ☑ | ☑ | ☑ | ☑ |
| Group Discussion | | ☑ | ☑ | |
| Case Study | | ☑ | ☑ | ☑ |
| Role Play | | | ☑ | ☑ |
| Brainstorm | | | ☑ | |
| Practice Exercise | | | ☑ | |
| Field Exercise | | | ☑ | ☑ |
| Simulation | | | ☑ | ☑ |
| Quiz or Exam | | | ☑ | ☑ |

Note that several techniques can be used to assess learners. For example, you can use observation tools to note if a trainee is able to demonstrate skill and knowledge in a field exercise, simulation, role-play, or demonstration. Of course, ultimately, competency must be demonstrated in the field activities required in the program (see Section 5.2.8).

Descriptions of the selected techniques can be found in a lesson plan, which will be discussed in the following section.

### Choosing a Training Technique

There are important reasons to use a variety of training techniques rather than relying on only one technique. These reasons are summarized below.

- **Meet a variety of learning objectives.** Certain teaching techniques may fit the purpose of a learning objective—the competency that the learner is intended to demonstrate—better than others. This is true for learning objectives that may seem to be similar. For example, a learning objective in which trainees are to define the term "rate" might be taught during a lecture that is followed by questions and answers during which trainees are asked to define the term. If the objective is that trainees should calculate a rate, the training technique might be a variety of exercises or a case study that requires trainees to calculate rates.
- **Meet a variety of trainee needs, interests, and abilities.** Trainees come from a variety of backgrounds and learning experiences. Some people may be more comfortable in a large group discussion and others may prefer small group discussions. It is not possible to customize training for everyone's differences but it is beneficial to use a variety of techniques to meet the needs of trainees. Information from the needs assessment may provide ideas of the types of techniques that trainees prefer.
- **Stimulate a variety of senses.** Using techniques that allow trainees to use more than one sense can reinforce learning. Frequently, it is more effective to show a concept using a variety of senses rather than to tell about the concept. The most common example of this is faculty who use visual aids as they teach. This allows trainees to hear and see the information, using more than one sense at a time.

Other factors may also affect the training techniques that are chosen.

- **Skills of the trainer.** As with trainees, trainers come from a variety of backgrounds. Not everyone is skilled in using all techniques. While it is important to try new techniques, some trainers might benefit from observing others using a new technique prior to implementing it.
- **Resources.** The type of training techniques used may be determined by the available training space (there may not be space for small break-out group discussions), available technology (there may not be access to the Web for Web-based training), funding (there may not be money for a visit to a public health facility in another city), and other factors.

### Create a lesson plan for each topic

Lesson plans are blueprints for organizing course content. They include directions to the instructor about suggested content, examples, practice activities (including classroom and field exercises), and assessment activities. Additionally, lesson plans should include any necessary directions to the instructor on how to prepare and present the course.

Detailed instructions on how to create an effective lesson plan and an example are included in "Curriculum and Training: Appendix 3."

### 5.2.6 Create two-year program schedule

Once lesson plans are completed for each topic in the curriculum, noting both classroom and field placement activities, create a two-year class schedule. The schedule should allow enough time to cover the didactic portion of the course with the majority of time dedicated to field placement activities. Include any holiday scheduling as well. A sample schedule for an FELTP appears below.

| | Duration | Attended by | J | F | M | A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **YEAR 1** | | | | | | | | | | | | | | |
| **Introductory Course** – Epi Methods (descriptive), Biostatistics, Computer Technology | **4 weeks** | Epi & Lab | | | | | | | | | | | | |
| **2nd Course** – Surveillance, Epi of Priority Diseases and Injuries | **2 weeks** | Epi & Lab | | | | | | | | | | | | |
| **3rd Course** | **2 weeks** | | | | | | | | | | | | | |
| • Scientific Communications | 1 week | Epi & Lab | | | | | | | | | | | | |
| • Advanced Epi – concurrent | 1 week | Epi | | | | | | | | | | | | |
| • Lab Methods – concurrent | 1 week | Lab | | | | | | | | | | | | |
| **Field Placement** | **2 hours** | | | | | | | | | | | | | |
| **Monthly Seminar** | **2 hours** | | | O | O | O | O | O | O | O | O | O | O | O |
| **YEAR 2** | | | | | | | | | | | | | | |
| **4th Course** | **1 week** | | | | | | | | | | | | | |
| • Prev. Effectiveness – concurrent | 1 week | Epi | | | | | | | | | | | | |
| • Lab Policy – concurrent | 1 week | Lab | | | | | | | | | | | | |
| **5th Course** | **2 weeks** | | | | | | | | | | | | | |
| • Management and Leadership | 1 week | Epi & Lab | | | | | | | | | | | | |
| • Lab Management | 1 week | Lab only | | | | | | | | | | | | |
| **Final Assessment** | **2 weeks** | | | | | | | | | | | | | |
| **Field Placement** | **2 hours** | | | | | | | | | | | | | |
| **Monthly Seminar** | **2 hours** | | | O | O | O | O | O | O | O | O | O | O | O |

Residents must participate in the monthly seminar from their field sites.
*O=Ongoing

**Figure 2: FELTP Schedule**

### 5.2.7 Create training material development list

For each lesson plan there will be a list of documents needed to find, develop, or create a complete curriculum. Most of these items were listed in the "Materials and Equipment Required" section of the lesson plan.

- List of materials needed to cover each aspect of the lesson plan: content, examples, practice, assessment
  - Content and examples
    - Lectures (e.g., PowerPoint presentation)
    - Demonstration materials (e.g., lab supplies to demonstrate lab techniques, datasets for the instructor demonstrate analysis)
    - Panel discussion guidelines
    - List of guest lecturers or groups to invite to panel discussions
    - Reading lists
  - Practice activities
    - Directions/guidelines to the student for the practice activities, such as role-playing, debates, practice exercises
    - Source materials for the activity (e.g., datasets, scientific articles)
    - Case studies
    - Self-study materials (e.g., workbooks, CD-ROMs)
  - Assessment
    - Quiz and exam questions
    - Checklists for observations
- Directions to the instructor on how to complete each activity

### 5.2.8 Define expectations for field activities

It is advisable to specifically state the criteria and guidelines for what is expected of the trainees during the field placement portion of the program.

**Sample questions**

- How many outbreak investigations must they complete?
- What is the expectation for how they should document and report these activities?

In many programs the field activities fall into these categories (this is not an inclusive list):

- Emergency field investigations (e.g., outbreak investigations, disaster response)
- Epidemiologic study (e.g., case-control study)
- Surveillance project (e.g., evaluate a surveillance system)
- Surveillance data analysis
- Seminar or conference presentation (based on epidemiologic study or emergency field investigation)
- Manuscript development

A description of the expectations for documenting and reporting each of these field activities is needed to provide explicit expectation for the trainee as well as the RA and field supervisors.

A sample trainee workplan appears in "Curriculum and Training: Appendix 4."

## 5.3 Developing Training

### 5.3.1 Create course syllabus

The didactic (classroom) portion of the course can be organized with the list of lesson plans. The classroom portion should cover the content, examples, and practice activities.

1. Determine the length of the day and create a calendar-style table that lists events by every hour or half hour.
2. Identify any and block out time for any necessary breaks (lunch, tea).
3. List each topic according to the length of time needed.
4. List specific practice activities if more than one hour in length. For example, list a block of time for presenting case studies.

An example of a course syllabus appears in "Curriculum and Training: Appendix 5."

### 5.3.2 Choose appropriate existing class materials

Review the training materials development list (from Section 5.2.7) and research available training materials.

Through research with colleagues, the library, and the Internet, it is possible to find a good portion of material that is usable as is or with some minor adaptation (e.g., examples that fit your country context). If material cannot be used directly, it can provide the resource material for future training materials.

Materials developed by CDC specifically for FETPs can be found at www.cdc.gov/descd/materials.html. You may also find a list of materials on the TEPHINET website (http://tephinet.org).

### 5.3.3 Develop new class materials

If material to suit the program's needs is not found, it will be necessary to develop new materials. You may find that lectures cover content and examples, but that there are no practice or assessment activities to complement them.

NOTE: It is beyond the scope of this document to provide in-depth discussion of training materials development. For further instruction on training development, see "Curriculum and Training: Appendix 3."

### 5.3.4 Develop field study

The field study/survey is a valuable type of field exercise and should be incorporated into the curriculum as soon as the trainees have completed all instruction related to developing a study. They should have completed the following:

1. Study design
2. Questionnaire design

3. All basic statistics required to analyze the study

*Note:* If the study is descriptive, such as a cross-sectional study, trainees do not necessarily need to have covered advanced analytic statistics. A good understanding of analyzing data by time, place, and person may be sufficient before conducting this activity.

4. Analyzing and presenting data in tables, graphs, charts, and maps
5. Epi Info

The field study provides practice in all these activities. It is best to conduct the field study as close as possible to the completion of these activities during the course, so that trainees can immediately apply what they have learned. It is a good idea to follow the field study with training on reporting of studies and investigations to provide trainees with practice in report writing.

"Curriculum and Training: Appendix 6" is a checklist to ensure a successful field study.

### 5.3.5 Link didactic course content to field activities

Setting specific and realistic expectations for the trainees while in the field will support the attainment of required competencies. It is here that didactic preparation supports services which affect the health of the population. Identify clear activities and evaluation expectations after considering the curriculum of the didactic component and the course schedule. A formal workplan that details expectations provides guidance to the trainees and helps prioritization of activities.

Field activities should be directly linked to the desired competencies. Expect some type of activity for every competency domain.

"Curriculum and Training: Appendix 7" contains activities and indicators to demonstrate competency in each recommended competency domain.

Before releasing the trainees for their field placement, conduct individual meetings to review the workplan and agree on target completion dates. As part of the trainees' evaluation in the program, they may be asked to create a portfolio of the products created during their field activities.

A sample portfolio may contain the following:

- A report of a field investigation of an outbreak or other acute health problem
- A late draft of a scientific paper submitted for publication to a refereed journal
- A report accepted for publication in the national epidemiology bulletin
- A review of a communicable disease surveillance or laboratory system in which the trainee has been practically involved during the periods of field placement
- A summary of practical epidemiologic experience gained during the field placement

Moreover, trainees should be given the opportunity to evaluate their field experience and the support they received. Constructive comments from the trainee can help improve the program as a whole and alert the FETP staff to challenges in the field.

"Curriculum and Training: Appendix 8" contains a sample evaluation form for a trainee to comment on satisfaction of the field placement component.

## 5.4 Delivering Training

### 5.4.1 Manage logistics of training events

Organizing and managing training events such as workshops, training courses, or seminars involve many details and take a lot of time. It is not always possible to have a staff member who handles all the logistics of trainings so it is important to consider all the tasks and determine who will be responsible for each.

The following table summarizes the tasks involved in coordinating the training. More detail follows on certain key activities.

**Table 13: Training Course Checklist**

| | |
|---|---|
| ☑ | **Three months before the course**<br>• Finalize course objectives, dates, and training facility location<br>• Finalize budget (include facility fees, travel and per diem for faculty and trainees, transportation for field studies, faculty honorariums, and printing)<br>• Confirm faculty participation and prepare invitation letters<br>• Select training site (see below) |
| ☑ | **Six weeks before the course**<br>• Conduct orientation for faculty (see Section 5.4.3)<br>• Contact training facility to request room arrangements and audiovisual equipment based on instructor requirements (see below)<br>• Develop faculty list with names, titles, and addresses<br>• Develop participant list with names, titles, and addresses |
| ☑ | **Three weeks before the course**<br>• Order supplies (e.g., binders, name badges, notepads, pens, CD-ROMs)<br>• Finalize course syllabus<br>• Remind instructors to submit their materials for review and reproduction |
| ☑ | **Two weeks before the course**<br>• Send materials for photocopying (e.g., syllabus, handouts, evaluation forms)<br>• Send final syllabus to faculty |
| ☑ | **One week before the course**<br>• Develop evaluation forms (see Section 5.5)<br>• Fill binders with materials<br>• Visit facility to confirm room arrangements and audiovisual capabilities |
| ☑ | **After the course**<br>• Collect evaluation forms from participants<br>• Compile evaluation summaries (see below)<br>• Send thank you letters to faculty<br>• Make final payments for hotel and per diems<br>• Send summary of course to MOH and donors (see below) |

#### Select training site

One of the biggest training logistical challenges is space. FETPs may not have their own classrooms. Frequently, space can be provided from a university or the MOH. For some events, it may be necessary to rent space at another facility such as a hotel. When renting space, it is important to obtain a written agreement between the renting facility and the FETP. Document all interactions with hotel staff to avoid any miscommunications.

**Before considering training site requirements, consider these factors**

- Will there be persons with disabilities whose needs must be considered?
- What type of room layout is required for the planned activities?
- Will extra rooms be needed for break-out sessions?
- Does the site have audiovisual equipment or will it need to be rented?
- Will trainees need lodging at the training site?
- Will food and beverage be provided?

**When working with an external facility, such as a hotel, consider these factors**

- What is the cost per day/hour?
- What does the cost include (e.g., room only, room plus audio-visuals)?
- If audio-visuals are included in the cost, is there a technician available at the facility to help if there are problems?
- Is there a discount if trainees or faculty reserve sleeping rooms?
- Is there a cancellation fee?

#### Contact facility to request room set-up for training

A professional facilities coordinator at the event site can often help identify the best room configuration for your requirements.

When determining room set-up consider these factors:

| | |
|---|---|
| **Number of participants** | Small class sizes have greater flexibility and may even function well in a conference room. Larger class sizes require greater consideration of accessibility to work spaces and visibility. |
| **Classroom activities** | For computer-based courses, allow enough space per participant for computer equipment. Typically, computer based courses work well in classroom-style or U-shape configuration. For small group work or highly interactive classes, small round tables of 5-10 seats typically work best |
| **Break-out sessions** | For concurrent sessions or project work, a selection of small classrooms is usually preferable to grouping work teams in corners of a large room. |

### 5.4.2 Coordinate faculty

Coordinating the schedules of prospective instructors is often a daunting task. Review your agenda and identify which topics in the syllabus have pre-requisites that are flexible. When identifying faculty, seek not only experts in the subject matter, but those individuals whose instruction philosophies adhere to FETP priorities and are effective instructors.

### 5.4.3 Conduct orientation for instructors

An orientation for the identified instructors can help support the success of the course. This step is especially important if instructors are coming from various institutions or are new to the FETP. The orientation meeting introduces the instructors to the overall goal of the course, sets expectations and due dates for the instructors, and helps prepare for smooth transitions between instructors. This step can be done via a meeting or teleconference.

### Orienting faculty

It is suggested that the program develop an orientation course and manual for faculty.

TEPHINET and FETP staff in other countries are good resources regarding the programs and materials they have used to orient faculty.

### Suggested content for faculty orientation

The content for orienting faculty to the FETP will vary. Topics to consider include the following:

- Introduction to the FETP training model
- Administrative details (e.g., compensation, per diem, lodging if faculty from out of town)
- Introduction to competencies/goals/objectives
- Design of curriculum
- Sequencing of course and activities
- Design of materials and how to use materials effectively
- Presentation of effective technical content using audio-visual equipment, tables, graphs, and software
- Course agendas
- Logistics of course
- Teaching techniques
- Group facilitation skills for use in case studies, field exercises, and other activities
- Available audio-visual support
- Evaluation methods
- Evaluation forms

A sample agenda for an instructors' orientation meeting is included in "Curriculum and Training: Appendix 9."

## 5.4.4 Conduct effective lectures, case studies, exercises

The following tips can assist you in maximizing the effectiveness of class time.

**Lecture Tips**

- Have a colleague observe your lecture style and provide feedback on your voice and body language (mannerisms).
- Remember that learners retain most effectively when they 'say and do.' Keep lectures to a minimum and encourage interaction.
- Challenge the students to provide examples of how they would use a concept with their current responsibilities.
- Apply the 10 Minute Rule: Do not let more than 10 minutes go by without some kind of interaction with the learners, even if it is just to ask a question.
- Reduce fatigue by taking hourly breaks. Have everyone stand up and stretch, or take a 10-15 minute break.
- Before proceeding to a new topic, ask for questions.
- In multi-day sessions, begin the day by asking if there are questions from the previous day.
- Begin a session by reviewing the session agenda and learning objectives
- Conclude a session by reviewing learning objectives and connecting it to the subsequent activity.

**Case Study Tips**

- Ensure you have enough facilitators to support the class size. A good rule of thumb is 1 facilitator for every 10 participants.
- Be sure all concepts have been introduced in class before beginning a case study.
- For larger groups, consider breaking the class into teams to encourage interaction.
- Be aware of students who are dominating the discussion.
- Be aware of students who do not actively participate. If necessary, rearrange seating into smaller groups to encourage interaction.

**Exercise Tips**

- Use six levels of questions to ensure understanding and encourage deeper learning: Knowledge, Comprehension, Application, Analysis, Synthesis and Evaluation.
- Connect exercises closely to a lecture's learning objectives. Conduct exercises to practice new skills before moving on to subsequent topics.
- Make sure you have clear and complete instructions for the activity. Distribute an instruction sheet or summarize the instructions on a flip chart or whiteboard.
- Make sure any required equipment (i.e., calculator) is available.
- Mix the exercise format to allow both individual and group work.
- Have a plan for students who complete exercises more quickly. For example, instruct them to take a break when they complete the exercise or have additional activities ready.

See "Curriculum and Training: Appendix 10" for more information on effective questioning techniques.

Conducting effective training also involves managing the classroom that can involve dealing with difficult students.

For suggestions on managing difficult students, see "Curriculum and Training: Appendix 11."

### 5.4.5 Prepare effective class reviews

Class reviews and summaries serve two primary purposes:

1. To aid learners in retrieving and retaining information
2. To provide a check for the instructor to identify what was learned in the course

#### Length of review session

Recommended length is 5% to 10% of the total course time. For example a 15-minute review would be appropriate for a 3-hour course.

#### Successful review sessions

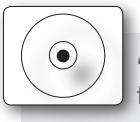
- Involve participants
- Promote retention
- Clarify key points
- Provide feedback

Rather than summarizing the points of the lecture themselves, instructors should lead the trainees in summarizing and reviewing key points. These can be written down and redistributed to trainees at the end of the course.

### 5.4.6 Support field supervisors

Field supervisors are an important link to the success of the trainee. Effective communication is important. Work with the supervisors to support effective lines of communication between the FETP staff and the field supervisors.

In addition, provide supervisors with tools to facilitate their communications with the trainee.



"Curriculum and Training: Appendix 12" provides a sample of guidelines to assist supervisors as they support the trainees in their specific activities.

## 5.5 Evaluating Training

### 5.5.1 Evaluate curriculum and training

Evaluation is an essential process to determine and increase the effectiveness of a training program. The results are crucial in demonstrating the value of the training to the MOH, sponsors, and other organizations. Evaluation provides feedback to continually improve the program and ensure that the training meets the needs of the trainees and of the country. It is important to develop an evaluation plan prior to beginning the training program and integrate it in the workplan.

#### Levels of evaluation

Four levels of curriculum and training evaluation are described below. Each level is beneficial for any training program, and each level uses different tools and indicators.

- *Level 1:* Evaluate learner satisfaction
- *Level 2:* Evaluate learning
- *Level 3:* Evaluate performance
- *Level 4:* Evaluate results

For additional information on these evaluation levels, see: *Evaluating Training Programs: The Four Levels* by Donald L. Kirkpatrick (San Francisco: Berrett-Koehler Publishers, 1998).

### 5.5.2 Level 1: Evaluate learner satisfaction

A level 1 evaluation assesses the immediate reaction of the trainees to a course or activity and is a measure of trainee satisfaction with that activity.

This type of evaluation helps the learner by

- Providing the opportunity to provide constructive responses,
- Enforcing the message that the course and the trainers are intended for their benefit,
- Benefiting future learners with perspective from their peers.

This type of evaluation helps the staff by providing the following:

- Learner's perspective
- Timely suggestions
- Quantitative information which can be shared with partners
- Quantitative information which can be used to compare programs and identify best practices

Level 1 evaluation data can be gathered several ways.

#### Evaluation form

Reaction is most often measured through a written evaluation form distributed to trainees at the end of a class. For courses that are several days or weeks in length, consider weekly evaluations, or soliciting feedback using an additional evaluation method. For multiple week courses, consider also an overall course evaluation that can provide additional types of helpful information, such as course logistics. Many suggestions can be implemented during the course itself, for example, adjusting the pace of the course. It is important to gather both quantitative and qualitative information on the course, the trainers and the training environment.

#### Focus groups

This technique is especially helpful for multi-week courses. Choose a facilitator that can be considered neutral. Do not ask an instructor to facilitate that day's focus group. Be prepared with a short list of questions on key areas of concern and expect plenty of feedback. Collect their ideas on the following:

- Pace of the course
- Effectiveness of the instructor
- Appropriateness of the material for their needs
- How courses may be improved

#### Classroom observation

Spend a significant amount of time in class as an observer, particularly with new instructors. Be prepared to take notes. Pay particular attention to the following:

- Effectiveness of instructor interaction with the learners
- Attentiveness of the learners
- Duration and timing of activities
- Classroom environment

**Tips for Level 1 Evaluations**

- Have the trainees complete forms immediately at the end of a session. This will facilitate more accurate information and a better response rate.
- To encourage candor, the instructor should not be present while the evaluations are being completed.
- Keep evaluation forms as short as possible; they should be completed in less than five minutes.
- Build time in your project plan to summarize evaluation results and distribute reports. Thank the learners for their cooperation and point out when changes are made based on their suggestions.

An example of a level 1 learner reaction evaluation form is in "Curriculum and Training: Appendix 13." An example of a course evaluation can be found in "Curriculum and Training: Appendix 14."

### 5.5.3 Level 2: Evaluate learning

A level 2 evaluation assesses whether knowledge or skills have increased. This type of evaluation helps the learner by

- Increasing confidence that required knowledge and skills have been improved,
- Identifying and prioritizing areas requiring additional training.

This type of evaluation helps the staff by

- Identifying effectiveness of training,
- Providing quantitative information which can be shared with partners,
- Providing quantitative information which can be used to compare programs and identify best practices.

Level 2 evaluation data can be gathered several ways.

### Written assessment (test)

Assessments should be carefully designed to make sure that they relate directly to the objectives stated for a particular course. Content addressed in the assessment should be covered during the course.

"Curriculum and Training: Appendix 15" contains a sample assessment.

### Self assessment

Self assessments are surveys learners complete to evaluate their skill level and the importance of the skill for their current and expected responsibilities. Results assist in identifying and prioritizing additional training requirements.

"Curriculum and Training: Appendix 16" contains a sample self-assessment.

### Classroom observation

Observe trainees during discussions, exercises, projects, and other activities. Consider including role-play activities during the course to allow opportunities to practice the new skills.

### Assignments

Assignments of work to be done outside of class should include a component to document the activity. For example, ask learners to interview a laboratorian at a reference laboratory, providing them with specific questions. Assign a report summarizing their findings.

### A "one-minute paper"

This type of evaluation tool is designed to be completed quickly and to provide the faculty a sense of what the trainees learned from a particular lesson or training session. This differs from a classroom review activity in that it is completed by each individual. At the end of a lesson, trainees are asked to respond to two or three questions. Examples of questions are

- What were the main points in this lesson?
- Describe one or two ways in which you will apply this information in your work.
- What unanswered questions do you have after this session?

**Tips for Level 2 Evaluations**

- Pilot-test an assessment tool with a subject matter expert AND a typical student.
- Administer a test both before and after the instruction to identify if learning has occurred.
- Pre-tests and post-tests should address the same content, but should not be identical. Consider re-ordering or rewording the questions.
- Address the issue of using resources to complete a test (i.e. "open-book" tests). For complex procedures for which the learner will use reference materials on the job, an open-book test will more closely replicate the work environment.
- Provide a mixture of activities that assess knowledge, skill, and application.

### 5.5.4 Level 3: Evaluate performance

*Note:* Levels 3 and 4 of the Kirkpatrick model can be used to evaluate trainees' activities in the field. These levels are pertinent while trainees are completing their field assignments. It is strongly recommended that a list of expected activities and outputs be provided at the beginning of the program. These expectations should be documented in a workplan. See Section 5.3.5 for more information on field activities.

A level 3 evaluation assesses whether performance has improved in the work environment. Level 3 evaluations can gather data from the trainee, supervisors, peers, and subordinates. (Kirkpatrick, Evaluating Training Programs)

This type of evaluation helps the trainee by
- Recognizing the value of their new knowledge and skills,
- Identifying areas requiring additional training.

This type of evaluation helps the staff by
- Identifying performance obstacles that are unrelated to training,
- Identifying gaps in a training program,
- Providing quantitative information which can be shared with partners.

Level 3 evaluation data can be gathered several ways.

#### Analysis of outputs

This is strongly recommended during field placement. Review of a trainee's work in the field can be assessed for scientific quality and value to the community. Review of outbreak reports, abstracts, and published articles provide evidence of performance.

"Curriculum and Training: Appendix 17" provides a sample form to analyze the scientific quality of an outbreak report.

#### Performance evaluation

This is strongly recommended during field placement. Regular private meetings between the trainee and supervisor or RA should be included in the program schedule. This meeting provides the opportunity for the trainee to receive comments on his progress and to communicate any obstacles to completing assignments.

"Curriculum and Training: Appendix 18" provides a sample performance evaluation form.

### Interview

This method involves interviewing the trainee about the skills and knowledge they have acquired, how they have used their skills so far, and any difficulties they have had in using or implementing what they have learned. This method can be effective both during the program to address any issues the trainee may have in completing the program and after completion of the program as part of the evaluation of the program as a whole. To use this method effectively, the trainee must have been allowed enough time to have an opportunity to use what was learned.

"Curriculum and Training: Appendix 19" provides a sample list of interview questions.

### Survey

Trainees can also provide feedback through a written survey. This method is effective both during and after completion of the program.

### Checklist

A checklist of completed tasks can indicate whether trainees were able to apply their classroom learning to a specific task.

### Reports

Analyze reports from the workplace to determine improvement in accuracy, completeness, and timeliness.

**Tips for Level 3 Evaluations**

- Evaluate both at the beginning of the program and after the program, if possible. Because the analysis of outputs, performance evaluation, and reports methods require completion of activities which could not be expected of the trainee prior to the program, the best method for evaluation would be to use the interview, survey, or checklist method. The same evaluation technique should be used both times, if possible.
- Combining methods to incorporate both direct feedback from the trainee as well as review of activities and products the trainee has produced will provide the depth of information needed to adequately evaluate the trainee

## 5.5.5 Level 4: Evaluate results

Level 4 evaluation assesses whether the changed behavior has actually improved public health. This type of evaluation is more difficult to measure because many factors contribute to a program's success. However, consistent tracking of indicators can provide sufficient evidence to determine the impact of an FETP on the health of a country.

This type of evaluation helps the learner by

- Documenting the impacts to public health that the trainee's knowledge and services have provided,
- Providing a portfolio to draw from when addressing subsequent public health issues.

This type of evaluation helps the staff by

- Demonstrating to partners the value of the program,
- Documenting the public health impacts to public health,
- Identifying trends and additional training requirements.

And of course this type of evaluation ultimately helps the citizens of the jurisdiction.

Level 4 evaluation data can be gathered in several ways.

#### Data Analysis

Many indicators can be used, such as the following:

- Number of outbreaks completed by the graduates
- Number and percentage of recommendations that have been implemented
- Reductions in rate of disease for a targeted program
- Timeliness and accuracy of reporting
- Number of published articles or scientific presentations

#### Programs and services

Identify new programs, systems or services that were initiated by FETP graduates.

#### Interviews

Discover if there is support for the program by program managers and other decision makers.

#### Career path

Investigate the responsibilities and job positions of graduates to indicate the effectiveness and credibility of program participants.

**Tips for Level 4 Evaluations**

- Allow time for results to be achieved.
- Be satisfied with evidence if proof is not possible.

### 5.5.6 Summaries

#### Compile evaluation summaries

Spreadsheet software can be very effective to compile evaluation responses.

A sample spreadsheet is provided in "Curriculum and Training: Appendix 20."

#### Summary of course to MOH and donors

Typical components of a summary include a record of participants, agenda, and evaluation results.

# 6 Administration

This chapter describes

- Maintaining funding sources
- Managing equipment and supply needs
- Developing staff and field supervisors
- Managing program communications

## 6.1 Maintain Funding Sources

When an FETP is first developed, it is often started with external funding. However, these same funds are often not available after the program has been in place for several years. It is the expectation of the FETPs that they become sustainable programs that derive their primary operating budgets from the MOH. However, where MOH resources do not completely fulfill the needs of FETP or where there is opportunity to expand the program, FETPs will need to develop new sources of funding.

To maintain support for the program and, therefore, for the funding of the program, it is important to provide both MOH decision makers and potential funders with information on the program and evidence of its public health outputs and related outcomes. Additionally, where outside funding is required, the program should make ongoing efforts to identify outside funding sources that meet its needs.

### 6.1.1 Identify outside funding sources

#### Identify donors

In addition to funding from the MOH, the program may be able to find funding through outside donors from within the country or across the region. This includes identifying the interests and focus areas of these potential donors and highlighting the components within the workplan that address these interests and addressing them within the funding proposal. Remember that the focus is on finding donors that will help meet the needs of the program; avoid placing burdens on the program to conduct activities that are not beneficial to the FETP.

#### Regularly update workplan

Each year the workplan, discussed in Chapter 3, Section 3.3: "Develop Workplan and Timeline," should be revised to reflect the current plans and needs of the program. Additionally, developing two-year and five-year (short-term and mid-term) workplans allows the potential donor to see that there are long-term plans for the program but establishes short-term plans that the donor may be more readily able to fund. Funding proposals to donors should be based on this workplan and vary little from it. Most importantly, the workplan should be realistic and state clear and measurable goals that relate to the donor's area of interest.

Additionally, establishing well-defined components within the overall workplan allows the donors to fund individual or multiple components according to their priorities (e.g., laboratory development, communications, informatics, selected states/provinces within a country where the donor is actively engaged).

If, after implementation starts, there is a need to change major strategies outlined in the workplan, the donors need to be informed of the plan and may need to be involved in approving the changes.

#### Research application process and funding potential

Carefully read the donor's instructions for applicants and review previous awards made by the donor. The types of awards made previously will provide information on donor priorities. Both resources are usually available from the donor's website. If not available on the Internet, request this information from the donor agency to see who and what projects get successfully funded.

#### Funding resources

- Community of Science Funding Opportunities: http://fundingopps.cos.comf
- Science Info: www.escienceinfo.com
- The Ellison Medical Foundation : www.ellisonfoundation.org
- Nuclear Threat Initiative: www.nti.org

### 6.1.2 Establish clear communication with donors

Once an award is received, the program should maintain communication with the donor through program updates, joint site visits, and reports. Also, the donor may have specific reporting requirements which the program must meet. While it is good to share the positive accomplishments of the program, it is equally important to alert the donors to possible challenges or need to change strategy and the reasons why.

Focal points of contact for the program (e.g., the country or program director) and the donor agency must be defined to communicate funding and program issues. This develops a clear relationship and communication channel between the donor and the recipient agency.

## 6.2 Manage Equipment and Supply Needs

#### Central office

Each program needs to maintain basic equipment for staff and trainees. This includes not only purchasing, but also tracking items purchased, and maintaining and servicing equipment. Plans should be made to provide technical support for computers and other office equipment. Equipment and supplies needed include the following:

- Computers for use of all staff and trainees
- Software (e.g., word processing, spreadsheet)
- Internet access
- Fax
- Copier
- Printer ink, paper, and other office supplies
- Textbooks (for library and yearly purchase of textbooks for trainees)

It is recommended that programs assign a computer to each trainee or assist the trainee in purchasing a computer.

#### Field sites

The program needs to ensure that trainees have access to a computer in the field, preferably as the sole user. A laptop is preferable to a desktop computer, so that it can be used in the field. Additionally, the trainee should have access to phone, fax, and Internet, including e-mail, if at

all possible. The program should check with the field site to determine what is available and make arrangements for any additional equipment needs of the trainee. The program should also ensure that the trainees have adequate office supplies and all equipment and supplies necessary for conducting outbreak investigations.

Part of the field site selection process is related to ensuring that trainees have appropriate equipment and supplies. Additional information about field site selection is in Chapter 4, Section 4.2: "Organize Field Placements."

#### Laboratory

As programs develop to include laboratory training, they will need to work with laboratories to ensure adequate equipment and supplies are available, though this may not include direct funding. Where possible, it is important for the program to assist the trainee when a lack of equipment or supplies hinders completion of competencies, including an inability to complete outbreak investigations due to lack of laboratory support.

## 6.3 Develop Staff and Field Supervisors

An additional element to supporting the FETP is to provide technical training for both field supervisors and other staff. These trainings may include epidemiology topics of specific interest to the country. For example, programs in countries hardest hit by HIV/AIDS may wish to provide additional training to field supervisors and staff on the subject. Or, programs in countries that have experienced severe natural or man-made disasters may wish to provide training on disaster management. Resources for these trainings may be found by contacting CDC and other TEPHINET-affiliated countries, as well as MOH and universities.

It is also advisable to periodically survey the staff and supervisors about their ongoing professional needs as they relate to field epidemiology. They may suggest specific training topics that they feel will allow them to provide the needed support and expertise to the trainees.

## 6.4 Manage Program Communications

An FETP requires multiple levels of communication: internally among staff and trainees, with partners of the program, and with the general public and scientific community. Below are a number of suggested communication activities that need to be planned and coordinated.

#### Internal communications

- Regular presentation of field work (weekly/monthly) depending on program
- Regular feedback to trainees from both field supervisors and central staff
- Regular meetings of central staff to review student progress
- Regular/formal communication between central and field sites

Programs often hold weekly or monthly meetings with trainees so they may present their work to fellow trainees and discuss their progress with the central staff. The best approach is to set a regular date and time for these meetings. The program will need to determine how often staff and trainees can meet in person or if the meetings can be conducted via phone or Internet. This will vary significantly depending on the circumstances (i.e., distance) in the country.

The RA, country director, and program manager should also plan at least quarterly meetings to review trainee progress. This should include a review of field activities completed both to ensure that

the trainee will meet all requirements by the end of the program and to review the quality of the products produced.

The program management should also maintain regular contact with the field supervisors to answer any of their questions or concerns and to ensure they are maintaining regular contact with trainees.

### Communications with partners and MOH

- Advisory committee meetings
- Routine communication with MOH, donors, and other key partners (e.g., TEPHINET, CDC, universities)
- Timely reports to appropriate authorities (e.g., outbreaks, studies, reports to funding sources, reports to MOH)

The program should plan regular meetings with the advisory committee, if one has been established. The advisory committee should discuss issues of broad concern to the program, such as continued funding or expansion of the program.

Program staff must also plan regular communication with MOH, donors, and any partners. Key contacts should be identified and planned meetings with regular dates and times to discuss progress should be implemented. An additional approach to maintaining regular communication would be to plan a regular written e-mail to each of the key contacts. RAs who work with CDC must plan to provide weekly updates by e-mail to CDC in the U.S. and CDC directors in-country on program activities and major investigations or events.

Finally, one of the most important communication activities for the program is to provide prompt reporting of all outbreak investigation activities to the MOH and additional reporting of findings and recommendations from studies and evaluations. The program must identify key contacts within the MOH for these activities. Additionally, the program will need to discuss with the MOH the format of reports and systems used for communicating outbreaks and surveillance updates.

Read about communications with the public and the science community in Chapter 7: “Service.”

# 7 Service

This chapter describes

- Services provided by trainees to improve the public health of their country
- Emergency responses conducted by trainees
- Assessment and improvement of national surveillance and health information systems
- Communication with other public health workers and with decision makers
- Linkages between laboratorians and epidemiologists

FETPs can improve public health practice in several ways. They encourage the improvement of the quality of public health science and services by training public health professionals. They also work towards building long-term capacity in the form of public health systems and providers. As trainees learn to be competent field epidemiologists, researchers, or public health practitioners, they are simultaneously adding value to the public health system in which they work. As trainees progress through the FETP, they participate in outbreak investigations and work with the team to collect and analyze the data. They also provide epidemiological studies, surveillance evaluations, and assistance in natural disaster or emergency situations. They contribute to the population they are being trained to serve as training is ongoing and continue to do so throughout their careers as they provide public health service.

In addition to the ongoing public health services provided throughout training, FETPs often contribute to the improvement of existing surveillance systems and health information systems through evaluations and the integration of laboratory services with epidemiological services. Many FETPs also publish an epidemiologic bulletin to report the public health news of the nation to interested parties. This bulletin may or may not include those manuscripts that trainees have written describing their own investigations. Publication in a peer-reviewed journal is a secondary goal of FETP trainees, the first, of course, being to improve the outcome of public health interventions. The FETP must orient them to the concept that their ultimate goal is the reduction of morbidity and premature mortality in the population they serve. Publication of their findings is an important contribution to the science of public health and recognizes the quality of the program, but trainees and FETP staff and mentors must also focus on bringing real and measurable benefit to the communities they serve.

## 7.1 Public Health Services

As trainees complete the FETP, they are actively providing public health services to the community in which they are working. These services include emergency response, surveillance and health information systems, public health assessment and interventions, communications, and laboratory capacity and evaluation.

### 7.1.1 Emergency response

#### Outbreak investigations

Outbreak investigations are a major contribution to the FETP process and therefore, are one of the main services that trainees are able to offer the countries in which they undergo training. FETP trainees are required to participate in at least one outbreak investigation before graduation from the

FETP, though many country programs require more. These investigations help to identify the cause of an outbreak, which in turn provide evidence for preventing and reducing the damaging effects of future outbreaks.

#### Natural disasters

If a natural disaster should occur in the vicinity of an FETP, such as the 2001 earthquake in El Salvador or the 2004 tsunami in the Indian Ocean, trainees may be deployed to provide epidemiologic services such as rapid surveys to assess the initial health impact or to warn of a potential epidemic such as cholera. In this way, they are able to contribute to the effort at hand as well as experience invaluable learning in the field.

### 7.1.2 Surveillance and health information systems

Surveillance is another important arena where the trainee is able to contribute.

FETPs are often instrumental in strengthening their national surveillance systems because these systems are critical to both the training and service components of the FETP.

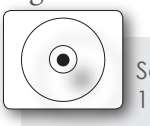
Often, the need for useful data and an effective, efficient surveillance system is one of the motivations for developing an FETP. The existing means of collecting public health data may be costly both in money and time for clinical and public health personnel, but produce little or no valuable data. Typically, during a country planning assessment, numerous disease-specific surveillance systems are identified that compete for the attention of personnel at all levels. Health workers struggle under the burden of reporting and decision makers complain that they lack basic data about both urgent events and long-term trends.

#### Role of FETP in surveillance assessment

Through the assessment of surveillance systems, the FETP can gather information that helps the MOH consider whether to use existing systems or create new ones to meet the needs of the country. A system assessment helps to identify who will be responsible for managing surveillance systems. The program can work with the MOH to determine what agency or agencies will manage the system or systems. By assessing surveillance systems, the FETP can provide the following services:

- Upgrade the surveillance system to monitor trends of selected diseases and detect and suppress outbreaks
- Provide experience setting up new information systems to meet basic needs
- Offer important experience in surveillance system evaluation to the trainees

In the Philippines, the FETP manages the national surveillance system after trainees worked to set up sentinel systems as a method to improve the overall surveillance of the country. In Saudi Arabia, the FETP began weekly reviews of surveillance data to establish trends and determine if action was needed. In other FETPs, trainees perform surveillance system evaluations early in their program. They may be introduced to the basic concepts of surveillance in the introductory course. The second course focuses on surveillance concepts in more detail. Between the introductory and second courses, trainees evaluate surveillance systems. During the second course, trainees present the results of their evaluation and make recommendations for changes. The FETP may also assist the MOH or another organization in various aspects of the management of the system.



See CDC's Guidelines for Evaluating Public Health Surveillance Systems (*MMWR*, Vol 50, RR 14;1; August 17, 2001) in "Service: Appendix 1."

In addition, FETPs examine the coverage and attributes of the information systems. The book *Updated Guidelines for Evaluating Public Health Surveillance Systems* (CDC, 2001) has often been used to evaluate information systems.

An example of an assessment tool, Health Information System Inventory and Flowchart, is in "Service: Appendix 2" . See "Service: Appendix 3" for a shortened version of a surveillance evaluation that may be used to conduct a rapid assessment.

### Functions of a surveillance system to consider in assessment

No matter what disease or event is under surveillance, there are general categories of actions that must be accomplished to conduct surveillance.

**Table 14: Actions Necessary to Conduct Surveillance**

| Action category | Description |
|---|---|
| Identify cases | Identify cases using standard case definitions. This information may be used by integrated disease surveillance systems to identify priority diseases and conditions. |
| Report | Report suspected cases or conditions to the next level. If this is an epidemic-prone disease, or a disease targeted for elimination or eradication, investigate and respond immediately. |
| Analyze and interpret data | Compile the data, and analyze it for trends. Compare information with previous periods and summarize the results. |
| Investigate and confirm suspected cases and outbreaks | Take action to ensure that the case or outbreak is confirmed, including laboratory confirmation where feasible. Gather evidence about what may have caused the outbreak and use it to select appropriate control and prevention strategies. |
| Respond | Mobilize resources and personnel to implement the appropriate outbreak or public health response. |
| Provide feedback | Encourage future cooperation by communicating with levels that reported the outbreaks and cases about the investigation outcome and success of response efforts. |
| Evaluate and improve the system | Assess the effectiveness of the surveillance system, in terms of timeliness, quality of information, preparedness, thresholds, case management and overall performance. Take action to correct problems and make improvements. |

### Levels of the health system to consider in assessment

The levels of the health system should be considered when planning a surveillance system in order to ensure that the data found are reported to the correct people or agencies for action.

**Table 15: Levels of a Surveillance System**

| Level | Description |
|---|---|
| Community | Represented by basic village-level services such as trained birth attendants, village leaders, village health workers or similar care providers |
| Health facility | Defined by each country. For surveillance purposes this may include institutions with outpatient and in-patient facilities. |
| District, region or provincial | Intermediate administrative units. Countries may have two intermediate levels; for example, district and provincial. |

| Level | Description |
|---|---|
| National | In many countries this is the federal level where policies are set and resources are allocated. This level usually compiles information and gives data to numerous programs. |
| International | At this level, surveillance data is reported to WHO or other agencies. Only a few diseases are required but many are of interest. |

These sections adapted from: Technical Guidelines for Integrated Disease Surveillance and Response in the African Region in "Service: Appendix 4."

#### Assessment findings

The following is a list of common problems identified during evaluation of information or surveillance systems. Providing evidence of these problems is useful during planning for the revision of surveillance systems or creation of new ones.

- Multiple systems for a variety of diseases or events
- Duplication of effort
- Extensive time required to fill out forms with no benefit for health workers or patients
- Collected information not reliable or credible
- Information not used by public health personnel or donors
- No action taken based on information—no investigation of outbreaks or public health response
- System expensive and wastes resources
- No sharing of information or of information system(s) resources across vertical programs is allowed or encouraged
- Donors' data needs increase the reporting burden on the national and local levels

#### Resources for evaluating surveillance systems

For additional information to assist you in evaluation, refer to the following resources:

- Cash RA and Narasimhan V. Impediments to Global Surveillance of Infectious Diseases: Economic and Social Consequences of Open Reporting. *J. Soc. Int. Devel.* 1999.
- Teutsch, SM, Churchill, RE. (Eds) *Principles and practice of public health surveillance.* New York: Oxford University Press, 2000.
- White, ME, McDonnell, SM. Public health surveillance in low- and middle-income countries. In: Teutsch, SM, Churchill, RE (Eds) *Principles and practice of public health surveillance.* New York: Oxford University Press, 2000.
- CDC, Updated Guidelines for Evaluating Public Health Surveillance Systems: Recommendations from the Guidelines Working Group. *MMWR*, Vol 50, No RR14;1 08/17/2001. www.cdc.gov/mmwr/preview/mmwrhtml/rr5013a1.htm
- WHO/CDC. *Technical guidelines for integrated disease surveillance and response in the African region,* 2001.

### 7.1.3 Public health assessment

In addition to surveillance system assessments, FETP trainees may also be called upon to measure and assess current public health needs. For example, they may take part in an assessment to learn how many taxis have working seatbelts or the prevalence of cigarette smoking. Assessments identify community priorities and health shortcomings. They may identify catalysts to the spread of

communicable diseases or other harmful behaviors. These assessments are exploratory in nature and information gathered is used to plan and implement public health interventions.

### 7.1.4 Public health interventions

FETP trainees evaluate and may participate in the planning and implementation of public health interventions. They may be responsible for designing a study in order to evaluate an existing intervention or to further examine surveillance data related to the intervention. Trainees should be able to design an appropriate study to address these issues. Following the study, they are responsible for reporting methods, results, and recommendations in scientific format. The following discussion regarding studies is not meant to focus on details of how to conduct a study, but rather focuses on the service aspect of conducting and providing results and recommendations.

### 7.1.5 Involving decision makers in study design

An effective study is one that will have a tangible outcome. One way to increase the chances of this is to involve decision makers and other key players in the design of the study. Typical decision makers include program managers, MOH staff, district health staff, politicians, and government officials. The knowledge and priorities of decision makers can often be determined by simply asking them questions regarding health needs and their views of current programs. Trainees and others involved in a study should ask themselves, "Who will be able to act on this information?" in order to identify who specifically should be consulted regarding a particular issue.

Involving decision makers in the early design can help trainees understand the information needed and ask the right questions. Also, it is more likely that decision makers will use evidence if they feel they are a part of the study.

Because decision makers are often unfamiliar with evidence-based public health, it may be helpful to give them examples or to help them formulate problems by asking questions such as the ones below.

**Sample questions**

- What are the most important health needs in the district? If decision makers are not sure, trainees may work with them to conduct needs assessments.
- What is the rate-limiting step for implementing different health programs? If people are not using a service, it might be helpful to conduct focus-group discussions to determine the reason. If there are drug or supply shortages, a logistics survey might be helpful.
- Are programs reaching the target populations? Often, local health workers prioritize serving the most accessible populations and do not provide adequate service for more distantly located people. If this is the case, a cluster survey of service coverage may identify populations that need service.
- What causes a population to be at risk for illness? An analytic study or behavioral risk-factor survey may help to provide the answer to this question.

Although it is important to involve decision makers in problem identification and determining how the information will be used, the technical issues of designing the studies need to be defined by FETP training staff or other experienced technical experts.

### Reporting results and recommendations to decision makers

Reports detailing the findings and recommendations of each study, investigation, and assessment should be written in an agreed-upon scientific format. This generally includes a review of current literature, a hypothesis, methods, results, recommendations, and a conclusion. Because decisions may be based on these results, results and recommendations may also be presented to decision makers. Some useful formats for this are an executive summary or an oral presentation. Trainees need to be able to convey their results in clear and persuasive terms that decision makers can understand and use.

An example of the classic IMRAD (Introduction, Materials and Methods, Results, and Discussion) model is provided in "Service: Appendix 5."

In addition, trainees need to be informed of reporting protocols and procedures. An investigation is sometimes classified as research if the results are intended for publication and therefore, may be subject to review by the appropriate Institutional Review Board.

### Linking action to trainee evaluation

Some programs explicitly make use of the study as part of the trainee evaluation. For example, in some programs a portion of the trainee's final grade depends on whether a decision maker acted accordingly based on the results. This strategy has the effect of focusing trainees' attention on producing and presenting data in a practical and useful manner. For training purposes, it may be just as effective to judge the utility of a trainee's data presentation. Other programs gather anecdotes about studies that led to particularly important interventions. This is useful for marketing the program to top managers and for justifying budget requests.

## 7.2 Communications

Data-driven information and public health recommendations derived from trainees' epidemiologic activities cannot be useful if it is not effectively communicated to others, such as key players who may influence policy and non-governmental and community based organizations which may use the information to encourage behavior change. Leaders in health, education, government, industry, labor, and the community must all be involved if a comprehensive and effective health communications strategy is to be implemented.

For this reason, FETP graduates and trainees must understand the importance of their role in the use of epidemiologic information in communications, marketing, and advocacy beyond the field itself. In addition, they should consider their target audience carefully when planning a communications strategy. Health communications strategies can be designed to inform, influence, and motivate target audiences in setting policy or making other decisions that have a positive impact on public health.

### Defining communications

Communications is a process that involves at least two people in an effort to convey, receive, interpret, and agree upon the meaning of **data, information,** and **messages.**

**Purpose of communicator**

- Inform
- Influence
- Motivate
- Persuade

**Purpose of receiver**

- Learn
- Use for decision-making
- Reject or discredit
- Reinterpret and use

We use the term "communications" to describe **the process in which we use language or images (symbols) to share meaning with other people.**

In the sections that follow, communications, marketing, and advocacy strategies based on surveillance information are discussed in the context of data, information, and messages.

Health communications can accomplish the following:

- Remind audiences of knowledge, attitudes, or behavior that have an impact on health
- Create attitudes to support change for a particular policy or action
- Increase awareness of a health problem, concern, or solution
- Demonstrate skills or technology
- Increase demand for health services and for health-affirming policies

Therefore, health communications (marketing and advocacy components) should be included as **one** key element in an integrated program designed to address a health problem or to convert health policy to action.

### 7.2.1 Communication difficulties

Following are some difficulties that FETP graduates and trainees may face when communicating information to the public or to policy makers.

- **The relationship between public health and the media**—public health professionals may have different objectives, priorities, and timelines than the media for disseminating information.
- **The use of jargon**—public health comes with its own language, one that the general public may not understand. Acronyms and slang should not be used when communicating with the public or policy makers. In addition, certain terms may need to be defined in relation to the impact they will cause.
- **Security guidelines**—some governments may assign a certain level of secrecy to surveillance and other epidemiologic data, in which case the public health professional may be challenged to share what he/she feels to be pertinent information.
- **Protocol**—many countries have certain protocol which must be followed. This protocol, which is generally bottom-up with no practical feedback can be limiting in communications. FETP promotes communication across levels through national and regional conferences.

### 7.2.2 Communications products

Many different types of products may be used for the communication of epidemiologic information, results, and recommendations. Following are some that are used frequently by FETP trainee:

- Public health bulletins/reports
- Public health newsletters
- Scientific, peer-reviewed papers for publication
- Scientific posters
- Emergency bulletins
- Oral presentations

### 7.2.3 Public health bulletin/report

The health bulletin/report is the most common way of communicating public health information. For this reason, we will discuss in detail methods for strengthening and improving a public health bulletin/report. The principles described can and should be applied to all of the informational products listed above.

See "Service: Appendix 6" for steps to involving an FETP in a public health bulletin and "Service: Appendix 7" for a planning guide to publishing a health bulletin/report.

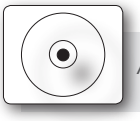
A public health bulletin (more than 10 pages) or report (less than 10 pages) is an important method of conveying useful surveillance data and other types of information to health workers, public health officials, and key partners. Many FETPs are involved in developing, managing, or providing support to this type of bulletin/report. An effective public health bulletin

- Informs the public health and medical communities of outbreaks of disease or other health problems,
- Provides timely public health information to health professionals, policy-makers, the media, and the public,
- Links national, regional, and local public health agencies,
- Increases the visibility and work of the FETP,
- Provides a mechanism for trainees to publish reports of their projects and programs.

Public health bulletins/reports vary with the needs of the country in which they are published. They may be published on a quarterly, monthly, or weekly basis, depending on the surveillance system on which they are based and on human and other resource considerations. Regular publishing dates/intervals will enhance perceptions of credibility and reliability. Bulletins/reports may be published and disseminated as paper copies, e-mail reports, faxes, or Internet publications. Often, representatives of the mass media use information from bulletins/reports, so it is important that information be presented clearly and accurately and at a reading level that is understood by audiences not educated in scientific jargon.

### 7.2.4 Clearance for public health bulletin/report

A public health bulletin/report should provide "Instructions to Authors" for material to be submitted for publication.



An example of author guidelines is in "Service: Appendix 8."

There should also be written guidelines for clearance of information submitted by FETP authors.

### 7.2.5 Disseminating reports electronically

Electronic channels are being used more and more often for delivering public health information quickly. An example is CDC's *Epi-X (Epidemic Information Exchange)*, a secure Web-based communications network for public health investigation and response. Through *Epi-X*, epidemiologists, laboratorians, and other members of the public health community receive notifications of urgent public health events and daily e-mail messages in specific categories of

information. A searchable database is available. Additional information is available at www.cdc.gov/epix/

The table below provides a list of some of the public health bulletins/reports currently being published from their countries' MOH.

**Table 16: Current Epidemiology Publications by Country**

| Countries or organizations | Title of publication | Web Address |
|---|---|---|
| Australia | *Communicable Diseases Intelligence* | www.health.gov.au/internet/wcms/Publishing.nsf/Content/cda-pubs-cdi-cdicur.htm |
| New South Wales, Australia | *The NSW Public Health Bulletin* | www.health.nsw.gov.au/public-health/phb/phb.html |
| Brazil | *Boletim Electrônico Epidemiológico* | |
| Canada | *Canada Communicable Disease Report (CCDR)* | www.phac-aspc.gc.ca/publicat/ccdr-rmtc/ |
| Columbia | *Boletín electronico epidemiológico* | |
| Costa Rica | *Boletín electronico epidemiológico* | |
| Europe | *EuroSurveillance Weekly, EuroSurveillance Monthly* | www.eurosurveillance.org/ |
| Italy | *Bolletino Epidemiologico Nazionale* | www.epicentro.iss.it/ben/ |
| Mexico | *Boletín Epidemiología* | www.salud.gob.mx/<br>Follow these links: Sala de prensa>Publicaciones><br>Boletín Epidemiología |
| Mozambique | *Weekly Epidemiological Bulletin* | |
| Northern Europe | *Bulletin of the Network of Communicable Disease Control in Northern Europe* | www.epinorth.org/ |
| Spain | *Boletín Epidemiológico Semanal* | http://cne.isciii.es/htdocs/bes/bes.htm |
| United Kingdom | *Communicable Disease Report (CDR) Weekly* | www.hpa.org.uk/CDR/ |
| United States | *Morbidity and Mortality Weekly Report (MMWR)* | www.cdc.gov/mmwr/ |

## 7.3 Integration of Laboratory and Epidemiology Services

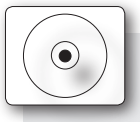
Another form of service provided by the FETP is the linkage and improved collaboration between laboratorians and epidemiologists. To support surveillance efforts and other public health needs, laboratories must be able to perform accurate and reliable testing in a timely manner, maintain records of testing, and provide data as needed. The laboratory track of the FELTP (Field Epidemiology and Laboratory Training Program) is designed to develop laboratory management skills that are needed to assess current laboratory capacity and to improve the quality and integration of laboratory services with epidemiology services.

Graduates should be able to help clarify the role of the laboratory services within the public health system, assess the availability of resources in district and provincial laboratories, and recommend additional resources laboratories require to support surveillance activities. Because the study is combined with epidemiology concepts and practices, graduates should be uniquely qualified

to provide needed laboratory services for both outbreak investigations and other public health needs. Entry into the laboratory track of the program requires previous laboratory education and experience.

Most national public health referral laboratories in low-income countries have significant deficiencies. Low levels of national support and use of these facilities is evidenced by ongoing diagnostic limitations, poor linkages with epidemiological surveillance activities, and little or no effective use of laboratory data. This situation has prompted CDC, WHO, and numerous other health agencies and partners to consider how to stimulate the establishment of effective reference diagnostics.

Just as trainees conduct assessments of a country's surveillance systems, FELTP trainees are able to provide assessments to identify laboratory capabilities. These assessments lead to recommendations for the improvement of laboratory services within public health needs.



See "Service: Appendix 9" for suggestions in conducting a laboratory capacity assessment and subsequent improvement strategies and "Service: Appendix 10" for Framework for Program Evaluation in Public Health, *MMWR Recommendations and Reports,* Vol 48, No RR11,1; 09/17/1999.

# 8 Monitoring and Evaluation

This chapter describes

- Need for program monitoring and evaluation
- FETP monitoring and evaluation cycle
- Utility of monitoring databases
- Steps for program evaluation

In this chapter we will present some ideas for monitoring and evaluating an FETP.

*Note:* This section of the manual covers evaluation of the FETP as a whole. For specific information on evaluating training activities, see Chapter 5: "Curriculum and Training."

Program monitoring and evaluation are essential practices in public health. They provide a systematic way to improve and account for public health actions. Monitoring and evaluation can indicate whether a program is having the desired effect, as well as identify aspects of the program that are working well and those that need to be adjusted.

Monitoring is defined as the routine tracking and reporting of priority information relevant to achievement of the program plan and its intended outputs and outcomes.

Evaluation is an episodic activity of greater complexity than monitoring; evaluation is used to determine impact of program and the effectiveness of the various components in supporting the outcomes and impact.

Monitoring and evaluation can accomplish the following:

- Document success of a program towards achieving its goals and objectives
- Identify and help address areas that need to be strengthened
- Provide information to help other countries initiate FETPs
- Strengthen established FETPs
- Provide credibility to the government nationally and internationally
- Provide evidence of success that can be used in fundraising
- Provide documentation needed for credentialing

A key to a useful evaluation is proper documentation of the program's activities. Setting up a complete and consistent monitoring system will provide the data needed for evaluation. Tools and activities for ongoing monitoring and evaluation of program activities, products, and impacts should be implemented with the initiation of the program. It is ideal that these processes become routine in order to increase the effectiveness of both monitoring and evaluation.

Monitoring and evaluation both play a role in providing information to identify the connections between program efforts and resources and program goals. A common model for developing a monitoring and evaluation plan for a country makes use of the logic model to describe the elements of the program (refer to the FETP logic model on page 5). The logic model allows us to summarize the program's goals for effecting change by linking processes to effects and describing the relationships between the inputs and outcome. Linking the inputs to the desired outcomes helps to focus program direction. These elements provide a useful basis for comparison of planned versus actual implementation. They also can indicate the important evaluation priorities.

## 8.1 Monitoring and Evaluation Cycle for FETPs

Programs usually begin with an assessment or situation analysis of country needs. Based on this information, a program is designed with appropriate goals and objectives. A logic model including inputs, processes, expected outputs, outcomes, and impact is usually part of program planning. Monitoring of inputs, processes, outputs, and outcomes, as described in the logic model, occurs throughout program implementation and provides feedback for the improvement of program design and activities. Additionally, a more formal and thorough evaluation of the various program components and effects will be carried out at intervals which will also provide feedback for the improvement of program implementation.

Monitoring is carried out consistently throughout program implementation and evaluations occur at several designated points throughout and following program implementation. The frequency and number of planned evaluations will change based on the length and needs of the program. It is useful to schedule evaluation points during the planning phase of the FETP, but additional evaluations may be added as needed.

## 8.2 Program Monitoring

Use of the logic model for the definition of the indicators allows the program to identify information that can be collected to monitor the program. Ongoing monitoring can help with advocating for resources, early identification of problems (or potential problems), and can ensure that the periodic full evaluation is a relatively easy process.

Refer to "Monitoring and Evaluation: Appendix 1" for a table of recommended indicators for the different components of the logic model.

The use of monitoring information assumes that the program is being implemented according to a plan developed to achieve specific desired outcomes. Ideally, monitoring and evaluation are included in that plan to help ensure success. The program plan describes important outcomes and the activities necessary to achieve them, and includes a timeline. The monitoring and evaluation plan specifies indicators of the actual performance of the necessary activities and a method and timetable for collecting and reviewing the indicator data, and responding to it—much the same way that a surveillance team frequently reviews surveillance data using explicit, objective standards and criteria.

Figure 3 on the next page illustrates how routinely collected information can be used to strengthen the day-to-day management of a program. This model has also proved effective in Integrated Disease Surveillance and Response in countries including Uganda, Ghana, and Zimbabwe and has been adapted for use in the FETP.

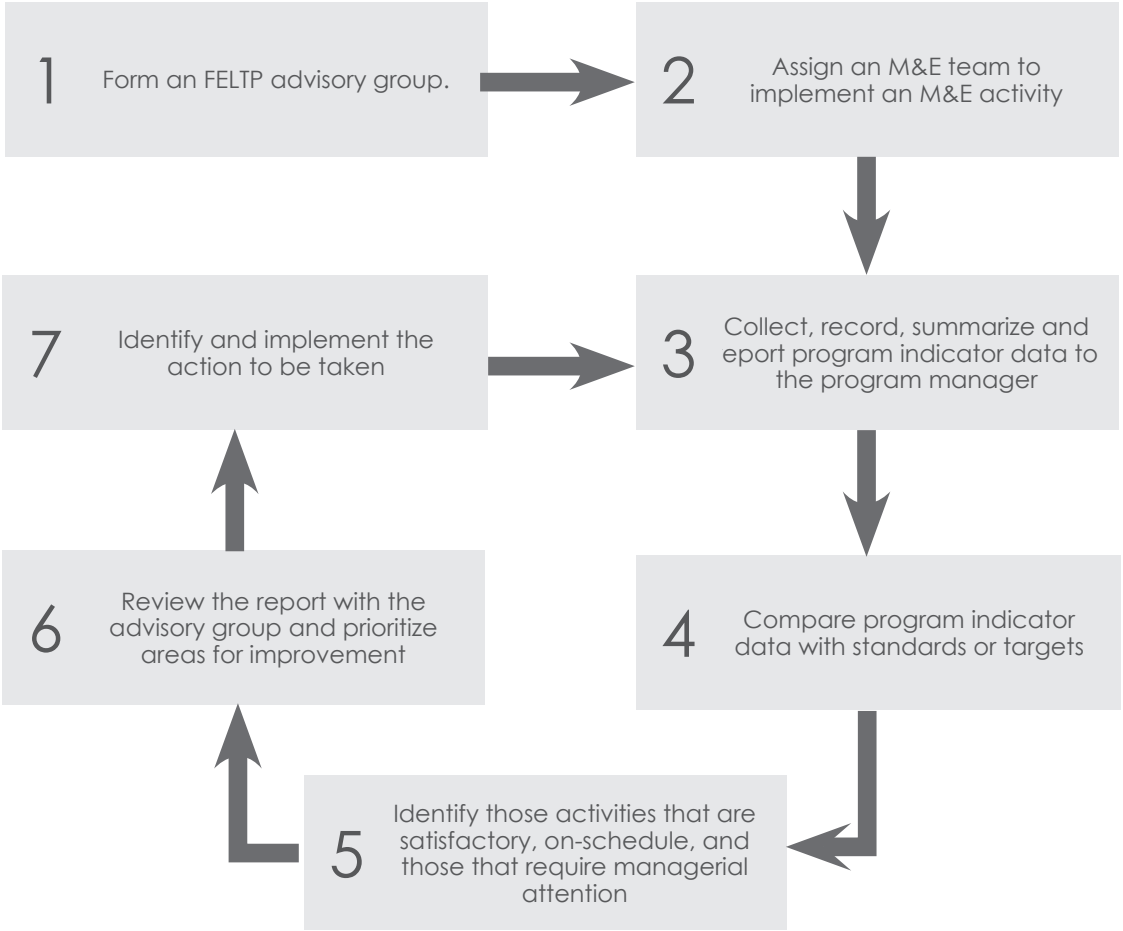



**Figure 3: Use of Continuous Monitoring for Program Improvement**

Monitoring should be conducted at various levels of program implementation. Some examples of how monitoring can be used are described below.

### Inputs

Programs may choose to monitor inputs, such as the number and qualifications of program applicants. This would allow the program to identify and implement any needed improvements in recruiting and marketing.

### Outputs

Programs may want to monitor outputs such as outbreak investigations or surveillance evaluations completed. These can be tracked by type of problem investigated, type of surveillance system evaluated, area of the country, or individual student or student cohort. A program may want to look at the quality of the outputs by measuring such things as proportion of investigations or evaluations that have been presented at international meetings or have resulted in a published paper.

### Outcomes

Programs may also look at whether the recommendations from the work were implemented. These can all be examined in the detail and timing decided by the program. If they see that many studies are done but no actions have been taken as a result, they may want to consider the reasons for this

and look at the appropriateness of the topic of study, the quality of the work, or the appropriateness of the recommendations.

### 8.2.1 Using data systems to facilitate monitoring

Routinely collecting information on program indicators allows a program to periodically review key aspects which assess its progress toward program goals. Having access to the information in a standard format will make this process much easier.

#### Data system

It is suggested that the program create a system for routinely collecting information for a database of key information on the program, staff, trainees, graduates, projects, activities and trainee and program achievements. It is important that a system is established that allows for ongoing, prospective data collection and management. Staff need to be identified and responsibility assigned in order to keep information current.

To assist in the implementation of routine data collection, CDC is creating and testing a monitoring and tracking tool in Epi Info, called EpiTrack. This tool, which is customizable to the needs of each program, maintains the information needed to monitor the accomplishments of the program and its trainees. EpiTrack contains the majority of suggested indicators. Programs can choose whether to use all elements of the database or to select key indicators of most importance and usefulness to a given program. In addition, EpiTrack allows the generation of reports based on the needs of the program. Other systems may be used as long as they allow the routine collection and review of similar information.

#### Continuous quality improvement

Continuous quality improvement (CQI) is a systematic reiterative review of inputs, processes, outputs, and outcomes of training programs to improve their performance. TEPHINET has developed guidelines for this process which will be an opportunity for programs to use their program data to improve their program. TEPHINET's CQI handbook can be found at www.tephinet.org.

### 8.2.2 Documents and hard-copy files

It is suggested that the following documents be kept on file as documentation for monitoring and evaluation.

#### Planning for the course

- Program planning documents
- Trainee selection process: timetable, eligibility, and selection criteria
- Copies of all field reports
- Information about each field placement
- Budget and expenditures

#### People

- List of all trainees and graduates
- Curriculum vitae or resumes of program staff
- Curriculum vitae of adjunct/guest faculty
- Position descriptions and job responsibilities for program staff

Training Materials

- Schedules, learning objectives, and teaching materials for class work
- Plan and tools for trainee assessment
- Trainee portfolios/notebooks
- Competency indicator monitoring checklists for each trainee

Evaluation

- Copies of training, learner, field site, mentor evaluations, etc.
- List of competencies and competency indicators

Publications and other large-scale outcomes

- List of materials in library
- Reports describing "important" service activities of the program and individual trainees
- Copies of all FETP-authored articles in bulletins, journals, etc.
- Copies of abstracts submitted for presentation or publication
- Copies of FETP oral or poster scientific presentations
- Copies of national epidemiology bulletin
- Information on training courses run by the program or provided by FETP staff and trainees to others
- Policy recommendations made and status of implementation
- Seminars, conferences, and training courses sponsored by the program
- Changes to public health systems
- Early effective outbreak or other acute episode intervention, including impact measures

### 8.2.3 Reporting and using data

The purpose of collecting the monitoring information is to use it. Each program should decide what detail and what frequency are required for the different types of information they are monitoring and should develop a system for reporting.

## 8.3 Program Evaluation

Evaluation is an episodic activity of greater depth and complexity to determine impact of program and how the various components work towards supporting or not the outcomes and impact. It is used to improve programs and inform decisions about future resource allocations, and to make a systematic assessment of how well a program is meeting its goals and objectives. Evaluations of individual FETPs usually occur episodically at a timing determined by the programs and their funders.

Programs may conduct internal evaluations—evaluations done by the program itself—on an as-needed basis. It is also recommended that programs have an external evaluation every three to five years.

Information from the program's monitoring system or CQI process will be important to inform the evaluation process, whether internal or external.

See "Implementation: Appendix 1" to review a sample evaluation (the Battelle report). The executive summary includes an outline of the evaluation methodology. A sample program evaluation summary based on this report is included in "Monitoring and Evaluation: Appendix 2."

General information on program evaluation can be found in CDC's Framework for Program Evaluation in Public Health, *MMWR* 1999; 48 (No. RR-11). It is available in "Service: Appendix 10" and at www.cdc.gov/eval/framework.htm.

The CDC framework is composed of six steps that must be taken in any evaluation. They are starting points for tailoring an evaluation to a particular public health effort at a particular time. Because the steps are all interdependent, they might be encountered in a nonlinear sequence; however, an order exists for fulfilling each—earlier steps provide the foundation for subsequent progress. Thus, decisions regarding how to execute a step are iterative and should not be finalized until previous steps have been thoroughly addressed.

### Step 1. Engaging the stakeholders

At the time when an evaluation is being planned for a specific country/regional program the stakeholders for the specific program will need to be identified and involved. Appropriate stakeholders to consider for such an evaluation would be program funders (e.g., CDC's Coordinating Office for Global Health (COGH), Division of Epidemiology and Surveillance Capacity Development, COGH's Global Disease Detection, USAID, CDC Foundation, World Bank), TEPHINET, appropriate local MOH officials, key program staff, program graduates, current students, in-country partners such as universities, WHO, NGOs, and outside partners (similar list to above that may or may not be funders).

### Step 2. Describe the program

Describing the program involves providing information about the program's resources and activities as well as the program context. This will differ for each program, but at a minimum should include information from the monitoring/tracking database for the time period of the evaluation. In addition background information is used to define the need for the program before a program is started and to help set the context. This should be available from the original needs assessment or planning documents for the program.

The key factors in describing a program set out in the CDC Framework include: Need, Expected Effects, Activities, Resources, Stage of Development, Context, and Logic Model.

If the program has already created a monitoring program and database, this will assist the process. Most of the needed information can be provided using information already being collected as part of the ongoing monitoring process.

### Step 3. Focus the evaluation design

Programs will need to determine the goals of their specific evaluation and its intended users and their information needs in order to focus the design and develop appropriate questions in addition to the indicators already being monitored.

### Step 4. Gather credible evidence and justify conclusions

This aspect of the evaluation should be straightforward using the indicators, the monitoring database, available background information and appropriate interviews.

### Step 5. Ensure use and share lessons learned

Essentially the last step is to use the evaluation/monitoring process to improve our programs—the ultimate goal of the process.