

Avian Flu School: A Training Approach to Prepare for H5N1 Highly Pathogenic Avian Influenza

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SYNOPSIS

Since the reemergence of highly pathogenic avian influenza (H5N1 HPAI) in 2003, a panzootic that is historically unprecedented in the number of infected flocks, geographic spread, and economic consequences for agriculture has developed. The epidemic has affected a wide range of birds and mammals, including humans. The ineffective management of outbreaks, mainly due to a lack of knowledge among those involved in detection, prevention, and response, points to the need for training on H5N1 HPAI. The main challenges are the multidisciplinary approach required, the lack of experts, the need to train at all levels, and the diversity of outbreak scenarios.

Avian Flu School addresses these challenges through a three-level train-the-trainer program intended to minimize the health and economic impacts of H5N1 HPAI by improving a community's ability to prevent and respond, while protecting themselves and others. The course teaches need-to-know facts using highly flexible, interactive, and relevant materials.

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Since the reemergence of a highly pathogenic avian influenza (H5N1 HPAI) strain in 2003, the world has been experiencing a global panzootic that is historically unprecedented in the number of infected flocks, geographic spread, and economic consequences for agriculture and livelihoods.¹ The disease is believed to have spread to new geographic regions both through the movements of migratory wild birds and the trade (legal and illegal) of poultry, poultry products, and wild birds. Millions of commercial birds have died or been destroyed as a result of outbreaks in dozens of countries across three continents.² The epidemic has also affected a wide range of wild bird species and mammals.³

Moreover, HPAI H5N1 has important implications for human health: 307 cases had been detected in nine countries as of May 2007, with a lethality of 61%.⁴ Most human cases have been associated with direct or close contact with infected poultry or surfaces contaminated with their feces or secretions. In addition to the current panzootic, the world now fears a pandemic similar to the one in 1918.⁵ This pandemic may happen if the virus changes such that it can spread easily from person to person.

The importance of H5N1 HPAI to animal and human health has drawn attention to the sometimes ineffective management of recent outbreaks, mainly due to a general lack of practical and applied knowledge among the people involved in detection, prevention, and response. For example, confirmatory diagnosis has been delayed in some cases because of a lack of expertise and experience in packing and shipping samples for international delivery.⁶ Also, many human infections to date have been caused by the unsafe handling of infected birds during preparation for consumption, which could have been prevented by the application of simple hygiene and personal protection practices. There is clearly an information gap that an applied training course on H5N1 HPAI could fill.

The nature of the current panzootic challenges the design and implementation of training programs that address knowledge gaps and needed skills. One of the key difficulties is that diverse species have been impacted by H5N1 HPAI, and that increases the professional disciplines whose input is required in prevention and response discussions. The needed multidisciplinary approach is made more difficult by the lack of collaboration between professions and the failure of health professionals to see beyond the confines of their own expertise and experience.

Additionally, the current number of qualified experts in some disciplines is inadequate to respond effectively in many parts of the world, particularly

in developing countries. For example, in Tanzania there are no field veterinarians who specialize in poultry medicine or public health; only at the university level are there three or four specialists in each of these fields (Personal communication, Dr. Peter L. Msoffe, Department of Veterinary Medicine and Public Health, Sokoine University of Agriculture, December 2006). Even in a developed country the size of the U.S., there are only 275 qualified poultry veterinarians, and approximately 600 veterinarians have demonstrated expertise in preventive veterinary medicine.⁷ Presumably, very few of them have both qualifications. Moreover, these few experts are fully employed and committed to full-time jobs; therefore, they lack the time to travel to the countries that need their advice on the prevention and control of H5N1 HPAI.

On one level, there is a need to provide detailed training to professionals already working in a particular discipline; however, it is the people who will directly encounter avian flu who can benefit the most from training and will have the greatest impact on the outcome of a disease outbreak. In the case of H5N1 HPAI, those individuals include poultry producers, district-level veterinarians, agricultural extension staff, medical doctors, public health workers, wildlife health experts, and, most importantly, those raising poultry at the village level. All of these individuals need to know how to detect, prevent, and respond to an H5N1 HPAI outbreak, as well as how to protect themselves and others from becoming infected. The delivery of information to all levels requires numerous trainers, and materials that can be delivered both to educated professionals and the general public.

Another training challenge is that there is no one solution that will fit all disease outbreak situations. Because of its global spread and the range of species that may be infected, an HPAI H5N1 outbreak may occur in an enormous diversity of scenarios. Each scenario is characterized by a number of factors and circumstances that may be unique to a region. For example, the poultry sector is defined in terms of production systems, species raised, distribution chains, and marketing, all of which impact how the disease is spread and, therefore, controlled. Other less obvious factors may include the geography of a region, its climate, the susceptible wildlife species in the area, the culture(s), the country's trading partners, the political/economical environs, transportation networks, and the animal and human health infrastructures. All of these factors and their complex interactions will determine the best strategy to respond to an outbreak or case in a specific setting.

AVIAN FLU SCHOOL

Avian Flu School (AFS) was created to address these training challenges and needs through a train-the-trainer program that was intended to build local capacity. The AFS development project was completed between May and December 2006. AFS, a project of the Global Livestock Collaborative Research Support Program, is based on a cooperative extension model for the delivery of information and skills, and was developed by experts from the Schools of Veterinary Medicine and Medicine at the University of California, Davis (UC Davis).

MATERIALS AND METHODS

The pilot training courses

During the initial assessment period, three pilot courses were conducted—one at UC Davis (July 1–4, 2006) with 17 domestic and international participants (4 instructors, 13 trainees); one at Sokoine University of Agriculture, Morogoro, Tanzania (August 21–24, 2006) with 37 participants (5 instructors, 13 observers, 1 coordinator, and 18 trainees); and one at Texas A&M University (September 11–14, 2006) with 29 domestic and international participants (4 instructors, 4 observers, 1 coordinator, and 20 trainees). Four

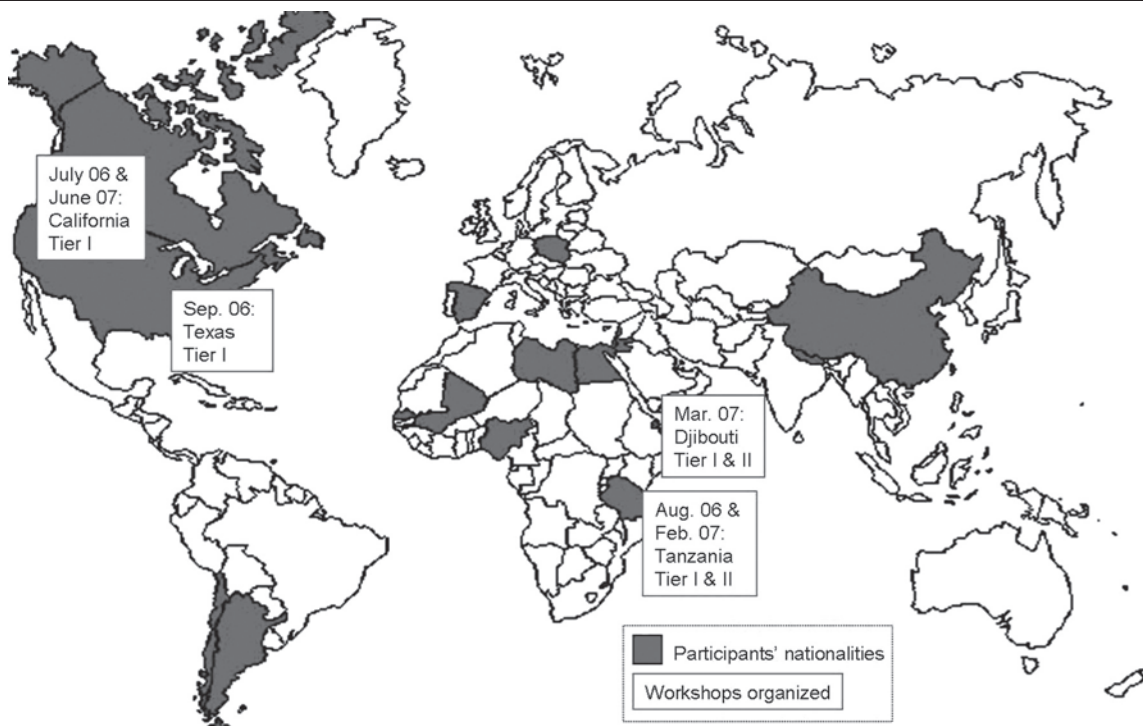
additional courses have been conducted in Djibouti (two), Tanzania (one), and Davis, California (one), in addition to courses taught by other organizations based on the AFS materials. The cadre of trainers is of 17 nationalities and comprises a core of 50 qualified AFS instructors. Of these, by summer 2007, 10 had conducted additional AFS courses. The location of the courses and the participants' nationalities are shown in Figure 1.

Course evaluation

Assessment of the training model's effectiveness is based on evaluations of the pilot courses only. Participants were asked to complete pre- and post-course assessments of their knowledge and to evaluate their perceived improvement in comprehension of the subject matter. An additional evaluation form was completed by trainees at the end of each module, ranking the effectiveness of each module on a scale of 1 to 5, with 5 being the highest level. Moreover, at the end of each workshop there was a facilitated discussion about the course's effectiveness and how to improve it. Most adjustments in course content were made based on feedback gathered at the pilot courses.

Ten months after the first pilot workshop, an invitation to complete an anonymous online survey was e-mailed to participants of the pilot courses. Participants

Figure 1. Locations of workshops conducted and nationalities of Avian Flu School trainers



were asked to report on their training activities, behavioral changes since the workshop, whether they would change anything in the course, and their familiarity with the main learning objectives for each module.

Training model

Based on the assessment that there is a need to deliver information to large numbers of people worldwide, it was concluded that a train-the-trainer model might be the best approach. “Train-the-trainer” is a term used to describe programs designed for training people who will in turn train others. Also known as “cascade training,” the train-the-trainer approach is commonly used in the fields of animal health, public health, and agricultural extension. It has been used in the past to approach issues in both developed and developing countries, such as Newcastle Disease vaccination in chickens,⁸ human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS),^{9–12} asthma,¹³ care for disaster survivors,¹⁴ health promotion for childbearing,¹⁵ promotion and risk reduction in pregnancy,¹⁶ neonatal intensive care,¹⁷ and the use of pesticides by farmers.¹⁸

AFS materials are designed in tiers based on the expertise of the intended audiences. In Tier I, professionals as well as national officials from public health ministries and veterinary service departments are trained. Tier I trainees then conduct Tier II trainings, mainly within their districts or organizations; the intended audiences are zonal and district veterinarians, agricultural extension staff, wildlife managers, and public health workers who will, at Tier III, reach their respective communities.

Tier I trainers apply for AFS and are admitted to the course based on their qualifications as health professionals with relevant expertise (e.g., poultry health, public health, epidemiology), language skills, and willingness to travel. Trainers are classified in a dataset by these characteristics so that they can be easily identified and matched to the specific requirements of requested trainings. Tier II trainers are identified by their job functions, and Tier III trainees are identified by their interest and needs.

Flexibility

The AFS curriculum is adaptable because of its interactive structure. In addition, the course was designed in a modular format so that it can be easily and quickly adapted to an audience’s needs by adding or removing modules and/or lessons. Figure 2 presents a list of the modules and their content. Customizing the AFS course usually means teaching the whole or most of the Overview module and selecting only some lessons of the

Figure 2. Topical outline and timeline of the Avian Flu School course

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- Module 1: Overview (1 day)
 - Introduction
 - Avian flu viruses
 - History of H5N1 HPAI
 - H5N1 HPAI transmission
 - H5N1 HPAI risk to humans
 - Impacts of H5N1 HPAI
 - Virus surveillance, testing, and reporting
 - Coordination and management of an H5N1 HPAI emergency
 - Communications planning
 - Module 2: Surveillance (4 hours)
 - Introduction
 - Surveillance of H5N1 HPAI: steps, methods, types, and objectives
 - Sample-size calculation
 - Surveillance in poultry and captive populations
 - Surveillance in wild birds
 - Developing an H5N1 HPAI surveillance plan
 - Module 3: Public Health and Worker Safety (2.5 hours)
 - Introduction
 - General public education and protection
 - Poultry farm worker protection
 - Backyard/small holder poultry owner protection
 - Live-bird market worker protection
 - Medical worker protection and patient protocol
 - Public health team protection
 - First responder protection
 - Health-care worker protection
 - Module 4: Prevention and Response (1 day)
 - Introduction
 - Prevention
 - Response
 - Recovery
 - Scenarios (smallholder poultry operations, wet markets, commercial poultry facilities, zoo and aviary collections, wildlife refuges, parks)
 - Developing prevention plans
 - Developing response plans
 - Practical Session (3 hours)
 - Packaging a virus sample for shipping
 - Putting on and removing personal protective equipment
 - Cloacal and oral cavity swabbing for samples (1 person, 2 people)
 - Vaccinating a chicken
 - Bleeding a chicken
 - Safe slaughter and cleaning of a chicken or duck
 - Use of a rapid diagnostic test

H5N1 HPAI = highly pathogenic avian influenza

other four modules. While the Overview module serves as the basic background information for all audiences, the Surveillance module is not always taught because it is aimed only at individuals involved in the development and/or implementation of surveillance activities.

As an additional option, lessons in sample-size calculation, for example, can be shortened to include only the importance of adequate sample sizes, and covered with a job aid like a laminated card with a sample-size table, which can be used as a reference.

Lucidity of the material

The materials are written in simple language using short statements and formatted as bulleted lists whenever possible. Technical jargon is avoided and complementary diagrams are presented along with the text to explain some of the more complex and confusing concepts. This approach facilitates not only comprehension, but also the teaching of the materials. Moreover, many participants do not speak English as a first language, and a more complicated writing style would compromise their understanding. The simple language structure and straightforward points also facilitate the translation of the materials into other languages. To date, the curriculum has been translated into French, Kiswahili, and Spanish. Trainers are also instructed to speak slowly and clearly, stressing the most important concepts, and monitoring trainees frequently for comprehension.

Interactivity

Lessons are highly interactive, mainly through the use of small group review exercises. The exercises generally present participants with hypothetical scenarios with which they can practice the lessons' main concepts. Most of the exercises are conducted in small groups of three to five people, who discuss the exercise and then report back to the full workshop group for further review and discussion. The main exercise answers are then recorded on a flip chart and later distributed by e-mail to all participants.

Open discussion is highly encouraged, not just during the exercises but also at any time during the lessons. Discussions help in understanding concepts and clarifying common misunderstandings, while keeping participants involved and interested in the subject. If the discussion goes off track, the trainer can note the issue or question on a chart so that it can be clarified and/or discussed at a more relevant time later on in the course. This helps to keep the modules on topic and on schedule, yet allows the curriculum to be adjusted to the audience's specific needs.

Relevance

AFS courses usually include local guest speakers who present their own experiences, especially as they relate to situations that may impact H5N1 HPAI detection, prevention, response, or recovery. Examples of such information offered during the pilot courses included

presentations about the response to the first HPAI H5N1 outbreak in Nigeria, a talk on the Tanzanian National Plan, and open discussions on the diagnostic capabilities both in the U.S. and Tanzania. Instructors are also encouraged to use real-life examples and case scenarios from their own experience to illustrate the different concepts being taught. At a minimum, a presentation on the poultry sector in the host country and another one on the implementation of the national HPAI Plan are important topics to be included with the Overview (Module 1).

To encourage immediate action based on knowledge gained in the course, participants are asked after each module to identify one action that they plan to take based on what they just learned, when they plan to implement the action, what other immediate applications they may see, and with whom they will share the information.

Training materials

AFS materials were compiled and developed from existing documents in the public domain as well as from new materials. To locate appropriate background and documents, the websites of the main organizations involved in outreach, education, and messaging on avian influenza were visited to identify relevant brochures, fact sheets, slide shows, and books. These documents were collected, read, and categorized by topic. An outline was then developed to identify gaps in the publicly available information, and experts were enlisted to develop material to fill those gaps.

A text version of the materials was developed with the input of experts in relevant fields. Once the content was developed, the materials were organized into short, highly interactive lessons by a commercial adult training firm (Info Pros, Sacramento, California), which provided guidance on the course module format and structure.

Content

The complete AFS course consists of three days of workshops divided into four modules with short lectures and small group exercises, plus a half-day of practical exercises (Figure 2). The practical session covers the applied skills related to the four modules. It is best taught in a location, such as a laboratory or outdoors, that allows the manipulation of live birds. Each module is supplemented with a list of the references used, a feedback form, and a short Microsoft® PowerPoint® presentation. In addition, a series of appendices covers specific standard operating procedures, exercises, diagrams, case studies, and other complementary information. Each module covers only information essential

to understanding avian influenza. For example, only general concepts in virology necessary for understanding the prevention and control of avian influenza are presented. Any extra information that the participants may want to know in an individual training is directed as questions to the instructors. Because the material is used in a variety of settings, every group of trainees will have specific questions related to their own experiences, interests, or needs.

Structure

All modules follow the same structure to aid in their ease of use. Instructors are provided the module contents, a description of the target audience, a suggested timeline, the module objectives, and the module preview, which stresses the key points of the lessons to come. The curriculum follows in short segments that include highly interactive review exercises. The module preview and the objectives are repeated at the end of the module to ensure that all basic concepts are clear.

The course manual is structured into two columns: the left column contains the instructors' notes, and the right column presents the material for the participants (Figure 3). The instructor column includes the information to be taught, plus instructions, transitions, and the course timeline. The participant column consists of highlighted key information, exercises, diagrams, and space for participants to take notes. Tier I participants are presented with both columns, while the manuals for Tiers II and III trainees show only the participant's column.

Each module has an accompanying slide show presentation with exercises, pictures, diagrams, and simple animations to help explain the most confusing concepts. It was decided not to include in the slide shows detailed text or information covered in the manual. Initially, some instructors in the pilot courses used slide show presentations that either represented the curriculum using new pictures and graphics or added illustrative material. Participants' feedback was nearly unanimous in that they wanted instructors to use the exact material in the manual to make it easier to learn in a short period of time. The current iteration of AFS keeps participants focused on their manuals, which means that the course can be taught in the absence of projection equipment, or in the event of a power outage, which is common in some developing countries.

Course schedule and setup

It is recommended that full 3.5-day AFS courses be taught by a minimum of two instructors, preferably

three. Ideally, one instructor should have a veterinary and poultry background and one other should have a public health background. A third instructor with expertise in communication or national planning is helpful. The ideal number of trainees to optimize the learning process is between 10 and 15, with varied professional qualifications. The interactive exercises are most effective when trainees can bring public health and veterinary health perspectives together. Although several points of view are presented in the workshop, a more complete integration of ideas is achieved when the participants have diverse backgrounds.

The recommended room layout for the workshop is illustrated in Figure 4. The AFS laboratory requires at least one instructor per four participants, and the suggested room or facility setup is also shown in Figure 4.

Making the AFS materials available

To support course workshops domestically and internationally, the AFS Assessment Project developed a website, www.avianfluschool.org, which provides guidance for organizing a training workshop, directions for ordering AFS course materials or a custom course, guidance for locating AFS instructors, and recommended resources for instructors.

RESULTS

Pilot course evaluation

Each pilot course received higher evaluations than the preceding one, indicating that the modifications made between courses effectively improved the course's perceived quality. Figure 5 shows how the overall course evaluation score improved from 4 out of 5 during the first pilot course at UC Davis to more than 4.4 out of 5 for the last pilot course at Texas A&M; both were attended by similar audiences. Similar results were obtained for each of the modules individually. Module 2 was changed the most from the first to the third pilot course. The improvement in evaluation scores is reflective of those changes.

The online survey conducted after the pilot courses had a 66.1% response rate and showed the following about the participants:

- 80.6% were confident in their ability to use the materials to train others as a result of the course.
- 36.1% trained someone using the AFS course materials. The trainees included marine biologists, poultry producers in the U.S., national park rangers, medical officers, government leaders and

Figure 3. Avian Flu School training manual^a

AVIAN FLU SCHOOL

COURSE GUIDE

LESSON I H5N1 HPAI SURVEILLANCE

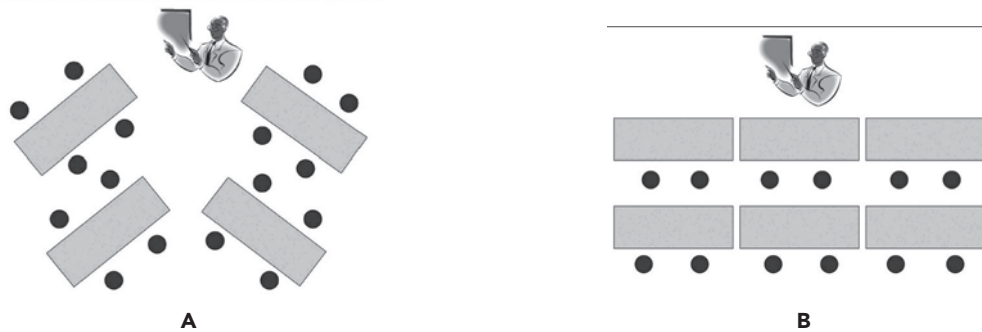
Instructor Notes	Course Material
<p>TIME: 30 MINUTES</p> <p>START TIME: _____</p> <p>END: _____</p> <p><i>TRANSITION</i></p> <p><i>As discussed in the overview, it is optimal to survey both poultry and wild birds, since H5N1 HPAI may spread into uninfected areas through their movements.</i></p> <p>Successful surveillance planning includes specific strategies for each the following:</p> <ul style="list-style-type: none"> • Locating susceptible populations. • Efficient detection, reporting and assessment of morbidity and mortality events. 	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="background-color: black; color: white; padding: 2px;">IMPORTANT POINT</p> <p>To have effective H5N1 HPAI emergency management, it is critical to be ready to respond to an outbreak. Surveillance is vital for early detection.</p> <p>A surveillance plan should be ready to be applied before, during and after an outbreak.</p> </div> <p>Successful surveillance planning includes specific strategies for each the following:</p> <p>1. Locate:</p> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p style="background-color: black; color: white; padding: 2px;">IMPORTANT POINT</p> <p>Keeping an accurate and up to date database of all commercial premises, backyard poultry, wild bird congregations, zoos, and pet shops is vital to allow the quick identification and surveillance of at risk populations within an area after infection is detected.</p> </div> <p>2. Detect:</p> <hr style="border: 0; border-top: 1px solid black; margin: 5px 0;"/>

Wildlife Health Center and Cooperative Extension
UC Davis School of Veterinary Medicine

Global Livestock CRSP
Module 2: Surveillance **7**

^aThe course manual is structured into two columns: the left column has instructor notes and the right column has material for the participants. The participant column has key information highlighted, notes, exercises, diagrams, and space for taking notes. Tier I participants are presented with both columns, while the manuals for Tier II and III trainees show only the participant's column.

H5N1 HPAI = highly pathogenic avian influenza

Figure 4. Suggested table setup for Avian Flu School^a

^aSetup for the workshop (A) and the laboratory (B):

A) The room should be set up with 4 to 5 tables of 4 to 5 trainees each. The tables should be angled toward the instructor so that participants can easily look forward, but also turn back to their tables for group discussions.

B) Participants should all face the instructor and have enough space to perform the bird manipulation (2 to 3 per table depending on the size of the table).

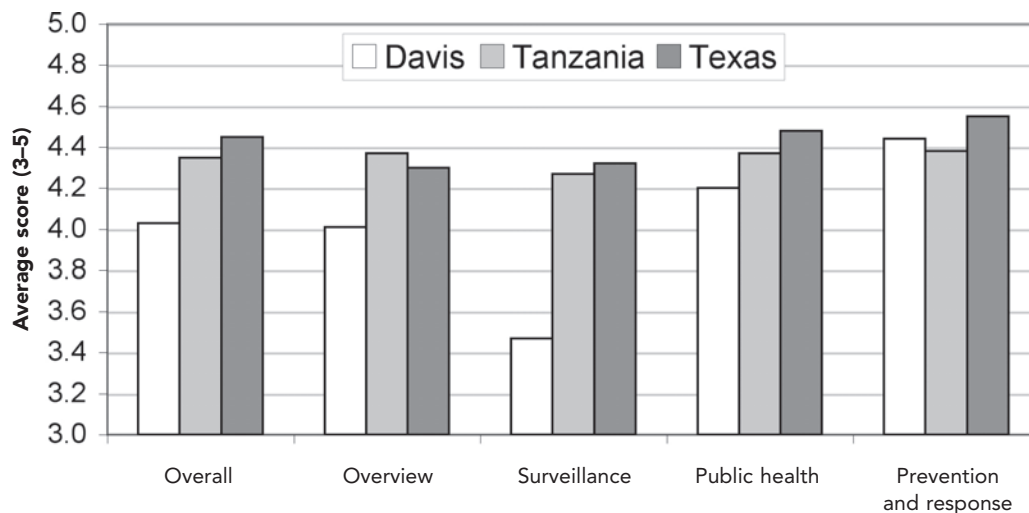
field officers in Tanzania, government veterinarians in Vietnam, and a virologist in Libya.

- 52.8% gave the entire manual or part of it to someone, for a total of 119 additional individuals who received the materials.
- 38.9% implemented some behavioral change based on what they learned.
- 52.9% would not modify, add, or eliminate any part of the training materials, both in terms of content and presentation.

With regard to the AFS content, trainees were asked to assess their knowledge of the course's learning objectives. The responses of the survey participants are summarized in the Table.

Project

One of the unanticipated outcomes of the AFS training courses has been the development of a village Newcastle vaccination project through collaboration by trainees from the Tanzanian pilot course. During the exercise in the Surveillance module (Module 2),

Figure 5. Overall and individual module average scores given by participants in evaluations conducted at each of the three Avian Flu School pilot courses^a

^aAverage scores were calculated from individual scores, with 5 representing the best possible score and 1 the worst.

two groups of participants suggested a novel strategy. They proposed implementation of a Newcastle disease vaccination program in selected villages to prevent clinical disease associated with viscerotropic velogenic Newcastle disease (VVND). VVND is endemic in Tanzania and many other parts of the developing world, and is clinically indistinguishable from any HPAI, including H5N1 HPAI. The cost of the laboratory testing needed to differentiate these diseases is prohibitive, and is thus a limiting step in achieving adequate surveillance for HPAI in rural Tanzania.

The groups of trainees proposed using sentinel villages in which chickens would be vaccinated for Newcastle disease and enrolled in a reporting system for mortality events. A chicken die-off in Newcastle-vaccinated chickens is much more likely to be caused by HPAI than a mortality event in nonvaccinated chickens. If a mortality event occurs, veterinarians in the region who have been equipped with rapid flu detection kits can confirm a presumptive diagnosis. This system optimizes the use of influenza tests that are expensive and in short supply in Tanzania, as they are in many countries.

DISCUSSION

Challenges

Although the AFS was effective, it did raise some issues. There is a general need for practical training of this type. Additionally, the immediacy of those needs changes as H5N1 HPAI spreads. Although the train-the-trainer model has worked well in a short period of time, and there are more than 50 trainers with a variety of language skills, this number is equivalent to fewer than two per nation with reported H5N1 HPAI cases.

Furthermore, most are fully employed and often cannot travel on short notice when an outbreak occurs.

In addition to the difficulty in developing a network of trainers, there are three main challenges for the implementation of AFS: time constraints, logistics, and funding. Generally, six weeks are required to organize an AFS workshop, although a series or regional cluster of courses may require less time to organize. Most of that time is spent organizing speakers and their visas, transportation, lodging, and meals; selecting the participants and the venue; and preparing and shipping the materials. All of these tasks are time-consuming and logistically challenging. Many laboratory materials considered common in developed countries may not be easily accessible in developing nations, so almost everything has to be packed and shipped from elsewhere. However, every effort is made to find local products that can be used effectively. For example, if a recommended disinfectant is only available in the U.S., then international trainees have no ready supply. It is then necessary to investigate locally available disinfectants and determine which ones are effective yet nontoxic to animals or people.

Workshops can also be expensive. There are substantial costs for travel, accommodations, and meals for participants and instructors, and for laboratory supplies, venue rental, and staff time. Initial workshops were more expensive than current courses. This is partly because there are trainers located in more parts of the world, with many who are located closer to workshop sites, which reduces travel expenses. Additionally, the materials have been translated into key languages, thus reducing the expense of any given workshop. Training funds are available to conduct Tier I workshops in many countries, but may be inadequate to support Tier II

Table. Results of a survey of Avian Flu School participants and their comprehension of the learning objectives for the material before and after the course

<i>Learning objectives for AFS</i>	<i>Participant responses</i>	
	<i>Knew before AFS (percent)</i>	<i>Learned in AFS (percent)</i>
Are familiar with H5N1 HPAI virus transmission pathways	54.8	96.8
Are prepared to communicate about an avian influenza emergency	12.9	87.1
Could design a surveillance plan and modify it based on status of the disease	16.1	80.6
Know how to protect themselves and others from exposure	38.7	96.8
Could give biosecurity advice for poultry flocks in various settings	22.6	96.8
Are familiar with response and recovery procedures	16.1	77.4
Can properly don and doff personal protective equipment	16.1	93.5

H5N1 HPAI = highly pathogenic avian influenza

AFS = Avian Flu School

workshops or village-level training. Within three weeks of the Tanzania course, a participating zonal veterinarian conducted a Tier II course for district veterinarians in the Arusha area. This is one indication of the need for the information and how little extra input would be needed to implement Tier II trainings.

The AFS course materials have not yet been fully adapted for education programs at the local community or village level. These Tier III trainings may be best facilitated by nongovernmental organizations and agencies that already have an existing network of field staff. There are numerous networks of people working at the village level, including agricultural extension advisors, agricultural associations, faith-based organizations, local volunteer organizations, microfinance networks, and public health field program staff (in areas such as HIV/AIDS, tuberculosis, and rabies projects). The AFS team is currently seeking to establish collaborative relationships with organizations that have the interest and necessary networks to deliver Tier III trainings.

Future of AFS

AFS is now a part of the Stop AI effort of Development Alternatives International funded by the U.S. Agency for International Development. Through the Stop AI effort, AFS will be combined with other training programs and delivered worldwide.

Avian Flu School California is another iteration of the course. The goal of this project is to educate existing networks of state cooperative extension advisors and specialists about avian influenza. California cooperative extension has lost most of its poultry specialists and advisors, although the state remains a major poultry producer. Therefore, there are few resources to address poultry disease threats like H5N1 HPAI. Through AFS, county farm advisors, youth development advisors, and nutrition, family, and consumer sciences advisors can be educated about avian influenza. After training with a shortened version of AFS that covers the basics of H5N1 HPAI and topics of special interest, they will deliver the program in their communities to audiences such as ethnic groups, health-care workers, children, hunters, backyard poultry owners, and hobby farmers.

Now that the training model, materials, and methods have been fully developed and repeatedly tested, the AFS approach can be used to develop educational

programs for other diseases that threaten the sustainability of agriculture.

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