

# **Part III**

## **Notes for Trainers**

This part of the book is designed to help those involved in training veterinary staff in surveillance techniques. Both national or regional level epidemiologists, and international development staff, may be responsible for training. Chapter 10 provides a number of guidelines and hints for trainers on how to teach effectively. It describes a variety of techniques that help participants learn and understand the material better. Chapter 11 provides suggested lesson plans for a series of training courses covering all the material in this book. Chapter 12 is made up of activity sheets, which can be used to help run a range of learning activities for participants, from group discussions and classroom games, to practice surveys and pilot village interviews.

### **Structure of the training**

The lesson plans in Chapter 11 have been developed to cover all of the material in this book. Everybody has their own way of thinking about a subject and every trainer has their own style, so these lesson plans should be used as a guide only. In particular, some of the survey or sampling techniques are unlikely to be relevant to all situations. Lessons covering these topics can be skipped. In addition, there may be some survey activities to be carried out that are not covered in this book (such as different questions during a village interview, or the collection of different types of specimens). Trainers should develop their own lessons and insert them where appropriate.

The main philosophy underlying all the training is that the best way to learn something is to actually do it. There are therefore a lot of practical activities and field work during the training. However, the training is meant to be structured around an actual large-scale survey. For this reason, it is divided into three separate training courses.

## **Training course 1**

This course is for the veterinary staff who are responsible for planning, organising, and running the survey. They are also responsible for data management and analysis. Usually, this means national or provincial level veterinary staff. The first course is designed to give staff all the background understanding necessary to run a successful survey. Part of the learning activities include the preparations needed to carry out a real survey.

## **Training course 2**

This course is normally run immediately following the first course. It is specifically for the field staff who are responsible for data and specimen collection in the herds or villages. Some basic material from the first course on sampling is repeated, but the focus is on activities within the village or herd, rather than the larger organisational issues. As it is important the survey coordinators also have a good understanding of the field activities, so they can continue to support field staff during the survey, it is anticipated that the participants of the first course will also participate in the second.

Following this second course, the field work for a real survey is started. In this way, all participants have an immediate opportunity to practice the skills they have learnt.

## **Training course 3**

When the field work is finished, a third course is held, with the same participants as the first. The survey coordinators are taught skills for the management and analysis of survey data, using the actual data collected in the field. The importance of reporting the information from the survey is easier to understand when there is real information to report.

## **Creating a different course**

The structure used for the lesson plans will not suit every situation, and trainers should not feel constrained by them. Pick out the parts that you feel are relevant and useful, use some of the activities you like, and ignore the rest.

When designing your own course, try to keep the following principle in mind. Only cover as much material as is necessary, and make sure all topics are relevant to the work of the participants. If the participants cannot see how the material will help them in their jobs, they will quickly become bored.

# 10

## Guide for Trainers

### Contents

Chapter 1: Introduction

#### **Part I: Background to Disease Surveys**

Chapter 2: General Principles of Animal Disease Surveillance

Chapter 3: Sampling

Chapter 4: Principles of Data and Specimen Collection

Chapter 5: Village Interviews

Chapter 6: Computerised Data Management and Analysis

#### **Part II: Survey Design and Analysis**

Chapter 7: Prevalence Surveys

Chapter 8: Incidence Rate Surveys

Chapter 9: Surveys to Demonstrate Freedom from Disease

#### **Part III: Notes for Trainers**

Chapter 10: Guide for Trainers

Advice for trainers

Who should be a trainer

Training skills

Lesson planning

Activities

Teaching Techniques

Learning land marks

Reinforcement and practice

Warmers

Questions and answers

Games or competitions

Group discussions

Brainstorming

Ranking

Role playing

Field trips

Practical activities

Field work

Chapter 11: Lesson Plans

Chapter 12: Activity Sheets



## Advice for trainers

It is often assumed that anybody who understands a subject well should be able to teach that subject to others. Unfortunately, this is not the case. There is a lot more to good teaching than just having an understanding of the subject. An understanding of the students and the way they learn is also necessary.

This chapter discusses who should be a trainer of the active surveillance techniques described in this book, and provides advice on techniques that may be used to help with the training.

## Who should be a trainer

The two basic requirements for a trainer of active surveillance techniques are a good understanding of the subject and the ability to teach it to others. The most likely people to be involved in training are national or provincial level veterinary staff (epidemiologists) responsible for livestock disease control. Veterinary epidemiologists working as development project staff may also be involved. Other people with different backgrounds may also successfully conduct training courses, but ideally, the trainer should have the following characteristics:

- A sound understanding of active surveillance, and the techniques described in this book. Experience with surveillance, and sample surveys, and a knowledge of epidemiological principles is important. However, in the absence of formal epidemiological training, a sound knowledge of all the concepts in this book, and experience in conducting survey field work will provide a trainer with all the technical background necessary.
- Practical field experience. The trainer should be reasonably experienced in restraining livestock and collecting specimens.
- Ability to use computers. Many of the technical calculations and analyses depend on the use of computer programs. The trainer should be familiar with computers and the programs being used (including a database program such as Epi Info), and be able to solve the types of computer problems that may arise.
- An ability to communicate easily with trainees. The trainer should be reasonably fluent in their language, and have an understanding of the social and cultural issues that may impact on field work and training.
- A respect for the skills and experience of trainees, and the knowledge of livestock owners.
- Enthusiasm for teaching and for active surveillance and survey field work. Enthusiasm is contagious.
- Experience with, or an understanding of basic teaching techniques. These are discussed in more detail below.

## Training skills

Every trainer has their own style. While you may wish to copy some good points from people you have learnt from, there is no point trying to imitate them completely. Some people are more serious and strict, while others are casual and like to joke a lot. Both can make a good trainer, as long as they are comfortable with the way they do things. Whatever your style, try to consider if anything you do makes it more difficult for students to learn. If so, then try to change it. Whatever your

training style, it is always possible to learn new tricks and techniques, and to improve the effectiveness of your training.

Training is a process of communication, both from the trainer to the students, and from student to trainer. There are many ways to make this communication more effective. You are not simply transferring information that you have to others, but you are trying to help the participants understand and solve problems, using tools they already have and new tools you give them. Some tips to encourage effective communication include:

- Keep eye contact with the participants. Don't talk with your back to them, while you are working on the board.
- Show interest in what you are saying, and make it more like a story. Don't speak in a droning voice. Speak clearly and loudly, but not too fast.
- Vary activities regularly, so participants don't become bored. Don't spend too much time in the classroom.
- Make sure that the environment where you are teaching is comfortable and not too distracting.

## Lesson planning

One of the keys to successful teaching is good organisation and planning. Regardless of how much technical knowledge the trainer has, if they are not organised, or are unsure what they are doing next, then the students will find it difficult to learn.

A well organised, carefully thought out lesson plan will ensure that both the students and the trainer know exactly what is happening, and that effective learning can take place. Lesson plans have been prepared for the training courses suggested, and are presented in Chapter 11. These should be thought of only as a guide, as the specific needs of each training course will be different. You may use some of these lesson plans if they are appropriate, or develop your own. The structure that has been used for the lesson plans in this book is as follows:

- Title. The title of the lesson, so students know what to expect.
- Location. Where the lesson is to be conducted (classroom, village etc.)
- Duration. The expected time of the lesson. This can vary greatly depending on the level of knowledge and experience of the students.
- Objectives. These are the things that the student should be able to do at the end of the lesson.
- Key points. These are highlights from the lesson, and things to keep in mind when teaching.
- Page references. The relevant pages from this book are listed for easy reference.
- Teaching methods. This is an outline of the activities during the class, and the methods used to achieve the objectives.

## Activities

Many of the items listed under teaching methods refer to activities. These may be games, discussions, role plays, field trips, etc., as described in the next section. For each activity, an activity sheet has been included in Chapter 12. The activity sheets explain the purpose of the activity, how to run it, what equipment is needed, and suggested follow-up questions for discussion.

## Teaching techniques

There are two main ways that people learn. The first is through being told something by somebody else. As we all know, it is easy to forget something that you are told. The second is to discover something on your own, either by doing something new, or using things that you already know to understand something in a new way. When we discover new knowledge on our own, it is much easier to remember. This is partly because it is fun, and gives us a feeling of satisfaction.

These two types of learning are described as 'teacher-centred learning', where all the knowledge comes from the teacher, and 'student-centred learning' where the knowledge is either discovered by the students or comes from a new understanding of things they already know. In many societies, teacher-centred learning is the most common way that people are expected to learn. Listening to lectures, taking notes from a blackboard, and memorising lists of things is an approach that has been successfully used for years. However, there are two problems with it. Firstly, it is not fun, and because the facts that are being learnt are not connected to anything, it is easy to forget. The second problem is that things are not placed in context when they are taught. This means that it is harder for the students to use the facts in a real-world situation to solve problems.

Student-centred learning starts with the students' own experience of problems in the real world. Guided by the teacher, students are encouraged to come up with solutions to these problems, either using their own experience, sharing the experiences of their fellow students, or making new connections with knowledge they already have. Naturally, the teacher is required to provide new information. However, if the new information provided by the teacher is given when students actually want or need the information to solve a problem they are dealing with, then the new information immediately has a useful purpose and is placed in context. These new facts will not be easily forgotten, and can be used to solve other similar problems faced outside the classroom.

When either teacher or students are not used to using student-centred learning techniques, it can be quite difficult at the start. However, after trying for a while, both will realise that it makes teaching and learning more fun, and that the things being taught are useful. When running a training course, a quick check to see if you are using student-centred learning techniques is to listen for a while. If the students are doing most of the talking, then it's working the right way. If the teacher is doing most of the talking, something is wrong.

How, then, can a teacher encourage student-centred learning? The main technique is to use the experience that the students already have, and to present them with problems that they have already faced. To solve these problems they need to think, discuss with other students and discover new information. A skilful teacher is able to guide students so that they rarely need to be taught anything at all – most of the time, they discover things for themselves. It is surprising how often students already have a basic intuitive understanding of apparently complex concepts.

A range of different techniques and suggestions is presented below, to help trainers use student-centred learning effectively.

## Learning land marks

Effective learning has more to do with organising information than memorising new information. If a student understands the relationships between the different things they already know and the new things they learn, then they are able to use that information to help with everyday tasks. Trainers need to help students organise the

information - how does the thing that is being taught now relate to other things that I already know and have previously learnt? How will I be able to use this knowledge?

When travelling on a journey, land marks help people navigate and know where they are. Learning land marks are pointers for students that show where they have come from, where they are now, and where they are heading. If students always know exactly where they are, it is much easier to organise the information. If they get lost, and don't know where they are going, or how this information is to be used, then they don't know how this information relates to other things they know, and they don't know how to properly organise it. Unless the connection is made, the information may be wasted.

There are three good ways to provide students with learning land marks. The first is to give them a map of the lesson, so they can chart a course. At the beginning of every day, or every training session, give the students a brief outline of what is going to be covered. Make sure that it is clear how each topic is related the previous or the next topic, and why it is relevant.

The second technique is to regularly fix your position along the way. As each topic is dealt with, make sure the students know where they are up to. Introduce the topic, and better still, tick off the previous topics on the board. As each new concept is introduced, provide one or two examples of how this is relevant to the real world. The examples used throughout this book are there to help the readers understand how the topic being discussed is related to the real world.

The third way to provide learning land marks is to look back over the journey when it has ended. At the end of each lesson, run through all the topics covered, and highlight how they relate to each other.

## **Reinforcement and practice**

Most subjects, including active surveillance for livestock diseases, use knowledge that is built up layer by layer. It is possible to learn the next level only once the previous one is well understood. If new information is taught before the earlier information is properly learnt, then the foundations become unsteady, and students can become confused.

A good way to ensure that all the earlier information is well understood is to continually reinforce and practice it. Every time students are asked to remember something they have learnt, and to use it to solve a new problem, it makes it harder to forget. The teacher should therefore take every opportunity to include previous concepts in new exercises and problems, to help students practice them.

## **Warmers**

In student-centred learning, the students are expected to do most of the work, while the teacher guides them, providing new information when it is needed, and giving them direction. At the start of a lesson, students are often not prepared to take this active role. They are not yet thinking about the problems that need considering, and they may feel shy or inhibited about speaking out in front of the group.

Warmers are exercises that are designed to 'warm up' the students, to start them thinking about the problems and topics to be dealt with, and to make them comfortable speaking aloud and discussing things with other students. Warmers should be relatively short exercises, that involve a lot of student activity, and above all, are fun. It is best to use a warmer that deals with issues from the previous lesson, so they can practice what they learnt, while preparing them for the upcoming topics.

Any of the following activities can be used as a warmer, but games and competitions are often the best. Warmers can also be useful during village interviews, to help livestock owners relax and feel comfortable about speaking out loud (see page 107). A survey team which has had experience with warmers during their training will be much better able to use them during village interviews.

## Questions and answers

The simplest way to get students to actively participate in the lesson is to ask direct questions. Questions may be asked of the group as a whole, or directed to individuals. Targeting individuals forces them to participate, and avoids the problem of nobody being willing to speak first.

Questions can be used in two ways. Firstly, questions are good for introducing a new topic. A question is posed on how to deal with a problem, (for instance, how to select animals, how to collect blood from a pig, how to get participation from women during a village interview). This can then lead into a full discussion of the issue, maybe using some of the other techniques listed here.

The other way questions can be used is to check whether a topic has been properly understood. Using a new context or different example students are asked to use the new information to solve a problem or explain one aspect of the topic. If the student is unable to do this, or makes mistakes, another student is asked to comment or help. If several or all students show that they don't understand, then the topic hasn't been adequately taught, and you will have to think of a better way to explain or practice the concepts.

Using questions to check students' understanding is a quick and simple way to evaluate the effectiveness of your teaching. As a trainer, the only way to improve is to understand where there are weaknesses in your training, and think of new ways to solve these.

## Games or competitions

Much of the training involves serious or complex issues. To make the training more enjoyable, games or competitions can be used. These allow students to relax, have fun, but still practice the ideas they have been learning, or learn new ones through the game.

Competitions can be effective warmers, such as the knowledge quiz (Activity 22). This provides students with an opportunity to recall and practice information they have learnt, as well as gaining a feeling of pride. It also can be used by the teacher to assess the level of understanding of concepts.

As well as warmers, games can be used to introduce or practice new concepts. The sampling jigsaw game (Activity 7) is an example of this. Through the game, students have an opportunity to see for themselves the effect of different sampling strategies, and have fun at the same time.

## Group discussions

In group discussions, the class is divided up into a number of smaller groups. Each group is asked to discuss a topic, or consider a number of questions, and record their ideas on a piece of paper as they go. At the end of an allotted time, one member of the group presents the findings to the rest of the class. Each group should be given an opportunity to present their ideas.

Group discussions are an opportunity for students to explore and discuss the issues with each other, to relate their own experiences and share those of others.

They are a good way for students to discover how much they already know about a subject.

Groups may be made up of just two people, but more usually have between 4 and 6. Before the discussion, you should make it very clear what the aim of the discussion is and what the topic or questions under consideration are. During the discussion, the trainer should wander from group to group, monitoring the topic, and checking that they haven't strayed onto something else.

While each group is reporting their ideas, they should be recorded on the board for all to see. At the end, the trainer needs to summarise and organise the ideas, to give structure to the conclusion.

## Brainstorming

Brainstorming is a technique in which class is given a topic, and students are asked for the first idea that comes into their head. It is used to collect a lot of ideas quickly and to encourage participation. Brainstorming exercises may be used as warmers, or to introduce a new topic.

For a brainstorming session, the teacher presents a question or idea. Students are then asked to respond to this question or idea with their own ideas, using just one or two words, and responding quickly. The teacher invites each person in the group to respond, and writes down the answers as they go. Students are told that there is no such thing as a wrong answer in a brainstorming session, it is just to collect lots of ideas.

To be successful, brainstorming should be done very quickly and with some excitement. You should choose the order of students in an unpredictable way, and jump to the next student quickly. Don't let any discussions or argument start at this stage, just collect the ideas.

When the list has been made and there are no more ideas, the list can be used as a basis for the next activity or session, depending on the objectives of the lesson.

## Ranking

Ranking activities are used to set priorities or arrange things in order of importance. Ranking may be used during village interviews to identify priority livestock diseases, but it can also be a useful tool during training courses.

There are many ways to run a ranking activity, and these can be adjusted to the specific situation. Normally, the activity starts with the creation of a list, for instance a list of the common diseases affecting village livestock in the study area. Participants are then asked to identify which of the listed diseases are the most important, and which are less important. It must be made clear what "important" means. You may choose to define importance as 'most likely to cause death', or 'causing the greatest financial loss' or 'causing the most inconvenience', or most expensive to treat. Separate ranking exercises can be conducted for each of these different criteria, if desired.

Each participant scores each disease on a piece of paper in order of importance. The most important disease gets a score of 1, the second most important disease gets a score of 2 and so on. When all participants have finished, the scores of all participants for each disease are added up. The disease with the lowest score is the most important, through to the disease with the highest score which is the least important.

One important use of ranking is to help participants identify their own preconceptions and biases. If a disease ranking exercise such as the one described is

carried out, and the same exercise is used then with village livestock owners during a trial interview, the differences in the diseases and ranks between the participants and the livestock owners can be highlighted. These differences represent differences in attitude or experience of the veterinary services compared with the livestock owners.

## Role playing

Role playing involves asking participants to act out some scene or situation. Role playing allows participants to think about issues that are likely to be raised during field work, and to develop appropriate ways of dealing with them while still in a safe, non-threatening environment. It is also a good way to get people participating and break down inhibitions.

A role play is like a very short play, acted by the participants. Each of the players is given clear instructions as to who their character is, and what position or attitude they have. The players then act out the play, making up the dialog as they go along. Usually, a role play involves some sort of conflict or disagreement, that the actors need to resolve.

Activity 17 is an example of a role play. Participants use the play to explore a situation that is likely to arise during field work. Livestock owners are reluctant to let the survey team collect blood from their animals, and the survey team needs to explain why they should let them.

## Field trips

The purpose of much of the training is to prepare participants for survey field work. By far the best way to do this is to actually do the work. Field trips give the participants an opportunity to practice the skills they have learnt, and to experience for themselves the problems and limitations of working in the field.

Field trips can provide valuable information for survey planning as well, as they can act as small pilot surveys. The activities of the survey staff, and the responses of the livestock owners can be assessed, and problems identified and corrected. However, a training field trip is necessarily very different from a real village visit during a survey. Participants are generally less confident with their new knowledge, and, more importantly, there will usually be many more participants on the field trip than would participate in a normal village survey visit.

Very good organisation is therefore essential if the field visit is to be successful. The purpose of the trip and activities to be carried out should be carefully explained, and the roles and responsibilities of each of the participants must be clearly assigned.

While carrying out training activities in front of livestock owners, the trainer should be aware of the sensitivities of both livestock owners and participants. For instance, if inexperienced participants are practicing restraining or collecting blood from an animal, don't let too many participants use the same animal, or the animals belonging to a single livestock owner. Both animal and owner are likely to become stressed.

It is also important to try to maintain the participants' status while working in the village. If participants are seen by livestock owners to be unskilled or ignorant, then both the owners' and the participants' confidence will be undermined. Teaching during field trips should therefore concentrate heavily on encouraging students to demonstrate and practice their knowledge and skills. It should be done in a positive, supportive way, avoiding direct criticism.

After the field trip, there should always be a time set aside for discussion. A few questions should be used to stimulate the group to talk about their experience. In particular, it is important to identify what problems were encountered, and how they could be addressed or avoided. Make a point of identifying the good things as well as the problems. Activity 18 describes a trial village visit.

## **Practical activities**

In addition to field visits, training should include as many, real-life practical activities as possible. The idea is for participants to learn 'on-the-job', and to feel that the activities they are doing during the training are not just made-up exercises, but are actually contributing to the aim of the work.

One example is the tasks involved in survey planning. After the principles have been taught and practiced with various exercises, they can be used, during the training, to prepare for the real survey. For instance, random selection of first-stage units (villages) in a two-stage prevalence survey can be done by the group during training. The participants work together to obtain and check the sampling frame, and then use the software to calculate sample size and select the required number of villages.

A similar approach can be used after the survey with data analysis. While the principles of analysis can be taught, analysing the actual data collected during field work will give the exercise much more meaning. There is also the advantage of having a larger group of people entering and analysing data, making it faster, and easier to use duplicate entry checking systems.

## **Field work**

Although not formally part of the training course, learning continues during the actual field work of any survey. The field work should start as soon as possible after the finish of the training course, and be seen as a logical extension of it. Each survey team should be encouraged to hold a brief meeting at the end of each visit, to discuss what problems occurred, and how the procedures can be improved to address these problems.

The trainer should participate in the field work alongside the survey team as much as possible. At a minimum, the trainer should accompany the team on a number of visits, especially during the early part of the survey. This is to help continue the training and refine the skills of the survey teams, and also to identify problems, errors, or poor practices that may have slipped in to the work routine. If these are corrected at the start of the survey work, the quality of the survey will not be compromised.

# 11

## Lesson Plans

### Contents

Chapter 1: Introduction

#### **Part I: Background to Disease Surveys**

Chapter 2: General Principles of Animal Disease Surveillance

Chapter 3: Sampling

Chapter 4: Principles of Data and Specimen Collection

Chapter 5: Village Interviews

Chapter 6: Computerised Data Management and Analysis

#### **Part II: Survey Design and Analysis**

Chapter 7: Prevalence Surveys

Chapter 8: Incidence Rate Surveys

Chapter 9: Surveys to Demonstrate Freedom from Disease

#### **Part III: Notes for Trainers**

Chapter 10: Guide for Trainers

Chapter 11: Lesson Plans

Course 1 - Active surveillance, survey planning and sampling

Course 2 - Field techniques for livestock disease surveys

Course 3 - Computerised data management and analysis, and reporting

Chapter 12: Activity Sheets



The lesson plans in this chapter are provided as a resource for trainers. They are divided into three separate courses.

Course 1, "Active surveillance, survey planning and sampling" is designed for national staff, survey planners and coordinators, to prepare them for the task of coordinating surveys.

Course 2, "Field techniques for livestock disease surveys" is designed for field staff and the survey teams. This course provides training in all the practical data collection activities required. The design of these courses assumes that the participants of Course 1 will also participate in Course 2, and that the two courses will be followed, almost immediately, by the actual field work of a survey.

Course 3, "Computerised data management and analysis, and reporting", is designed for national staff, and coordinators. The aim is to run this course for the same participants as Course 1, soon after the completion of field work. The data collected can then be used as material for training.

After the completion of the training courses, and participating in the field work, trainees should be in a position to organise and conduct further livestock disease surveys as required.

The lesson plans therefore provide a structured syllabus for teaching the techniques described in this book. However, they are not appropriate to every situation, and not every training course needs to cover all the material. While some trainers may wish to use the lesson plans much as they are presented, they can also be used simply to provide a guide and stimulate ideas for the running of similar courses. In particular, trainers should structure the lessons and use activities according to their preferences, and the needs of the participants.

# Course 1 - Active surveillance, survey planning and sampling

## Participants

National staff, survey planners and coordinators

## Course Structure

Lesson 1: Introduction to animal health information and surveillance . . . . .	2
Lesson 2: Surveys and inference . . . . .	3
Lesson 3: Measures of disease . . . . .	5
Lesson 4: Sampling . . . . .	6
Lesson 5: Sampling in practice . . . . .	7
Lesson 6: Sampling without a sampling frame . . . . .	8
Lesson 7: Practical RGCS field work . . . . .	8
Lesson 8: Introduction to survey planning . . . . .	8
Lesson 9: Trial survey - rabies vaccination . . . . .	8
Lesson 10: Prevalence surveys . . . . .	8
Lesson 11: Incidence rate surveys . . . . .	9
Lesson 12: Surveys to demonstrate freedom from disease . . . . .	9

## **Lesson 1: Introduction to animal health information and surveillance**

**Duration:** 2 hours

**Location:** Classroom

### **Objectives**

- Discuss the use and importance of information on animal diseases
- Examine how information is collected in the current system (passive surveillance)
- Identify weaknesses in the collection of information
- Introduce the concept of active surveillance to address these weaknesses

### **Key points**

- Many veterinary staff don't realise the importance of disease information to their jobs. Try to emphasise the relevance of information and the need for good information for the jobs of the participants.
- Passive surveillance systems suffer from under reporting and bias
- Active surveillance can overcome these problems

### **Page references**

Animal Disease Surveillance (page 14)

### **Teaching methods**

- Introduce the course
- Group discussion on the need for animal disease information. How do the participants use information in their own jobs? Who else needs information, and about what?
- Develop flow chart of collection of disease information. Have one participant draw the steps in information flow, while the others suggest different sources and paths.
- Use direct questions to investigate possible weak spots in the flow of information. Highlight the problem of under-reporting of diseases.
- Use group discussions to list possible reasons why a case of disease may not appear in national-level records
- Explain the term passive surveillance
- Use questions to find how it could be done better, and introduce the idea of active surveillance

## Lesson 2: Measures of disease

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Understand prevalence and how it is measured
- Understand incidence rate and how it is measured
- Explore the relationship between incidence rate and prevalence
- Consider examples of when to use incidence rate and when to use prevalence
- Understand the difference between clinical prevalence and seroprevalence
- Be able to interpret sensitivity and specificity as measures of a test's performance
- Understand the difference between apparent prevalence and true prevalence

### Key points

- Prevalence is the number of cases of disease at one point in time
- Incidence rate is the number of new cases of disease over a period of time
- Diseases of long duration have a higher prevalence
- Seroprevalence is easier to measure than clinical prevalence
- Make sure students understand basic principles of immunity, antibodies, and serological tests
- Diagnostic tests usually make a small number of mistakes
- Sensitivity is the proportion of true positives that a test detects, specificity is the proportion of true negatives
- Sensitivity and specificity can be used to correct for the mistakes of a test, and calculate true prevalence

### Page references

Measures of disease (page 26)

Diagnostic tests (page 32)

### Teaching methods

- Visual aids, examples and direct questions to introduce prevalence and incidence rate
- Example calculations
- Group discussion on which measure to use for two hypothetical situations (e.g. evaluate losses caused by Swine Fever, and monitor effectiveness of movement control regulations which dictate that all animals passing checkpoints must have been vaccinated)
- Activity 2: Sensitivity and specificity
- Questions and example on apparent prevalence versus true prevalence

## Lesson 3: Surveys and inference

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Explain the principle of a survey
- Introduce the concepts of population, and sample
- Contrast surveys with complete counting of the population (censuses)
- Explain the process of inference
- Define bias and explain the need for representative samples
- Discuss estimation and precision
- Identify the role of sample size on survey accuracy

### Key points

- Surveys examine only a small sample of the population
- The sample is used to make inferences about the population
- Inference can be wrong, giving a biased result
- Representative samples ensure that inference is not wrong

### Page references

Disease Surveys (page 18)

### Teaching methods

- Activity 1: Classroom census and survey for average age
- Questions on population and sample
- Explain inference using visual aids, stressing that a survey estimate can be wrong
- Explain bias, accuracy and precision using visual aids
- Activity 3: Biased sampling survey.
- Activity 4: Sample size effect and surveys
- Group Discussion - how are samples selected now? Are the samples representative? Ask participants to list the different ways they have selected samples in previous work. Have them consider potential for bias.
- Discuss techniques, highlighting potential for bias

## Lesson 4: Sampling

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Understand the need for random sampling to reliably select a representative sample
- Be able to distinguish probability from non-probability sampling techniques
- Select random numbers using physical randomisation, random number tables, and a computer
- Introduce the concepts of 'probability proportional to size sampling' and 'stratified sampling'
- Understand the requirements of a good sampling frame.

### Key points

- Random sampling is the only way to reliably select a representative sample
- In simple random sampling, all elements have the same probability of being selected
- Computers can simplify the task of selecting a random sample
- Systematic sampling can sometimes be used to avoid the need for a sampling frame
- Sampling frames should include every member of the population, once only
- The sampling frame determines the level of inference

### Page references

The need for random sampling (page 38)  
Random sampling techniques (page 40)  
Sampling frames (page 49)

### Teaching methods

- Assess the level of understanding of basic probability with questions
- Introduce the concept of chance and probability
- Examples, using dice, cards, coins of a random outcome
- Explain how we don't know the outcome of a single trial, but in the long run, we can predict what will happen over many trials
- Activity 5: Random numbers. Predicting the outcome
- Demonstration of using a random number table and computer generated random numbers
- Activity 6: Classroom age survey using random sampling
- Discuss repercussions of an incomplete sampling frame or one with duplications
- Activity 7: Sampling Jigsaw game

## Lesson 5: Sampling in practice

**Duration:** 2 hours

**Location:** Classroom

### Objectives

- Consider the problems of sampling from large populations
- Understand the principles and advantages of two-stage sampling
- Practice the actual selection of herds or villages from a sampling frame using a computer
- Explain the meaning of replacement and without replacement sampling

### Key points

- Building a sampling frame for large populations is usually too expensive or not possible
- Two-stage sampling removes the need for a complete sampling frame, and makes field work easier
- Computers can be used to select a sample from a sampling frame.

### Page references

Sampling from a Sampling Frame (page 41)

Two-stage Sampling (page 64)

### Teaching methods

- Questions about problems with sampling from large populations.
- Explain the benefits of two-stage sampling
- Activity 8: Selecting sample villages for survey (if using SRS or PPS)

## Lesson 6: Sampling without a sampling frame

**Note:** This lesson is necessary only for surveys using random geographic coordinate sampling.

**Duration:** 2 hours

**Location:** Classroom

### Objectives

- Consider the problem of random sampling in the absence of a sampling frame
- Introduce the technique of random geographic coordinate sampling
- Use the computer to select random coordinates
- Note how remotely sensed data can be used to screen points
- Demonstrate the use of a GPS unit
- Introduce the field procedures for selecting villages

### Key points

- RGCS is difficult and time consuming
- Remotely sensed data (satellite images or aerial photographs) can be used to make it less difficult
- The GPS uses satellites to pinpoint the ground location
- Villages must be identified with a single unique point
- The selection radius can be chosen during field work to make the task simpler

### Page references

- Selecting random coordinates (page 65)
- Identifying selected villages (page 71)

### Teaching methods

- Group discussion - sampling without a sampling frame. Consider the problems of ensuring that every village has the same chance of selection, and what techniques could be used
- Introduce RGCS
- Demonstrate GPS
- Practice using the computer to select random points
- Explain field procedures and the use of forms, using visual aids

## Lesson 7: Practical RGCS field work

**Note: This lesson is necessary only for surveys using random geographic coordinate sampling.**

**Duration:** 1 day

**Location:** Field

### Objectives

- Practice the techniques of selecting villages using RGCS

### Key points

- Trial selection of villages, or selection of some of the genuine survey villages
- Requires good planning, GPS, adequate transport, data recording sheets and computer for selection of points

### Page references

Selecting random coordinates (page 65)

Identifying selected villages (page 71)

### Teaching methods

- Preparation for fieldwork, explain activities and responsibilities
- Select actual villages using RGCS. Requires transport
- Analysis of GPS data, selection of villages
- Discussion of problems and difficulties

## Lesson 8: Introduction to survey planning

**Duration:** 2 hours

**Location:** Classroom

### Objectives

- Consider the steps involved in running a survey
- Understand the process of framing the question, and determining how to answer it
- Understand the factors that influence sample size considerations
- Understand the value of pilot surveys
- Consider issues of analysis and reporting before the start of the survey
- Plan a trial survey

### Key points

- The survey question must be able to be answered using a measurable value
- Variance, precision and confidence are important factors in determining sample size

### Page references

Outline of survey procedures (page 143)

### Teaching methods

- Group discussion on what the major steps are for running a survey
- Organise and add any missed steps
- Group discussion on the effect of variance. Present an example of two populations, such as one class in a school, and all the people in a village. Consider a survey to estimate the average age in each of the populations. How many people would be needed from the school class, and how many from the village?
- Group discussion of things that need to be arranged before a survey
- Compare with checklist
- Explain the need for pilot survey. Examples of what can go wrong in a survey, that would be avoided by a pilot
- Questions to stimulate thought on the importance of reporting

## Lesson 9: Trial survey - rabies vaccination

**Duration:** 1 day

**Location:** Classroom and area of town/city in which training is taking place

### Objectives

- Plan, implement and analyse a real survey
- Develop an appropriate question and way to answer it
- Practice concepts of building a sampling frame
- Carry out random selection from the frame
- Practice interview skills and data collection
- Perform simple data analysis
- Practice oral reporting skills

### Key points

- This is the first real-world survey to be conducted during the course. Good organisation is important to maintain the confidence of the participants
- Any other appropriate disease or species may be used depending on the situation, although some changes in design may be necessary

### Page references

Outline of survey procedures (page 143)  
Sampling (Chapter 3)  
Prevalence (page 26)

### Teaching methods

- Explain the activities carefully beforehand
- Activity 9: Prevalence of urban rabies vaccination survey
- Presentation of results by different groups
- Discussion of problems encountered during the survey

## Lesson 10: Prevalence surveys

**Note:** This lesson is necessary only if prevalence surveys are planned.

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Understand the basic steps in carrying out a two-stage prevalence survey
- Be able to decide on the best survey design to use in a given situation
- Calculate sample size, and understand the factors that are necessary
- Decide on appropriate stratification variables
- Select herds or villages from a sampling frame

### Key points

- The design chosen depends on the sampling frame available
- Variance and prevalence estimates are required for the sample size calculation. These usually need to come from previous surveys.
- The computer can be used to calculate sample size
- Details of second stage sampling are discussed in the next training course

### Page references

Prevalence Surveys (Chapter 7)

### Teaching methods

- Questions: Revise the need for two-stage sampling in large populations
- Questions: Revise the concept of prevalence and when to use it
- Present examples of different situations, and ask questions about how to carry out the survey: sampling frame available versus no sampling frame
- Use the survey design selection flow chart (page 151) to explain how to choose the right design
- Use the computer to calculate sample size. List the parameters necessary for the calculation, and have the group decide on appropriate parameters. Discuss their choices and your recommendations.
- Group discussion or questions on what an appropriate stratification variable would be
- Highlight the problems of selecting animals in the village, using examples. The solution to these problems will be discussed during the second training course (Course 2, Lesson 7).

## Lesson 11: Incidence rate surveys

**Note:** This lesson is necessary only if incidence rate surveys are planned.

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Appreciate the problems of collecting incidence rate measures
- Appreciate difficulties of remembering events from many years ago
- Know the limitations on which diseases may be studied
- Understand the procedure for carrying out a retrospective disease outbreak survey
- Use a computer to calculate sample sizes for a disease outbreak survey
- Know the key pieces of data that must be collected
- Understand the concept of two-sample analysis
- Be able to identify appropriate data sources for two-sample analysis

### Key points

- Incidence rate can be measured at the animal-level or village/herd level. Village/herd level incidence rate is easier to measure, and often more relevant to disease control programs.
- Surveys of past events are reliable only if the events are easily remembered
- Sample size calculation for disease outbreak surveys depends on the difference in the average time since the last outbreak.
- Interview procedures for collecting the information will be covered in the next course (Course 2, Lesson 5)
- Two-sample analysis requires two different, independent sources of information on village or herd disease outbreaks.
- These can be used to estimate the total number of disease outbreaks

### Page references

Incidence Rate Surveys (Chapter 8)

### Teaching methods

- Revise the meaning of incidence rate and the difference between incidence rate and prevalence
- Use examples to distinguish between animal-level and village/herd-level incidence rate
- Describe the survey procedure for village disease outbreak surveys
- Use examples to explain how sample size is calculated
- Use a computer to practice calculating sample size
- Use visual aids and the example of fish in a lake to explain the principle of two-sample analysis
- Use questions and examples to determine what sort of data sources are independent

## Lesson 12: Surveys to demonstrate freedom from disease

**Note: This lesson is necessary only if surveys to demonstrate freedom from disease are planned. The concepts covered are more complex than in other lessons.**

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Understand the situations when it may be necessary to demonstrate freedom from disease
- Understand the problems of using sampling and imperfect tests to demonstrate freedom from disease
- Understand the concept of minimum expected (maximum acceptable) prevalence
- Understand Types I and II error and their importance in survey design
- Understand the steps in a single-stage survey
- Be able to calculate sample sizes using a computer
- Understand how to use two-stage sampling in large populations
- Understand the concept of clustering of disease
- Be able to calculate optimal sample sizes for two-stage surveys (advanced groups only).

### Key points

- It is not possible to prove that a population is free from disease, if using imperfect tests
- Surveys can demonstrate that there is a low probability that, if the disease exists, the prevalence is greater than a specified level
- Two-stage sampling can be used for large populations, and populations with disease clusters

### Page references

Surveys to Demonstrate Freedom from Disease (Chapter 9)

### Teaching methods

- Group discussion on freedom from disease and when it may be necessary to be able to demonstrate it
- Revise the concept of sensitivity and specificity
- Activity 10: Classroom survey to demonstrate freedom. Use to stress that proof is impossible, and there must be a maximum acceptable prevalence
- Use a computer to calculate sample size for single stage surveys
- Give examples of how disease clusters in a population
- Questions on how to survey a large population (two-stage sampling)
- For advanced groups, demonstrate optimal two-stage sample size calculation
- For advanced groups, discuss the effect of combining tests in series or parallel

## Course 2 - Field techniques for livestock disease surveys

### Participants

Field staff, survey teams (including national staff, survey planners and coordinators from Course 1). The first three lessons cover much of the same material as presented in the first lessons of Course 1. At the end of the first course, split the participants into three groups, and have each group prepare one lesson. The members of the group can then share the responsibility of running the lesson and presenting the material. Be sure that they have a few days to prepare.

### Course structure

Lesson 1: Introduction .....	10
Lesson 2: Surveys and inference .....	10
Lesson 3: Random sampling .....	10
Lesson 4: Village interviews .....	11
Lesson 5: Ranking and village outbreaks .....	13
Lesson 6: Trial village interview .....	14
Lesson 7: Selecting random animals .....	14
Lesson 8: Animal restraint and blood sampling .....	14
Lesson 9: Trial village visit (interview and specimen collection) .....	15
Lesson 10: Preparation for field activities .....	15

## Lesson 1: Introduction

**Note:** Parts of this lesson may be presented by the participants from Course 1.

**Duration:** 2 hours

**Location:** Classroom

### Objectives

- Discuss the use and importance of information on animal diseases
- Examine how information is collected in the current system (passive surveillance)
- Identify weaknesses in the collection of information
- Introduce the concept of active surveillance to address these weakness
- Appreciate the balance between data quality and ease of collection
- Be able to identify appropriate sources of data for different questions
- Understand the advantages of village interviews for rapid, reliable data collection

### Key points

- The first part of this lesson is summary of Lesson 1 in Course 1, explaining the need for information on animal diseases
- Passive surveillance systems suffer from under-reporting and bias
- Active surveillance can overcome these problems
- Village interviews of livestock owners can draw on the collective experience and memories of all livestock owners, and get good quality information in a short time

### Page references

Animal health information (page 14)  
Types of data and quality of data (page 84)

### Teaching methods

- Introduce the course
- If appropriate, invite participants from the first course to lead some of the sessions. Training is one of the best ways of learning. Monitor the performance closely, and correct any mistakes, being careful not to undermine the confidence of the presenter.
- Group discussion on the need for animal disease information. Use direct questions to investigate possible weak spots in the flow of information. Highlight the problem of under-reporting of diseases.
- Explain the term passive surveillance
- Use questions on how to improve surveillance; introduce active surveillance
- Group discussion on possible data sources for animal disease information. Nominate sources, and discuss aspects of reliability, and difficulty of collection.
- Use examples of different types of information and ask questions to identify the best data source to use

## Lesson 2: Surveys and inference

**Note:** Parts of this lesson may be presented by the participants from Course 1.

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Explain the principle of a survey
- Introduce the concepts of population and sample
- Contrast surveys with complete counting of the population (censuses)
- Explain the process of inference
- Define bias and explain the need for representative samples
- Discuss estimation and precision
- Identify the role of sample size on survey accuracy

### Key points

- Surveys examine only a small sample of the population
- The sample is used to make inferences about the population
- Inference can be wrong, giving a biased result
- Representative samples ensure that inference is not wrong

### Page references

Disease Surveys (page 18)

### Teaching methods

- If appropriate, invite participants from the first course to lead some of the sessions. Training is one of the best ways of learning. Monitor the performance closely, and correct any mistakes, being careful not to undermine the confidence of the presenter.
- Activity 1: Classroom census and survey for average age
- Questions on population and sample
- Explain inference using visual aids, stressing that a survey estimate can be wrong
- Explain bias, accuracy and precision using visual aids
- Activity 3: Biased sampling survey
- Activity 4: Sample size effect and surveys
- Group discussion - how are samples selected now? Are the samples representative?
- Discuss techniques, highlighting potential for bias

## Lesson 3: Random sampling

**Note:** Parts of this lesson may be presented by the participants from Course 1.

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Understand the need for random sampling to reliably select a representative sample
- Be able to distinguish probability from non-probability sampling techniques
- Select random numbers using physical randomisation, random number tables, and a computer
- Introduce the concepts of 'probability proportional to size sampling' and 'stratified sampling'
- Understand the requirements of a good sampling frame

### Key points

- Random sampling is the only way to reliably select a representative sample
- In simple random sampling, all elements have the same probability of being selected
- Computers can simplify the task of selecting a random sample
- Systematic sampling may be used to avoid the need for a sampling frame
- Sampling frames should include every member of the population, once only
- The sampling frame determines the level of inference

### Page references

The need for random sampling (page 38)

Random sampling techniques (page 40)

Sampling frames (page 49)

### Teaching methods

- If appropriate, invite participants from the first course to lead some of the sessions. Training is one of the best ways of learning. Monitor the performance closely, and correct any mistakes, being careful not to undermine the confidence of the presenter.
- Assess the level of understanding of basic probability with questions
- Introduce the concept of chance and probability
- Examples, using dice, cards, coins of a random outcome
- Explain how we don't know the outcome of a single trial, but in the long run, we can predict what will happen over many trials
- Activity 5: Random numbers. Predicting the outcome
- Demonstration of using a random number table and computer generated random numbers
- Activity 6: Classroom age survey using random sampling
- Discuss repercussions of an incomplete sampling frame or one with duplications

## Lesson 4: Village Interviews

**Duration:** 3 hours

**Location:** Classrooms

### Objectives

- Be able to organise a village interview of livestock owners
- Identify people with the right skills to lead an interview
- Be able to use techniques to get good information from village livestock owners
- Understand how to encourage all livestock owners to participate in the interview
- Know the appropriate order for conducting an interview
- Be aware of potential problems that may arise, and how to address these problems during the introduction
- Build an animal sampling frame during a village interview

### Key points

- The aim is to have all village livestock owners attend the village interview
- Good organisation is needed to ensure that villagers know when the meeting is and that they attend
- Obtaining good quality information requires skill and practice
- Every effort should be made to ensure that livestock owners are happy to participate in this survey and any future surveys
- The introduction to the interview can be used to avoid problems, by explaining the purpose of the survey and addressing owners' concerns
- Building a complete animal sampling frame requires careful and persistent questioning

### Page references

General guidelines (page 104)

Introduction (page 114)

Building a village sampling frame (page 115)

### Teaching methods

- Use questions to revise the advantages of using a village interview to collect information
- Group discussion - problems with interview data and possible ways to overcome these problems
- Group discussion - problems with cooperation, during this interview, and in the future, and ways to overcome
- Present the typical order of an interview
- Activity 11: Role play - introduction to village interview
- Use questions to revise the idea of a sampling frame
- Demonstrate data collection forms for building a sampling frame
- Activity 12: Build a mock sampling frame in the class

## Lesson 5: Ranking and village outbreaks

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Rank disease priorities or other information from the village
- Understand techniques for determining the date of a disease outbreak in the past
- Be able to use village histories and village calendars to help livestock owners determine the date of an outbreak
- Understand the need for censoring times when collecting village outbreak data, and how to collect them

### Key points

- Ranking can be used to determine the importance of different diseases
- When collecting information about outbreaks, make sure that the livestock owners clearly understand the disease being discussed
- Village histories can help identify the year of an outbreak
- Village calendars can help identify the month or season of an outbreak
- Censoring times must be collected for villages that have had no outbreaks

### Page references

Ranking disease priorities (page 116)

Collecting outbreak history information (page 118)

### Teaching methods

- Activity 13: Disease ranking
- Discussion on what criteria may be used to determine which diseases are important
- Demonstration of data recording sheets for disease ranking
- Example of asking for the usual months for different diseases
- Activity 14: Retrospective questions
- Examples of building village histories and calendars
- Demonstrate and explain the use of the data recording sheet for village outbreaks
- Discuss ways to determine censoring times for villages with no outbreaks

## **Lesson 6: Trial village interview**

**Duration:** Half day

**Location:** Village

### **Objectives**

- Gain experience in conducting a village interview
- Develop confidence addressing livestock owners
- Present an introduction which addresses owners' concerns
- Build a village livestock sampling frame
- Determine disease priorities in the village
- Determine the normal time of occurrence for important diseases
- Determine the date of the most recent outbreak of a particular disease

### **Key points**

- Careful organisation is important. The village must be notified beforehand, and the best time for a meeting decided. Unlike a normal interview, there will usually be a large number of participants involved. Each must clearly understand their role and responsibilities.

### **Page references**

Village Interviews (Chapter 5)

### **Teaching methods**

- Preparation for visit, assigning responsibilities
- Activity 15: Trial village interview
- Discussion of successes, problems, and recommended solutions

## Lesson 7: Selecting random animals

**Duration:** 2 hours

**Location:** Classroom

### Objectives

- Understand how to select random animals, using both a random number table, and a computer
- Be able to identify individual animals that have been selected from the sampling frame
- Be aware of the possible concerns of livestock owners, and address these concerns convincingly

### Key points

- Random selection of animals can take place during the village interview
- To ensure a representative sample, it is important to avoid replacing animals when not necessary, and to follow the selection procedure carefully

### Page references

Sampling animals within a village (page 54)

### Teaching methods

- Use the sampling frame that was made during the village visit
- Demonstration - select random animals using a random number table
- Demonstration - select animals using the computer
- Explain how to identify individual animals
- Discuss the problem of bias if the survey staff count the animals
- Activity 16: Selection of animals from a village sampling frame
- Activity 17: Role play of owners' concerns during animal selection

## **Lesson 8: Animal restraint and blood sampling**

**Duration:** Half day

**Location:** Classroom, field

### **Objectives**

- Practice restraint and blood collection from all relevant species
- Understand how to handle, process and transport specimens that have been collected

### **Key points**

- Animals are usually more nervous around strangers. Have owners capture animals first
- Restraint is easier if done quietly, and without scaring the animal
- Good restraint is important to avoid injury to the animal or the field staff
- When collecting blood, make sure that enough has been collected

### **Page references**

Animal Restraint (page 87)

Specimen Collection and processing (page 95)

### **Teaching methods**

- Discuss and demonstrate restraint and sample collection equipment in the classroom
- Have participants handle equipment, and practice its use
- Practice techniques with real animals. The animals should preferably be research animals or purchased for the purpose.
- Demonstrate the technique once first, then have each participant practice
- Ensure that animals are treated humanely, and demonstrate this through your own behaviour
- Demonstrate sample processing, and transport techniques, and have the participants practice for themselves

## **Lesson 9: Trial village visit (interview and specimen collection).**

**Duration:** 1 day

**Location:** Village

### **Objectives**

- Implement all activities of a field visit
- Improve interview skills through practice, and implement suggested changes arising out of previous interview
- Select animals from a sampling frame
- Invite owners to submit animals for sample collection
- Restrain animals, and collect blood samples
- Process specimens appropriately

### **Key points**

- The field trip should be as similar as possible to real survey field work

### **Page references**

Survey principles and specific techniques (all of Parts II and III)

### **Teaching methods**

- Preparation, assigning roles
- Activity 18: Trial village visit
- Discussion of successes, problems, and suggested improvements

## **Lesson 10: Preparation for field activities**

**Duration:** Half day or more

**Location:** Class and elsewhere

### **Objectives**

- Ensure that all practical preparations for either pilot study or real field work have been completed

### **Key points**

- Stress the need for good planning and organisation
- Completing and storing data recording sheets should get special attention

### **Page references**

Survey procedures (page 143)

### **Teaching methods**

- Group discussions to develop checklist of all activities and preparations that need to take place before survey
- Prepare list of tasks
- Assign tasks
- Complete preparations

# Course 3 - Computerised data management and analysis, and reporting

## Participants

National staff, and coordinators

## Course structure

Lesson 1: Introduction and review of field work .....	15
Lesson 2: Principles of analysis and measures of disease .....	16
Lesson 3: Introduction to computers .....	17
Lesson 4: Data processing procedures .....	17
Lesson 5: Simple data analysis, descriptive statistics .....	18
Lesson 6: Prevalence surveys data analysis .....	18
Lesson 7: Incidence rate surveys – retrospective disease outbreak surveys .	19
Lesson 8: Incidence rate surveys – analysis of two data sources .....	19
Lesson 9: Surveys to demonstrate freedom from disease .....	19
Lesson 10: Reporting .....	20

## Requirements

This course uses computers in almost every lesson. Participants must have access to computers, preferably with no more than two people to each computer.

## **Lesson 1: Introduction and review of field work**

**Duration:** 2 hours

**Location:** Classroom

### **Objectives**

- Review fieldwork activities
- Suggest improvements for future work

### **Key points**

- This lesson is an opportunity for the participants to use their knowledge and experience to improve future work

### **Page references**

None

### **Teaching methods**

- Introduce the course and explain the content
- Group discussion on the fieldwork - strengths and weaknesses, suggestions for improvement - Ask groups to address each aspect of the field work in turn: training, preparation, village selection and so on.
- Be sure to record all suggestions, and act on them for future work

## Lesson 2: Principles of analysis and introduction to computers

**Note:** This lesson is necessary only for participants with no experience of using computers

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Understand measures of central tendency (especially mean)
- Understand measures of spread (especially variance or standard deviation)
- Become familiar with computer hardware
- Recognise the purpose of different types of major software
- Understand the storage of data in a computer database table
- Compile all data collection forms from the survey

### Key points

- Analysis of data converts a large amount of hard to understand data into a few easy to understand numbers (measures), which can be used to understand the disease. Mean and standard deviation are two examples of measures
- Computers use a set of instructions (programs) to process data.
- Data are stored in tables, made up of records (rows) and fields (columns)

### Page references

Measures of disease (page 26)

Principles of data management and analysis (page 124)

### Teaching methods

- Review measures of disease
- Activity 19: Analysis of data on age of participants
- Practical demonstration of the parts of a computer and the purposes of the different components. Open a computer and identify components, peripherals and different types of disks
- Demonstrate different types of major software
- Discuss different data types
- Use questions to help participants identify the most appropriate way to store different types of data
- Use visual aids to explain data storage (databases, tables, fields, records)
- Collect all data collection forms from the survey and check for completeness

## Lesson 3: Data processing procedures

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Check data for completeness
- Perform any manual coding necessary
- Understand how to deal with missing data
- Create a table
- Enter data into a table
- Check data for errors
- Manipulate data

### Key points

- If participants are familiar with a database program, use that program. If they are not, use any program that is available, and the trainer is familiar with. Epi Info is the recommended choice, as it can be made freely available to all participants.
- Don't go into detail on how to check data for errors after data entry. The techniques will be taught in the next lesson, and are the same as those used for simple data analysis.

### Page references

Data Processing Procedures (page 127)

### Teaching methods

- Activity 20: Data checking and data entry
- Most of this lesson should be taken up with individual or pair work on computers, with brief breaks to explain the procedures required for different operations
- Training will be much easier if several tutors experienced in the use of computers are available to help answer participants' questions

## Lesson 4: Simple data analysis, descriptive statistics

**Duration:** 3 hours

**Location:** Classroom

### Objectives

- Calculate means, standard deviation and confidence intervals for village level data
- Calculate proportions and confidence intervals for village data
- Generate frequency tables and cross-tabulations
- Analyse subsets of the data
- Create graphs of the results of analysis

### Key points

- Simple descriptive statistics can be generated quickly using the computer
- Analysing and graphing data in different ways gives a more complete understanding of the data

### Page references

Epi Info Manual (recommended)

### Teaching methods

- Perform simple data analysis
- Most of this lesson should be taken up with individual or pair work on computers, with brief breaks to explain the procedures required for different operations
- Training will be much easier if several tutors experienced in the use of computers are available to help answer participants' questions

## Lesson 5: Prevalence surveys data analysis

**Duration:** 3 hours or more (depending on data entry time)

**Location:** Classroom

### Objectives

- Estimate the prevalence and calculate confidence interval for the prevalence estimate based on two-stage sampling data
- Understand how the data requirements and analysis differs according to the survey design
- Calculate true prevalence from apparent prevalence
- Compare the prevalence estimates from two different surveys

### Key points

- Different data are required depending on the different survey design
- Apparent prevalence may be quite different from true prevalence with poor tests or low prevalence levels

### Page references

Review of survey designs (Chapter 7)  
Prevalence Data Analysis (page 160)

### Teaching methods

- Enter, check and recode data from prevalence survey
- Demonstrate the use of the Prevalence program for analysis
- Use questions and examples to explain the interpretation of the program output
- Use the True Prevalence program to convert to true prevalence based on test performance

## Lesson 6: Incidence rate surveys – retrospective disease outbreak surveys

**Duration:** 2 hours

**Location:** Classroom

### Objectives

- Understand the difference between traditional incidence rate measures and the survival curve measure of incidence rate
- Generate a survival curve describing village outbreak experience
- Interpret the summary measures of the survival curve
- Compare the results of two surveys
- Understand the interpretation of the Hazard Ratio
- Understand the need to adjust for seasonal patterns
- Be familiar with options for more complex analysis

### Key points

- Incidence rate uses a single number to summarise disease occurrence. Village outbreak surveys use a curve (the survival curve) to summarise disease occurrence.
- Just as incidence rate can be compared and the difference measured, so can survival curves
- The hazard ratio measures the risk of disease outbreaks in one group compared with another
- If two surveys are conducted at different times of the year, and the disease shows a seasonal pattern, you need to adjust for this to avoid bias

### Page references

Review of survey design (Chapter 8)  
Data Management (page 175)  
Data Analysis (page 177)

### Teaching methods

- Enter, check and recode data from village outbreak survey
- Analyse data using Survival program.
- Analyse different data sets to explain the need to adjust for seasonal patterns
- Use questions to clarify the interpretation of survival curves

## **Lesson 7: Incidence rate surveys – analysis of two data sources**

**Duration:** 2 hours

**Location:** Classroom

### **Objectives**

- Match outbreaks from two sources
- Analyse data from two data sources to estimate the total number of disease outbreaks
- Use this estimate to calculate the incidence rate

### **Key points**

- Clear rules have to be established for matching outbreaks between two sources
- If the number of outbreaks appearing in both sources is small, the estimate will have very wide confidence intervals
- Incidence rate requires a knowledge of the size of the total population (the total number of villages in the study area)

### **Page references**

Review of survey design (page 183)  
Data analysis (page 187)

### **Teaching methods**

- In small groups, match outbreaks between the two sources and calculate totals
- Use the program Capture Recapture for analysis of the results
- Calculate incidence rate and the confidence interval

## **Lesson 8: Surveys to demonstrate freedom from disease**

**Duration:** 2 hours

**Location:** Classroom

### **Objectives**

- Analyse data to calculate the probability that an area is free from disease

### **Key points**

- Analysis requires a knowledge of test performance (sensitivity and specificity), as well as maximum acceptable prevalence and Type I and II errors.

### **Page references**

Herd or village survey data analysis (page 198)

Large area survey data analysis (page 204)

### **Teaching methods**

- Enter, check and recode survey data
- Use the FreeCalc program to analyse the data
- Use questions to clarify the interpretation of the results, and the meaning of the null and alternative hypothesis.

## Lesson 9: Reporting

**Duration:** 1 hour, plus homework

**Location:** Classroom

### Objectives

- Understand the need for reporting at different levels
- Consider the best way to communicate the results at these different levels
- Understand techniques for clear communication of results
- Prepare reports of the survey results

### Key points

- Survey results should be reported back to everybody who has participated and everybody who may need the results
- Reports should be simple, clear, and easy to understand, and targeted at the user
- Written reports may not be appropriate for all users

### Page references

Survey procedures (page 143)

### Teaching methods

- Group discussion of who might need the information from the survey. Highlight why different people might need the results (including livestock owners, and the international community)
- Group discussion of how to best communicate with the different users of the information
- Activity 21: Report preparation

# 12

## Activity Sheets

### Contents

Chapter 1: Introduction

#### **Part I: Background to Disease Surveys**

Chapter 2: General Principles of Animal Disease Surveillance

Chapter 3: Sampling

Chapter 4: Principles of Data and Specimen Collection

Chapter 5: Village Interviews

Chapter 6: Computerised Data Management and Analysis

#### **Part II: Survey Design and Analysis**

Chapter 7: Prevalence Surveys

Chapter 8: Incidence Rate Surveys

Chapter 9: Surveys to Demonstrate Freedom from Disease

#### **Part III: Notes for Trainers**

Chapter 10: Guide for Trainers

Chapter 11: Lesson Plans

Chapter 12: Activity Sheets



This chapter contains a set of activity sheets, which provide a guide to running different types of activities during training courses. The activities are directed at the specific training courses described in the last chapter, but can be used modified or unmodified for different types of training courses.

Each activity is followed by a number of questions that may be used for discussion, to focus the participants' attention on what they have been doing.

## Activity 1: Introductory classroom census and survey

<b>Location:</b> Classroom	<b>Duration:</b> 20 minutes
<b>Reference:</b> Course 1, Lesson 3 Course 2, Lesson 2	<b>Software:</b> None
<b>Objectives</b> Differentiate between a complete count (census) and a sample (survey)	<b>Concepts practiced</b> Sampling Estimation Inference
<b>Equipment and materials</b> Board for recording ages	

### Description of activity

Explain that the aim is to determine the average age of all the participants in the room, and that this will be done in two ways. First, ask a sample of a small number of people. Record their age in a column on the board. When finished, have the participants calculate the average of the ages.

Next ask everybody in the class in turn, and write their ages on the board. Calculate the average and compare to the first result.

### Questions for discussion

Which way took longer?

If there were 3000 people in the room, which way would be best?

Was the answer from the survey right?

Was the answer from the census right?

## Activity 2: Sensitivity and specificity game

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> Course 1, Lesson 2	<b>Software:</b> None
<b>Objectives</b> Introduce an understanding of sensitivity and specificity	<b>Concepts practiced</b> Sensitivity and specificity Probability
<b>Equipment and materials</b> Board for recording responses	

### Description of activity

The aim is to demonstrate how participants intuitively use the concepts of sensitivity and specificity all the time. It is demonstrated using a non-diagnostic example.

Invite one participant to the front of the room. Ask them to make a decision about some unknown characteristic of each of the other members of the group. For example, to judge whether they originally come from the capital city, they belong to some ethnic or cultural group, they come from some broad region (the north or the south). Whatever characteristic is chosen should be culturally appropriate (not cause discomfort), and should have several people in the room representing both options (some from the north, and some from the south). It should also be some characteristic that is not immediately possible to be sure of, but the observer will get it right for most people most of the time.

Draw a two-by-two table on the board, and record the responses. For each person, the participant must first decide (e.g. say "North"), and then the person in question responds if this is right or wrong.

At the end of the exercise, ask how well the group thought they went. Ask if the person was better at picking people from the north than people from the south.

Use the figures to calculate sensitivity and specificity, and show how these can be interpreted. If possible, repeat the activity using a different person to decide, and the same characteristic. This second person should not have heard the answers from the first time. Compare the performance of the two people.

### Questions for discussion

How does this relate to diagnostic tests?

How could we improve the proportion of correct decisions?

### Activity 3: Biased sampling

<b>Location:</b> Classroom	<b>Duration:</b> 20 minutes
<b>Reference:</b> Course 1, Lesson 3 Course 2, Lesson 2	<b>Software:</b> None
<b>Objectives</b> Understand how non-representative samples produce biased estimates	<b>Concepts practiced</b> Sampling Populations Bias
<b>Equipment and materials</b> Board for recording responses	

#### Description of activity

Conduct a survey of the participants to calculate their average age from a small sample. Before selecting the sample, chose a group that will be clearly biased. For example, if younger participants mostly speak English, and the older participants don't, explain how this survey is going to be conducted in English. Select several people and ask their age in English, only recording those who can respond in English. Another biased sample is to only ask the people with the higher positions or ranks in the group, as a sign of respect or in recognition of their greater experience. Other approaches can be used to select a biased group, with ages either greater or lower than the overall average.

Select the group, record the ages, and calculate the average. Compare this average with the result of the census used in Activity 1.

#### Questions for discussion

Why are the results different?

If selecting animals, how could a similar thing happen?

## Activity 4: Survey sample size

<b>Location:</b> Classroom	<b>Duration:</b> 20 minutes
<b>Reference:</b> Course 1, Lesson 3 Course 2, Lesson 2	<b>Software:</b> None
<b>Objectives</b> Recognise the effect of different sample sizes on the reliability of a survey	<b>Concepts practiced</b> Surveys, sampling Sample size Variance
<b>Equipment and materials</b> Board for recording results	

### Description of activity

Conduct two classroom surveys, to calculate the average age of participants. In the first, use a small sample size, say 4 people. In the second, use a large sample size, almost all the people in the room.

Record the results, and calculate the average age from both. Contrast the results with the true average from a census (Activity 1).

If desired, calculate confidence intervals around the estimates.

### Questions for discussion

Which survey produced the most accurate result?

Which was fastest and easiest?

Was either survey correct?

Do the confidence intervals contain the real average?

## Activity 5: Random numbers

<b>Location:</b> Classroom	<b>Duration:</b> 40 minutes
<b>Reference:</b> Course 1, Lesson 4 Course 2, Lesson 3	<b>Software:</b> None
<b>Objectives</b> Become familiar with physical randomisation procedures Introduce probability and the prediction of random outcomes	<b>Concepts practiced</b> Random numbers
<b>Equipment and materials</b> Pack of playing cards, dice, coin	

### Description of activity

First demonstrate the concept of a single random outcome, in several ways. Shuffle the cards, and ask one participant to select one at random. Ask another to say if it is black or red. Have another roll the dice. Ask another to say what the result is without looking. Have another flip a coin while another predicts if it will be heads or tails.

Stress that the outcome of all of these things is random, and that the individual result cannot be predicted.

Next demonstrate how the average of many outcomes can be approximately predicted.

Split the group into three. In the first group, have one person flip the coin 100 times while the rest record the results. In the second, have one person shuffle the cards, and another draw one at random, and record if it is black or white. Replace the card and repeat 50 times, recording the results. In the third group, roll one die 120 times, recording the results in a table.

Explain the activities first, and then, before doing them, ask each group to predict what the outcome will be (how many heads, how many tails etc.). Record the predictions on the board. Then conduct the trials, and record the final results on the board.

### Questions for discussion

Why can't you predict whether a single flip will be heads or tails?

With many trials how well were you able to predict what the average outcome would be?

Was it exactly as you predicted, or just close?

How could this be used for survey sampling?

## Activity 6: Random sampling using a random number table and computer

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> Course 1, Lesson 4 Course 2, Lesson 3	<b>Software:</b> Random Village, or Random number generator (e.g. Epi Info)
<b>Objectives</b> Select random samples using random numbers	<b>Concepts practiced</b> Sampling Random numbers
<b>Equipment and materials</b> Board Random number table Computer	

### Description of activity

Conduct a classroom survey to determine the average age of participants. Have one participant build a sampling frame on the board, by asking each person's name, and writing a number next to it from 1 to the total.

Divide the group in two. Have one half use a random number table to select a random sample (with a reasonably large sample size), and the other half use the computer to generate random numbers for the sample.

Conduct two surveys, using the sets of random numbers, and calculate the average ages.

### Questions for discussion

Were the results the same?

Were the results correct?

Are they closer to the real value than using other techniques?

Are they representative?

## Activity 7: Sampling jigsaw game

<b>Location:</b> Classroom	<b>Duration:</b> 1 hour
<b>Reference:</b> Course 1, Lesson 4	<b>Software:</b> Random Village
<b>Objectives</b> Implement 4 different sampling schemes Examine how non-random sampling causes problems with inference	<b>Concepts practiced</b> Convenience sampling Haphazard sampling Random sampling Systematic sampling Inference to the population
<b>Equipment and materials</b> Jigsaw puzzle, with 40 to 80 pieces, showing a scene with lots of variation Each piece should be numbered on the back sequentially from 1 to the total Four sets of pen and paper for four groups, <i>or</i> , overhead projector, and four sets of overhead transparencies and pens for four groups.	

### Description of activity

The group is divided into four groups. It is explained that we are going to use four different sampling techniques to select a sample from a population, and that the sample will be used to estimate what the population is like.

Use the Sampling Techniques figure to introduce or revise convenience, haphazard, systematic and random sampling.

In a separate part of the room, assemble the jigsaw puzzle, and turn it over so only the backs of the pieces with the numbers are showing. The population is all the pieces. The sampling frame is a list of numbers from 1 to the total population.

As a class, have each group select the pieces to sample, using four different sampling techniques:

The same number of pieces is chosen by each group. For a puzzle of about 50 pieces, each group chooses 5 pieces. For larger puzzles, select more pieces.

Group 1 uses convenience sampling, and selects pieces 1,2,3,4 and 5 (all from the top corner of the puzzle).

Group 2 uses haphazard sampling. Ask each member of the group to pick a number between 1 and the total. Use the first 5 numbers chosen.

Group 3 uses systematic random sampling. If there are 40 pieces, the sampling interval is  $40/5 = 8$ . Have the group use either a random number table or the Random Village program, to pick one number at random between 1 and 8, as the starting number. Then pick every eighth number.

Group 4 uses simple random sampling. Use a random number table or the Random Village program to select 5 numbers (without replacement) between 1 and the total.

One by one, have each group come to the puzzle, and examine the 5 selected pieces. Do not let the other groups see the front of the pieces selected. When the pieces have been examined, have each group draw a picture of what they think the jigsaw puzzle is showing. This is an example of inference, guessing what the population is like, based on a sample. Give each group 5 minutes to draw their picture. They may want to write on the picture to explain what certain things are.

When all groups are finished, show each of the pictures (preferably on an overhead projector), and note which sampling technique was used. Then show the complete jigsaw puzzle, so the class knows the true state of the population. Finally, have the class vote on which group's picture was most like the real population.

**Questions for discussion**

Talk about how well each sampling technique was able to provide a representative sample.

Usually, systematic sampling and random sampling provide a good picture. Haphazard may sometimes give a good picture, but convenience never does. If haphazard is better than simple random, discuss how simple random sampling does not *always* provide a representative sample, but that it is the only way to give a representative sample most of the time.

## Activity 8: Selecting actual villages from a disk based sampling frame

<b>Location:</b> Classroom	<b>Duration:</b> 1 hour
<b>Reference:</b> Course 1, Lesson 5	<b>Software:</b> Random Village
<b>Objectives</b> Select a sample of herds or villages from computerised sampling frame	<b>Concepts practiced</b> Use of the computer for random sampling
<b>Equipment and materials</b> Computer Village or herd sampling frame (with or without population figures) in either Paradox, or dBASE format	

### Description of activity

This is part of the preparation for the real survey. Discuss the source of the sampling frame, what information is included (population figures or not), how well herds or villages are identified, and how complete the list is likely to be.

Ask the group to consider options for stratification. The sample size should have already been calculated.

Demonstrate the use of the Random Village program, using a dummy data set.

Have several members of the group use the program to select the sample. Save and print the results, and have staff with local experience examine the list for any villages or herds that are impossible to survey. Use the program to replace these with new villages/herds.

### Questions for discussion

What is the effect on replacing inaccessible herds? How do the results of the survey suffer?

## Activity 9: Local survey - dog rabies vaccination

<b>Location:</b> Urban area	<b>Duration:</b> 1 day
<b>Reference:</b> Course 1, Lesson 9	<b>Software:</b> Random Village or Epi Info random number generator
<b>Objectives</b> Implement field survey	<b>Concepts practiced</b> Sampling and sampling frames Data collection and analysis
<b>Equipment and materials</b> Transport to survey site Data recording sheets	

### Description of activity

The aim of this activity is to implement all the newly learned skills in the form of a survey to estimate the proportion of dogs in the local urban area that have been vaccinated against rabies within the preceding year. Other species and diseases may be used if appropriate.

In the classroom, explain the aim of the survey. Have participants frame the question (e.g. "Is the local rabies vaccination campaign working?") and refine it to a measurable quantity ("What proportion have been vaccinated in the last year?"). Define the target population (all dogs in the local urban area), and the study population (probably a much smaller area that can be surveyed in a few hours).

Discuss the options for sampling frames and sampling strategies. Assuming that no list of dogs is available (use it if it is), a household frame can be used instead. If no household sampling frame exists, then one must be generated.

Select a small area nearby, consisting of one or two streets, or a small number of blocks, with a total of several hundred houses. Draw a sketch map of the area. Divide the group into pairs, assign each pair to a particular part of the study area. Travel to the area, and have each pair prepare a map of their section, showing all households (preferably identified by house number).

Return to the classroom, and compile these maps into a map of the overall study area. Number each household consecutively starting at 1.

Have the group select random numbers using either a random number table or computer, to select a sample of households. When selecting, stratify by section of the study area. The sample size should be as large as possible. The group will divide into pairs to do the survey work, and each pair should have about 15 to 20 households to survey. If there are 10 participants, there are 5 groups, and the sample size can be about 100.

Prepare data recording sheets. The questions should be kept to a minimum, and include "Do you have any dogs?", "If so, how many?", "For each dog, was it vaccinated against rabies during the last year?". Discuss the brief questionnaire and the need for a short explanation to householders of what the survey is about.

Return to the study area, split into groups and collect the data. When finished, return to the classroom for data analysis. Tally the total number of dogs and total vaccinated on the board, and calculate the proportion. Use Epi Info to calculate a

confidence interval for the proportion. Have participants prepare a half-page report of the survey, its findings and conclusions, suitable for submission to the local authorities.

**Questions for discussion**

Is the rabies vaccination campaign working?

Can we use inference to estimate the situation in the whole town/city?

What population do the results relate to?

What problems did you have?

How could the survey be improved?

## Activity 10: Survey to demonstrate freedom from disease

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> Course 1, Lesson 12	<b>Software:</b> FreeCalc
<b>Objectives</b> Understand the difficulty of proving freedom from disease with imperfect tests	<b>Concepts practiced</b> Sensitivity and specificity Freedom from disease
<b>Equipment and materials</b> Computer	

### Description of activity

Begin this activity with a revision of sensitivity and specificity. Then, using the same or similar characteristic as used in Activity 2 (Sensitivity and specificity), have one member of the group make a decision about a sample of the others. Ideally, the characteristic should be rare, but quite possible. One possibility is whether the person was born abroad or not.

The assessment of the one person is recorded on the board, but the true status is not yet revealed. When the decisions have been made, the class is asked whether the results indicate that there is nobody who was born abroad. Explain how a sample is unable to prove this, because not everybody has been checked.

Repeat the survey using everybody in the room, and record the decision.

You may extend this exercise to analyse the results with the FreeCalc program.

### Questions for discussion

How confident can you be of the final conclusion?

How could you improve your confidence?

## Activity 11: Introductions for village interviews

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> Course 2, Lesson 4	<b>Software:</b> None
<b>Objectives</b> Practice explaining the purpose of the interview, and address problems which are likely to be of concern	<b>Concepts practiced</b> Addressing groups Awareness of the concerns of others Avoiding problems
<b>Equipment and materials</b> None	

### Description of activity

Select one person to act as the leader of the interview. The rest of the group takes the role of the village livestock owners. Ask the leader of the interview to spend 5 minutes preparing the main points to be covered during the introduction to the interview – for example, why we are here, what we intend to do, etc. While they are preparing, ask the rest of the group to imagine that they are livestock owners. Have them think of various objections to participating in the interview or giving information. Ask them to try to make things difficult for the leader.

Start the role play, and ask the leader of the interview to introduce the survey, and try to explain things so as to avoid as many problems as possible. When they are finished, the livestock owners should ask questions or raise concerns about those issues which the leader has not explained.

Repeat the exercise with a different leader (perhaps choose the most vocal of the livestock owners to play the role).

### Questions for discussion

How well did the leaders explain the survey?

Were there any major points that were missed?

Are there any potential livestock owner concerns that can't be addressed during this introduction?

## Activity 12: Building a livestock sampling frame

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> Course 2, Lesson 4	<b>Software:</b> None
<b>Objectives</b> Develop a sampling frame by asking livestock owners about their livestock	<b>Concepts practiced</b> Interview skills
<b>Equipment and materials</b> Data record sheets for the sampling frame	

### Description of activity

Select one member of the group to be the leader of the interview. Have that person leave the room, and ask the rest of the group to play the role of livestock owners, and decide how many animals they each have. Then ask different livestock owners to adopt different personalities that may be difficult during an interview. Ask one person to act as if they know it all, and try to answer for others, or correct their mistakes. Ask another pair to be bored and want to chat all the time. Ask some to pretend to be deaf, some to be unsure of what is wanted, and some to be suspicious. Ask some to try to give the wrong information, without lying.

Ask the leader to return, and collect livestock information.

### Questions for discussion

How well did the leader do the job?

Is all the information correct?

Could they have done it any better?

## Activity 13: Disease ranking

<b>Location:</b> Classroom	<b>Duration:</b> 40 minutes
<b>Reference:</b> Course 2, Lesson 5	<b>Software:</b> None
<b>Objectives</b> Rank diseases in order of importance	<b>Concepts practiced</b> Ranking Interview skills
<b>Equipment and materials</b> Board Paper and pens	

### Description of activity

Divide into several small groups, and ask each group to list on paper all the important diseases that occur in the local area, in the species of interest. When finished, record all these diseases on the board. Next have the groups discuss how the importance of these different diseases may be assessed, and to write a list of 3 or 4 different criteria for ranking.

Write the different criteria on the board, and agree on 4 criteria to use to rank the diseases. Ask each person to rank the diseases according to each of the criteria, scoring the most important disease with 1, down to the least important.

Add up everybody's scores for each disease, and each criteria, and assign overall ranks.

### Questions for discussion

Will livestock owners rank the diseases in the same way?

Is a disease with a rank of 10 twice as important as a disease with a rank of 20?  
(No)

How could ranking be done in a more quantifiable manner?

## Activity 14: Retrospective questions

Compare the results from the different groups, and discuss how they remembered.

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> Course 2, Lesson 5	<b>Software:</b> None
<b>Objectives</b> Emphasise the difficulty in remembering past events, and understand how it can be made easier	<b>Concepts practiced</b> Group memory Dating landmarks
<b>Equipment and materials</b> Paper to record responses	

### Description of activity

Break into small groups. Identify an event that occurred some years ago that every participant knows about. Examples include elections, natural disasters, major news items, etc. Ask each group to try to remember the month and the year of the event.

Record the different responses from each group.

### Questions for discussion

Are the answers the same? If not, what sort of errors were made (wrong year, wrong month)?

How did participants remember?

How can remembering be made easier?

## Activity 15: Village interview

<b>Location:</b> Village	<b>Duration:</b> Half day
<b>Reference:</b> Course 2, Lesson 6	<b>Software:</b> None
<b>Objectives</b> Practice a village interview in the way it will be done during the real survey	<b>Concepts practiced</b> Public address Explanations Ensuring cooperation Encouraging participation
<b>Equipment and materials</b> Transport Data recording sheets, pens, paper	

### Description of activity

Make sure that the village interview has been organised beforehand, and that the livestock owners know when it is. Prepare the group well, so they know their responsibilities and roles.

Try to use a village with a large number of livestock owners. Divide the village into several smaller groups, so that as many as possible of the participants have the chance to lead the interview. There should be two or three participants running each interview, with a minimum of 5 or 6 livestock owners. The exercise is easier if there are a number of tutors available, experienced in village interviews to supervise each group.

Have the group run through the complete interview, as it will be run during the survey. For example, the following sections may be included:

- Explain the purpose of the interview
- Build a livestock sampling frame
- Rank disease problems
- Ask about the usual dates of disease problems
- Ask about disease outbreak history
- Invite questions on disease problems and offer advice

### Questions for discussion

What information did each group collect?

Did each group get the same answers to the same questions?

What problems were encountered? How could these be addressed?

## Activity 16: Random selection of animals

<b>Location:</b> Classroom	<b>Duration:</b> 40 minutes
<b>Reference:</b> Course 2, Lesson 7	<b>Software:</b> Random Animal
<b>Objectives</b> Use a sampling frame to practice selecting individual animals	<b>Concepts practiced</b> Random selection
<b>Equipment and materials</b> Sampling frames from village visit (1 copy for each participant) Random number table Computer Pen and paper for results	

### Description of activity

Copy the sampling frame generated during a village visit (e.g. Activity ?). Give a copy to each participant, with a random number table. Have each participant select a group of 10 animals at random. While they are doing this, have each student in turn use a computer and the Random Animal program to enter the sampling frame and select 10 animals. When the samples have been selected, use a role play to practice identifying the individual animals. Have one participant play the role of the survey team leader, another the livestock owner, and several others play the role of the animals. Select several animals, then move to a new owner, and new animals.

### Questions for discussion

Which technique was simplest for selecting animals, the random number table or the computer?

Which is most appropriate for use in the village?

How well did the team leader select the animals? Are there any suggested improvements?

## Activity 17: Specimen collection role play

<b>Location:</b> Classroom	<b>Duration:</b> 30 mins
<b>Reference:</b> Course 2, Lesson 7	<b>Software:</b> None
<b>Objectives</b> To understand livestock owners' concerns about specimen collection To practice addressing these concerns and encouraging cooperation	<b>Concepts practiced</b> Communicating with livestock owners
<b>Equipment and materials</b> Role Cards - one for each actor explaining their attitude	

### Description of activity

Four of the group are selected to participate in the role play. One person plays the role of the member of the survey team, and three play village livestock owners. The scene is explained. The member of the survey team has come to collect blood. They visit the livestock owners, and want to collect blood from one animal belonging to each owner.

Each of the actors is then given a Role Card to explain what position they are to take during the play.

The member of the survey team needs to collect blood from the selected animals. They are not allowed to change the animals for another, and must get blood.

The first livestock owner is happy for them to try to collect blood, but doesn't believe that they will be able to hold their buffalo still.

The second livestock owner doesn't want blood to be collected from the selected animal, because she is pregnant. They have seen vaccinated animals abort after being vaccinated.

The third owner doesn't want their animals to be used because they are very suspicious of what the information will be used for. They are afraid that the team is trying to prove that they are not looking after their animals properly.

Conduct the play, telling the actors that it should last no more than 10 or 15 minutes. Each of the participants should stick to their role, and try to argue for what they believe as strongly as possible.

At the end, the play can be repeated again, with different actors, or with the same actors in different roles.

### Questions for discussion

How well did the survey team member perform?

Are there any important points that they missed in their explanation?

What should you do if the livestock owners completely refuse to cooperate?

If you were the livestock owner, would you be happy to be involved in the survey if it was conducted again next year?

How can these problems be avoided?

## Activity 18: Village interview and specimen collection

<b>Location:</b> Village	<b>Duration:</b> 1 day
<b>Reference:</b> Course 2, Lesson 9	<b>Software:</b> Random Animal
<b>Objectives</b> Implement a complete village visit	<b>Concepts practiced</b> Interviews Restraint Blood collection
<b>Equipment and materials</b> Transport Data recording sheets Restraint and specimen collection equipment	

### Description of activity

Organise the visit carefully beforehand. Make sure everybody knows their role and responsibilities.

Divide into several groups and conduct the village interviews as described in Activity ?.

During the interview have one or two people select animals from the sampling frame.

Collect specimens from the selected animals. Initially, have all participants as one group while identifying and collecting specimens from the first few animals. Then, if tutors are available to supervise, split into smaller groups so that each person has an opportunity to practice every role in blood sampling - capturing, restraining, etc.

Process the specimens appropriately.

### Questions for discussion

What problems arose?

How could they be addressed?

## Activity 19: Analysis of data

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> Course 3 Lesson 2	<b>Software:</b> Epi Info or other database/statistical software
<b>Objectives</b> Understand basic principles of data entry and analysis	<b>Concepts practiced</b> Summarising data
<b>Equipment and materials</b> Computers (preferably 1 each or 1 between 2 participants)	

### Description of activity

Collect data on the age of each participant, and record it on the board. Using a table that has already been created, have each participant enter the data. Use EpiInfo Analysis program to calculate the

- mean,
- minimum,
- maximum,
- variance,
- standard deviation, and
- confidence interval around the mean.

### Questions for discussion

How is each of these values interpreted?  
What population does the data relate to?

## Activity 20: Data management

<b>Location:</b> Classroom	<b>Duration:</b> 3 hours
<b>Reference:</b> Course 3 Lesson 3	<b>Software:</b> Epi Info
<b>Objectives</b> Become familiar with data management procedures	<b>Concepts practiced</b> Table creation Data entry Data checking
<b>Equipment and materials</b> Computers	

### Description of activity

Using the raw data collected during village surveys, set the task of calculating basic village-level descriptive statistics on livestock population, proportion of villages suffering outbreaks, and the most important livestock diseases.

Lead participants through each of the operations step by step, then let them do it themselves, and explore the procedures.

Check data, create appropriate tables and data entry forms, set up checks during data entry, check data after data entry, recode data, export data, analyse data.

### Questions for discussion

How should the results be interpreted? What do the numbers say about the disease situation?

## Activity 21: Report writing

<b>Location:</b> Classroom	<b>Duration:</b> 2 hours
<b>Reference:</b> Course 3 Lesson 9	<b>Software:</b> None
<b>Objectives</b> Practice writing appropriate reports	<b>Concepts practiced</b> Reporting
<b>Equipment and materials</b> Paper, pens, possible word processor	

### Description of activity

After discussing the levels of reporting and appropriate types of report presentation for different audiences, assign several participants to work together to produce a short report for each of identified groups. Give them 2 hours to work together in small groups to collect the data and generate tables and graphs.

Set them the job of preparing the report as homework, over two or three nights or a weekend.

Have each group present their report to the class. Some reports should be presented orally (e.g. reports for illiterate livestock owners, briefings for busy decision-makers such as the Minister). Other reports should be written, and the contents and presentation can be explained.

### Questions for discussion

Did each report contain the information that was needed?

Was it easy to understand?

How could they be improved?

## Activity 22: Knowledge quiz competition

<b>Location:</b> Classroom	<b>Duration:</b> 30 minutes
<b>Reference:</b> -	<b>Software:</b> None
<b>Objectives</b> Encourage participation Fun break Warmer	<b>Concepts practiced</b> Any concept from the previous topics covered during the training
<b>Equipment and materials</b> Scoreboard (Blackboard/whiteboard/paper) Paper for writing questions	

### Description of activity

The group is divided into two. Each group is given 10 minutes to think of a list of 15 questions (with the right answers), based on the topics covered during the previous day, or throughout the training. After 10 minutes, a spokesperson for each group is chosen. The first group asks the first question. Group 2 has 30 seconds to answer (the trainer keeps time), during which they may discuss the answer amongst themselves. Group 1 says if the answer is correct or not. If the answer is correct, Group 2 gets a point. If the answer is wrong or they are unable to answer in the time, group 1 gets a point. If the answer is either right or wrong, but Group 1 judges it incorrectly, they lose a point.

It is then the second group's turn to ask a question. This continues until all questions have been asked. The group with the highest score wins.

### Questions for discussion

Ask individuals to provide the correct answer for any questions that were answered incorrectly. If nobody (including the asking group) is able to, set aside time to cover the area again.