Basic Field Epidemiology

Facilitator’s Guide



Contents

[About this guide 4](#_Toc379285081)

[Overview of the course 5](#_Toc379285082)

[1.1 Competency statement 5](#_Toc379285083)

[1.2 Structure of the course 6](#_Toc379285084)

[1.3 Administrative material 6](#_Toc379285085)

[1.4 Evaluation material 7](#_Toc379285086)

[1.5 Training resources 7](#_Toc379285087)

[Preparing for the Basic Field Epidemiology course 8](#_Toc379285088)

[1.6 Who should be at the training? 8](#_Toc379285089)

[1.7 Where should the training be held? 9](#_Toc379285090)

[1.8 What resources are needed? 9](#_Toc379285091)

[1.9 How to make your training successful and interesting? 9](#_Toc379285092)

[How to use the Facilitator’s guide 11](#_Toc379285093)

[1.10 Formatting used in this Facilitator’s guide 12](#_Toc379285094)

[The Technical assistance module 13](#_Toc379285095)

[1.11 Timetable 13](#_Toc379285096)

[Session 1: Welcome and Introduction 14](#_Toc379285097)

[Session steps 15](#_Toc379285098)

[Session 2: Overview of Epidemiology 20](#_Toc379285099)

[Session steps 21](#_Toc379285100)

[Session 3: Animal Health and Disease 1 24](#_Toc379285101)

[Session steps 25](#_Toc379285102)

[Session 4: Animal Health and Disease 2 29](#_Toc379285103)

[Session steps 29](#_Toc379285104)

[Session 5: Animal Health and Disease 3 35](#_Toc379285105)

[Session steps 35](#_Toc379285106)

[Session 6: Animal Health and Disease 4 40](#_Toc379285107)

[Session steps 40](#_Toc379285108)

[Session 7: Disease Investigation 1 45](#_Toc379285109)

[Session steps 45](#_Toc379285110)

[Session 8: Disease Investigation 2 51](#_Toc379285111)

[Session steps 51](#_Toc379285112)

[Session 9: Disease Investigation 3 56](#_Toc379285113)

[Session steps 56](#_Toc379285114)

[Session 10: Disease Investigation 4 64](#_Toc379285115)

[Session steps 64](#_Toc379285116)

[Session 11: Disease Investigation 5 71](#_Toc379285117)

[Session steps 71](#_Toc379285118)

[Session 12: Course Evaluation, Conclusion, and Closing 82](#_Toc379285119)

[Session steps 82](#_Toc379285120)

# About this guide

This guide contains all the information facilitators require to run the training course on Basic Field Epidemiology.

Each facilitator will receive a copy of this guide along with the Training resource package which contains all documents and videos required to facilitate the course.

Facilitators should read through the training material, including facilitator’s guide, participant’s manual and workbook, and watch the videos prior to the training course.Becoming familiar with the other supporting administrative material is also important.

The purpose of this facilitator’s guide is to provide information to facilitate each of the course sessions effectively. The guide contains an overview of the course including the course structure, objectives, and required resources to run the training. It contains information on how to prepare for a successful course and how to facilitate each session. Where the training sessions include exercises or questions for the participants the answers are included in this guide.

A highly practical guide, ***Training Facilitation: How to facilitate a course and help people to learn***, has been developed in order to support and further develop your facilitation skills. You should read this manual and view accompanying video material prior to the course to help you feel more confident and to get the most benefit out of the course material.

# Overview of the course

This training course was developed as part of the Australian Indonesian Partnership for Emerging Infectious Disease – Animal Health Program.

The overarching aim for Component 2.1 of the AIP-EID Animal Health Program is to improve the collection, management and use of animal health information to improve capacity for effective disease control and prevention*.*

The training in field epidemiology has been developed to provide veterinary and para-veterinary field staff with the skills required to collect high quality surveillance data, and to make better decisions on the basis of the data collected.

The training has been developed in two individual courses. The basic field epidemiology course has been designed for training of para-veterinarians and to act as a refresher course for veterinarians. The advanced field epidemiology has been designed for training of veterinarians in more advanced field epidemiology techniques.

Field epidemiology is the application of general epidemiology skills to problems occurring *in the field*. Field epidemiology skills are necessary to being able to identify and describe diseases in animals, to collect and analyse data on livestock diseases or other conditions and to plan, implement and assess disease control activities.

## Competency statement

A competency statement is a description of what an individual may be expected to be able to do to be successful in their work. At the completion of this course the participants should:

For para-veterinarian to be able to use field epidemiology skills together with individual animal clinical skills to provide diagnostic, treatment and disease prevention services for the benefit of Indonesian livestock and their owners.

In order to achieve this, para-veterinarians working in village settings with limited resources need to be able to:

* Explain the difference between sign or syndrome, disease and diagnosis;
* Describe an approach to diagnosis of disease in animals that involves collection of evidence through history, clinical examination, environmental examination, laboratory testing and epidemiological investigation;
* Assess and explain options for farmers to treat and prevent diseases in their livestock;
* Contribute data and information into and use information derived from relevant Animal Health Information Systems such as iSIKHNAS to assist in the above activities.

## Structure of the course

The course is designed to be delivered over 3 days, each day is divided into four, 1.5 hour sessions. The first and last sessions are dedicated to welcome introduction and assessment, conclusions and closing ceremony. This leaves 10 sessions for content training.

The general structure of each session is

* Introduction to the sessions, learning objectives, and exercises
* Video associated with this session is presented and discussed
* Activities and exercises
* Key concepts review
* Feedback and evaluations

## Administrative material

The following administrative materials are available in the training resources package:

* Course preparation checklist
* Participant pre-course information
* Attendance list
* Course evaluation form
* Certificate template

## Evaluation material

Feedback on the course is collected for evaluation purposes by way of a questionnaire. The course evaluation form is available in the training resource package. The answers from this questionnaire should be collated and examined. Feedback is not always easy to interpret in a meaningful way but it will give you an idea of the overall satisfaction of participants.

### Evaluation of participant performance

Participants will be evaluated on a combination of the following:

* Attendance and active participation in discussion in all sessions.
* Completion of exercises and short-answer questions either individually or in groups as required during the training

## Training resources

The training resources package for this course include the following:

* **Facilitator’s Guide** – to be provided to all facilitators. Containing detailed information with lesson plans arranged for each session and learning objective. Important points will be accompanied with suggestions for additional material to be covered, questions and examples to be posed by the facilitators and expected responses as well as tips for facilitating responses.
* **Resource Manual –** to be available to facilitators and any interested participant. This manual is the full content of the course and is intended as the basis of the course, preparation material for facilitators and additional reading for enthusiastic participants. It is recommended that a few copies be printed and kept in the office for loan by staff interested in reading the material or revising. The document will also be available online as a PDF downloadable file.
* **Participants’ Manual –** to be available toeach participant. An easy-to-read manual containing the summarised content covered in the course. The manual will be used by participants as reference material during the course and afterwards. The manual will also be made available online and as a PDF file that can be downloaded and viewed on any computer or tablet device.
* **Participants’ Workbook** – to be provided to all participants. This contains course specific activities, practice exercises, and memory prompts.
* **Video-based training material** **–** to be provided toall facilitators and made available online or as electronic files to all participants. Videos will present each of the important concepts in the course using a combination of screen casting and personnel speaking to camera.
* **Administrative material** - to be provided toall facilitators. These documents include: facilitators training package information, participant pre-course information, training course preparation checklist, attendance list, certificate template, and are needed to effectively run the training.
* **Evaluation forms –** to be provided toall facilitators and participants. The evaluation forms are used for two purposes: evaluation of participant performance, and for collecting feedback on the course from participants and facilitators.
* **Online support –** a website will be developed for this project to make resource material available online. Teaching materials, videos and additional learning resources will be made available through the website.

# Preparing for the Basic Field Epidemiology course

## Who should be at the training?

This course has been designed for para-veterinarians who routinely work with farmers and their animal health issues in the field.

* Vets who would like to refresh their basic epidemiological understanding and be more informed about the knowledge and capabilities of staff they supervise should also be encouraged to attend if their presence will not be a deterrent to good communication amongst the para-vets and if they are willing to participate more as observers and resource people than as actual participants (who may be at risk of dominating the group).

Ideally, this course should only be conducted with between 8 and 20 participants.

* Too few participants may make a course less stimulating and useful. Too many participants often prove unsatisfying for all involved – too many to hear from everyone, the atmosphere in the room becomes difficult.

## Where should the training be held?

The training venue should be comfortable, quiet and away from distractions such as participants’ offices. The training room should be equipped with tables and chairs that can be moved around and there should be sufficient room for participants to be able to work comfortably in group exercises. There should be whiteboards, flipcharts, computer and projectors, and plenty of wall space to display ground rules, expectations, and the outcomes from group exercises.

## What resources are needed?

* Copies of workbooks (for each participant)
* Copies of the manual
* Facilitator’s Guide and resource manual
* Whiteboard, flipchart and paper, pens, etc.
* Computer, projector, and microphone if necessary.

## How to make your training successful and interesting?

### Give yourself sufficient time to prepare

It is very important that you read through all the training material, including participant’s manual and workbook, and watch the videos prior to the training course.Also becoming familiar with other supportive resources/ material/ references will help you have a successful work shop.

You are not expected to become an expert in epidemiology. You should not attempt to pretend to the participants that you are. As the facilitator of this course, you are leading the learning, guiding activities and helping to draw the most out of the material with the group.

The training course is designed to give the participants general skills in field epidemiology they need to improve animal health in Indonesia. The training is not designed to make them experts in epidemiology.

If asked questions that you are unable to answer then it is ok to say “I don’t know”. The participants are part of the Dinas and you can refer these questions to the local Dinas veterinarian.

Use the training course preparation checklist provided in the Administration materials to help ensure that you have prepared adequately for the course.

### Develop your facilitation skills

It may be useful to review some key concepts about how adults learn and some of the core characteristics of good facilitation.

A guide to good facilitation has been developed to assist you in this preparation. Please take the time to read this guide, ***Training Facilitation: How to facilitate a course and help people to learn***, and to adopt some of the key concepts which will help you to relax and enjoy your role as facilitator as well as assist the group to gain the most benefit from the course.

At an absolute minimum, your training course will be more successful if you can:

* **Communicate easily with participants** – be relaxed and aware of social and cultural issues that may affect the training. Remember to always use simple terms and appropriate language wherever possible.
* **Your role is to facilitate the training material** - you do not need to be a teacher in the subject matter.
* **Respect the knowledge held by participants –** have respect for the skills and knowledge that the participants already have. When checking if you have communicated clearly ask in a positive manner “Did I explain that clearly?” rather than in a negative manner such as “Did you understand that?”
* **Keep eye contact –** do not talk to the participants with your back to them while writing on the flipchart paper, for example.
* **Write clearly –** make sure your letters and numbers are clearly written so all participants can understand them.
* **Keep on time** - try not to let any session run more than the allotted time.
* **Be interesting –** show an interest in what you are saying. Tell a few stories if possible. Speak clearly and loudly but not fast.
* **Be enthusiastic and encourage all to participate. –** have enthusiasm for facilitation and teaching. Have enthusiasm for the course material and this will be imparted to the participants through you action and will encourage them to participate.

Most importantly, relax and enjoy the learning and training experience this course will provide.

### Group size

It is recommended an ideal group sizes is 10 - 12 participants. This way you can pay close attention to each participant’s needs. A maximum group size of 20 participants should not be exceeded. The training budget may limit the options for group sizes. In larger groups certain individuals can be reluctant to participate and having a larger group can limit the effectiveness of the training.

# How to use the Facilitator’s guide

The purpose of this facilitator’s guide is to provide information to facilitate each of the training course sessions effectively. It complements the Course outline document which contains the course overview, learning objectives, and proposed timetable. The following information is provided for each session under the following headings:

|  |  |
| --- | --- |
| * **Materials** needed
* Session structure
* Session objectives
* Review/Monitoring
 | * Group exercise
* Key concepts
* Note to Facilitator
 |

## Formatting used in this Facilitator’s guide

To help you find ways to express yourself during the course, some parts have been ‘scripted’ for you as a suggestion as to what you can say. Some less experienced facilitators may find it useful but you are not obliged to follow this advice.

* **Materials** needed

This section lists materials required specifically for each session over and above what is usually required.

**All sessions require**

* Copies of workbooks (for each participant)
* Copies of the manual
* Facilitator’s Guide and resource manual
* Whiteboard, flipchart and paper, pens, etc.
* Computer, projector, and microphone if necessary.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()**Facilitator talking points**

The important points for you to talk about with participants

At other times you will see the following icon

* Note to Facilitator

The information under this heading has been provided as advice about certain things to be aware of.

* Session structure

This indicates the key activities in each session.

* Session objectives

This section lists the key objectives of the session. It is important to keep these in mind because they give you a clear goal for the outcome of the session.

* Review/Monitoring

This part lists ways that can be used to make sure that participants have learned useful skills or knowledge from the content presented and that you have taken the time to assess the attendance and participation of each participant.

# The Schedule

## Timetable

The timetable below can be adjusted if the available training times do not with this structure. The course has been developed to be presented in the order as shown.



# Session 1: Welcome and Introduction

* Session structure

This session is structured as follows

* Introduction to the training, course objectives, and structure
* Group exercises - introductory icebreaker
* Methods of monitoring learning and engagement
* Group exercise- setting the rules for the course
* Review
* Session objectives
1. Welcome all participants and build a good rapport between the facilitator and participants.
2. Share recent work experiences and opinions from participants about how their work could be better supported with training or resources.
3. Discuss the structure, objectives, outline and the role of evaluation of the training course
4. Define the ground rules for the training course by consensus

Session steps

##### Official Welcome

This course has been developed as part of the Australian-Indonesian Partnership for Emerging Infectious Diseases program to support the work of para-vets in the field, to recognise their important role in the success of the animal health information system, iSIKHNAS and to support strong relationships between Government services and the local farming communities around Indonesia. It is aimed at strengthening the skills, confidence and approach by para-vets in dealing with animal health problems with the hope that these benefits will be felt by farmers accessing services and in the overall health and well-being of the whole community.

##### Introduce yourself (and any other members of the facilitation team)

* ![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Greet participants
* Make sure they know your name – if not, introduce yourself.
* Thank everyone for coming
* Give a brief introduction to the course.
	+ This course has been designed to
	+ Recognise that para-vets play a vital role in the future strength of animal health services
	+ Be useful and relevant to all field para-vets
	+ Develop practical skills which will be useful in your daily work so you feel even more confident and satisfied with your work
	+ Help staff give better service to farmers and their communities
	+ Support the changes which are occurring through the implementation of iSIKHNAS

##### Discuss any housekeeping items:

Participants appreciate knowing certain practical things before a course starts. Depending on how familiar participants are with the training location and other practical aspects you may choose to briefly give advice about.

Start and finish times,

Breaks, refreshments, lunch and how this will be organised including the timing and location for these breaks.

Where the toilets and washing facilities are

Prayer times and location

Attendance records, evaluations, feedback, certificates and other admin etc.

If photography is ok with everyone, mobile phones etc.

##### Describe what will happen over next three days

* ![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Role of Facilitator – helping participants to get the most out of the material. Not a teacher, not necessarily an expert in the field, not the creator of the course.
* The next 3 days will be split into 4 sessions per day.
* There will be a short break in the morning and afternoon and lunch.
* Each session will have specific learning objectives or things we want you to gain from the session, and there will be a short video in most sessions to present some of the key concepts.
* After the video we will take some time to discuss any questions or issues and then we will complete one or more exercises to explore the material and concepts further.
* During each session we will have activities to keep things interesting and to emphasize key concepts. Questions are always welcome and if I can’t answer them myself then together we will try to find the answer.

##### Describe the course objectives

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()By the end of this Basic Field Epidemiology training course you will all be able to use field epidemiology skills *together* with individual animal clinical skills to provide better diagnostic, treatment and disease prevention services to livestock and their owners.

Over the next three days we will be talking about:

* the difference between signs, syndromes, disease and diagnosis;
* an approach to diagnosis of disease in animals that involves the collection of different types of evidence - through the animal’s history, clinical examination, looking at the environment, laboratory testing and epidemiological investigation;
* how to assess and explain options for farmers to treat and prevent diseases in their livestock using this additional information;
* contributing useful data to iSIKHNAS and accessing information from iSIKHNAS to help you in your work.

At the start of each session we will go over the purpose and outline and at the end we will have the opportunity to review what we have learned.

##### Activity

* Group exercise – Sharing recent experiences

Rationale: This icebreaker is designed to share recent cases participants’ have seen and to provoke thinking on deeper issues relating to how they made decisions about the problem they faced, their treatment or response and where the strengths and weaknesses were in the process.

Additional note: If participants do not usually work together and do not know each other ask each participant to give their name before they share their individual case.

Facilitator: Should be listening out for

* diseases/health problems talked about by participants,
* difficulties encountered,
* weaknesses or inadequacies expressed,
* level of satisfaction about outcome as well as
* ideas for more support.

As facilitator, you should take a few notes and refer to these examples whenever they can be used as relevant examples in later parts of the course.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Ask each person to think about their recent cases or cases that stick in their minds as interesting.

[Give enough time for participants to reflect]

Pick just ONE of these cases and think about what happened and how you came to your decisions about what the problem was and how to treat or respond to it.

[Allow a little more time for reflection]

Invite a volunteer to talk briefly about their case?

[Go around the room, listening to each person and making a summary remark about the most important feature of the case/the decisions/the outcomes.]

Do you think you did a good job? Is there anything (training or resources) that could have helped you to do a better job?

Thank the participants. This has been very interesting and helpful. We will try and talk more about these examples during the course.

Ask if anyone wants to ask any questions or make any comments

##### Describe the methods of review and assessment and how participants are to use their workbooks

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()We hope that you will participate fully during the course and of course we hope that you actually learn something useful so that you feel the course has been worthwhile.

During the course and at the end of the course, there will be short activities which will test your understanding and memory of what we have talked about.

A certificate will be awarded to every participant who has contributed and who can demonstrate that they have engaged with the material.

In order to collect your certificate at the end of the course we will take into account:

- Your attendance

- Your active participation in discussions and group activities, and

- Your completion of the exercises and short-answer questions that appear in your workbook.

The workbook that you all have contains key information, exercises, activities, and questions that are related to each session of the course. You will be given time to complete these exercises.

We also need to evaluate the course itself and find out what you felt about the course and how useful it was to you. You will be given time to complete a one page questionnaire for us at the end of the last day. This questionnaire will ask your opinion about;

The structure of the training

The facilitator’s performance

If the course met your expectations, and

The best and worst parts of the course

Your responses will help us to improve the course and to revise other courses.

##### Activity

* Group exercise – Establish the group rules using discussion and consensus

Ask one participant to volunteer to record the list of group rules on the white board or flipchart. If writing on a flipchart, the list can be taped to a wall for the remainder of the training course so facilitator and participants can refer to it if necessary.

This can usually be done very informally and with good humour. You may wish to ask people to call out suggestions for rules or ask each participant for their ideas. Either way it is important to get some kind of consensus. The discussion can also deal with ‘punishments’ for lateness or mobile phone rings, talking over someone etc. Being forced to sing a song or tell a joke is a good form of ‘punishment’.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Let us try to decide on the ground rules for this course. This will help us all to understand the kind of behaviour we expect during the sessions, and let us devise ways of ‘punishing’ people who don’t follow the rules.

Some common rules try to deal with problems such as:

participants talking all at once, mobile phones ringing loudly, interruptions when someone is talking, late arrivals, asking questions, not accepting ideas from others, poor participation in group activities, dominating the group.

* Review/Monitoring

Review the session objectives and ask, if time, if they are ready to learn some new skills which will make their jobs more rewarding and effective.

# Session 2: Overview of Epidemiology

* Additional materials needed
* Video file - T1a\_1
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercises - Discussion of video content
* Group exercises - Small group discussion and answering of workbook questions
* Key concepts
* Method of assessment
* Session objectives

1.1 Describe the main roles of para-vets in Indonesia

1.2 Explain the relevance of epidemiological skills to para-veterinary work

1.3 Describe the overall concept of epidemiology

1.4 Outline the differences between the clinical approach to animal health and the epidemiological approach

1.5 Explain how epidemiological skills help prevent zoonosis

Session steps

##### Introduction to the key content of the session.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this session we are going to be looking at ...

* the main roles of para-vets
* what is epidemiology
* why epidemiology can be useful to para-vets
* the differences between the clinical approach to animal health and the epidemiological approach
* how epidemiological skills can help prevent zoonosis, as an example

##### Curiosity raising activity

**Option 1:** Draw a picture (organogram) which represents YOUR PERSPECTIVE of the relationship between the farmer, para-vet, vet, kepala dinas, lab, and pusat.

Give participants a few minutes only. The first few pictures can be shared and briefly explained by their owner. Ask for examples which are different to those already shown. This activity should promote thinking about where para-vets fit into the scheme of the animal health services and also demonstrate where in the hierarchy they fit in.

**Option 2:** What does the word epidemiology mean? Has anyone heard it before? Try defining it and we will see who comes closest to a good definition by the end of the video.

The actual result of this question is not terribly important at this stage but as facilitator you could write the ideas down on a whiteboard/flipchart and refer to the list of possible ‘definitions’ after the video so that they can be challenged and corrected.

##### Play video or present content

Play video *-* **T1a\_1**

See Annexe 1 – Video scripts for a full script of this video.

##### Discuss content of video

Start by referring to the Curiosity Raising Activity you used in Step 2 and if, after watching the video, anyone would like to revise their response.

**Option 1: Role of para-vets**

The point you want to draw out from the participants is that para-vets play an absolutely vital role in the success and strength of iSIKHNAS and Indonesia’s animal health system.

Para-vets are the ‘face’ of the service in the community.

Para-vets are doing the hard field work in all sorts of weather, in difficult conditions and they provide vital services to their communities.

Poor farmers depend on them.

iSIKHNAS depends on para-vets to feed information into the system – to share the details of their work and the cases they see. Without para-vets there would be no iSIKHNAS.

Our ability to respond quickly to outbreaks depends on para-vets.

So… in any diagram or picture to show where para-vets fit into the system they should be shown as central, the active reporters of disease, the source of all information that decision makers have to rely on.

**Option 2: Meaning of the word epidemiology**

The actual words used by participants is not absolutely crucial. This exercise gives participants the opportunity to adjust the attempts at defining the word before the video and in trying to explain the core aspects of epidemiology in their own words.

The study of how disease spreads and can be controlled.

Looking of patterns of disease in a population so that we can understand and control them.

Use of patterns, causes and effects of disease in populations of animals (or humans).

Additional informaiton:

Break down the word epidemiology and see that it comes from several ancient Greek words, Epi – meaning upon or among, Demos – meaning people or district, Logos – meaning study, word or discussion… so, literally, the study of what is upon (faced by, suffered by, experienced by) the people. Veterinary epidemiology deals with the study of the causes of disease in animal populations.

The words Epidemic and Endemic may also come up during discussion – the distinction in their literal meaning is disease which is ‘visited upon’ or one which ‘resides in’ a population respectively.

##### Activity

* Group exercise – Introduction to patterns of disease.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this activity we will be looking at an example of cases of diarrhoea in two villages and the way we can improve our treatment of these problems by looking ‘outside the box’, ie looking less at the individual cases and more at the whole population and patterns in the disease.

**Scenario:**

There are cows with diarrhoea in two villages in an area.

Step 1: The para-vet takes a history of the problem over the last 5 weeks. She draws up this sketch as a result of her findings.

**Village 1:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |

**Village 2:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Week 1 | Week 2 | Week 3 | Week 4 | Week 5 |

Question 1: What can you say from this sketch? What is the difference between the problems in the two villages?

**Answer to Question 1:** Village 1 has low level, stable or constant disease.

Village 2 has a sudden and significant rise in the disease with slow reduction over the following weeks.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Already, you are using an epidemiological approach to help you understand the PATTERN of the disease problem. Instead of just looking at individual animals and treating them one by one you are looking at the pattern of the problem and using this information to help you help the animals more effectively. Looking at patterns in populations of animals is what epidemiology is all about. This is an example of patterns in time (5 weeks) and space (2 villages).

Step 2: Here is another way to show this.

**Question 2: Does this chart say the same thing as the first sketch? What does it tell** us about the problem and its causes?

**Answer to Question 2:**

Village 1: Yes the same message as the first sketch. Ongoing problem (endemic) which suggests that the cause is constantly present.

Village 2: Yes the same message as the first sketch. There is a point (point exposure) where all the animals seem to have been exposed to the cause at the same time.

Question 3: What could be the possible causes for these two problems?

Ask participants to break into pairs and come up with a list of possible causes for the problem in each village based on the pattern of the problem and write them in their workbook.

|  |  |
| --- | --- |
| Village 1 | Village 2 |
| WormsJohne’s diseaseParasitic gastroenteritisFasciolosis – liver flukeParatuberculosis | PoisoningSudden change in dietContaminated foodCoccidiosisBovine virus diarrhoea BVDVsalmonellosis |

Step 3: This listing of possible causes of the problem is often called the differential diagnoses and the list is different for each village because we have taken into account the pattern of the problem in time and space.

**The next step is to try to narrow down the list** by looking at the likelihood of each option so that we get the list down to one or two MOST LIKELY causes.

**Question 4:** What can we do to narrow the lists down, eliminate from the lists the least likely?

Could you do some tests? What specimens would you take? How long would it take? What results would the tests give?

If you can’t afford to do lab tests then what could you do to narrow the list so that you are then able to treat or respond with advice?

|  |  |
| --- | --- |
| Village 1 Low level, chronic, endemic disease | Village 2 Sudden onset of severe diarrhoea in large number of cattle. |
| Test for eggs in faecal sampleLook at iSIKHNAS website for data about local problems | Investigate cause which is likely to be * sudden change in food, pasture, conditions etc
* toxic plant
* poison such as a chemical
* recent arrival of infected animals with intermingling

Look at iSIKHNAS data to see if there are recent cases of Coccidiosis, Bovine virus diarrhoea BVDV or salmonellosis, for example, in the area. |

**The next step is to respond.**

Question 5: How could you respond to these two different problems based on the information you have?

Village 1: Treat for what you think the problem is and reassess the situation after a suitable period. Trial and error is sometimes the only way if you can’t afford to test.

Village 2: Remove the cause if possible then continue to observe.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()This example shows that using an epidemiological approach to your clinical work can help you even when you don’t know what the real cause of the problem is and when you don’t have a definite diagnosis.

Using an epidemiological approach in your clinical work means you work upwards from the individual animal to the population level and patterns in that population. You then create a list of possible causes and start gradually narrowing that list down so that you can choose a treatment or response for the *most likely cause*. Using an epidemiological approach will improve the outcomes of your clinical work, farmers will be happier and more confident with the services you provide and the whole village will be able to benefit from your work.

##### Activity

This activity provides participants with the opportunity to share stories about

* if have used an “epidemiological approach” in their work or
* Instances where knowledge of epidemiology might have been useful in the past.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()This is a great opportunity to share experiences and to test out our understanding of basic epidemiology. Who has a story to share about a situation at work where you have used knowledge about the population, the environment or the same problem in other animals or maybe a story about a situation where it would have been useful IF ONLY you had understood more about how this kind of additional information about the disease in the population can help your clinical work.

If responses are slow to come then you may like to pose some of these possible questions;

Have you ever, for example, tried to answer …..

* how an infection came on to a farm?
* is diarrhoea more common after rain?
* Does the worm treatment we usually use the right one for my area?
* Is Lantana camara the real cause of baliziechter?
* Does the housing of animals have any effect on health?

Alternatively, you could use one or two of the following examples which participants may have knowledge or experience of.

Have you any experience of a situation where

* An animal is separated from other animals because it was thought to have a contagious disease?
* Farmers change their husbandry methods (housing, grazing, feeding etc) in different seasons?
* Someone has suggested slaughter for an animal that was putting others at risk?
* The same treatment was given based on successful treatment of past cases with similar signs?
* Biosecurity measures were used – disinfection for example?
* Thought about why we vaccinate as many animals as we do?
* Movements of animals were restricted?
* Mingling of animals was not encouraged?

These are all examples of situations where knowing about how a disease behaves in a population can help us to respond to it in the control and treatment of disease.

##### Complete the key concept activity in the Workbook

* Key concepts

Participants are to complete the following key concept statements in their workbooks.

Epidemiology is the study patterns and causes of disease in populations.

Epidemiology gathers information from **a group of animals (sick and healthy)** to describe patterns which help us determine the possible causes of disease.

**Zoonoses** are animal diseases that are able to infect humans.

* Review/Monitoring
* Facilitator’s observation of participants
	+ Attendance and participation
* Workbook revision activity

# Session 3: Signs, syndromes and making a diagnosis

* Materials needed
* Video file - T1a\_2
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercise - Discussion of video content
* Group exercise - Small group discussion and answering of workbook questions
* Key concepts
* Session objectives

2.1 Describe the effect of disease on animal health and production

2.2 List possible signs of disease

2.3 Define a syndrome

2.4 Define differential diagnoses

2.5 Define a definitive diagnosis

Session steps

##### Introduction to the key content of the session

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this session we are going to look at ….

the effect of disease on animal health and production

* signs of disease
* syndromes
* differential diagnoses
* definitive diagnosis

##### Curiosity raising activity

It is important to get participants in the right frame of mind for learning. By raising their interest or curiosity, checking their current understanding in this way, prior to the video you are preparing them to listen more intently. They are focussing their minds on the topics about to be discussed in the video.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Would anyone like to try to define what a syndrome is?..... What is the difference between a sign and a syndrome?.... Let us try to define what a sign is and then in pairs see how many we can list in two minutes. How many syndromes can we think of?

If you think the participants would respond well, ask for someone to take notes of their definitions on the flipchart so that you can check them as a group *after* the video.

##### Play video or present content

Play video if available *-* **T1a\_2**

##### Discuss content of the video

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this video we learnt about the effects of disease on animals and what signs, syndromes, differential diagnoses, and definitive diagnosis are. Did our definitions and understanding match with what we saw on the video?

Revisit the definitions produced prior to the video and make any adjustments necessary. Make sure definitions are clear. Refer to the Resource Manual for more information.

There will usually be little problem with the definition of sign, however syndrome, differential diagnoses and definitive diagnosis can create quite a bit of discussion.

Suggestion: In some districts, staff are quite adamant that para-vets ‘cannot make a diagnosis’ however as they are expected to treat health problem it could be argued that they are giving their ‘best guess’ at a diagnosis which is in fact just a **differential diagnosis**. Perhaps it is the only vets can give a **definitive** diagnosis. This discussion can get heated and long so it is recommended that you stay aware of the time. Don’t let the group go on too long!

Always make sure participants have no unanswered questions or confusions before you go forward.

##### Activity

* Exercise in pairs – Priority syndromes

What are Indonesia’s main priority syndromes?

Demam pada babi Gila galak Keguguran atau sendi membengkak

Mati meningkat pada unggas Mati mendadak

Pincang, air liur dan lepuh

How are they reported to iSIKHNAS?

iSIKHNAS SMS Code: DMB GGA KGS MMU MTD PLL

How are they defined?

|  |  |
| --- | --- |
| **Description**  | **Spesies**  |
| Demam tinggi, konjungtivitas dan peningkatan kematian pada babi  | babi  |
| Perubahan tingkah laku, menjadi lebih agresif atau depresif, hipersalivasi dan menggigit  | kucing, primate, anjing  |
| Keguguran pada trimester ke 3 atau sendi membengkak  | ruminan  |
| * **Ayam kampung dan unggas lain, burung:** kematian mendadak dalam waktu 2 hari dengan atau tanpa gejala klinis
* **Layer:** kematian diatas 1 % dalam 2 hari berturut-turut. Bila divaksin, penurunan produksi telur pada ayam
* **Broiler:** kematian mendadak di atas 1% dalam 2 hari berturut-turut umumnya menyerang pada umur diatas 20 hari
 | ayam, puyuh, itik  |
| Kematian mendadak dan keluar darah pada lubang kumlah  | babi, ruminan, kuda  |
| Penyakit yang .... Highly contagious (spreads rapidly), or High mortality (many animals die), or Zoonotic (might affect humans), or Unusual signs or behaviour (not like normal disease), or Exotic (may have come from outside Indonesia)  | monogastric, burung, ruminan  |
| Pincang, air liur berlebihan, dan lepuh pada mulut / kaki / puting  | ruminan, babi  |

Why are we on the alert for these syndromes? What makes them a national priority?

Exotic – we don’t have them and don’t want them

Highly contagious – we want to contain their spread

Endemic - but we want to control or eradicate them

Zoonotic – they can affect the human population.

What diseases are they trying to detect?

|  |  |  |  |
| --- | --- | --- | --- |
| **Kode**  | **Nama**  | **Spesies**  | **Disease of interest** |
| DMB  | Demam pada babi  | babi  | Hog Cholera |
| GGA  | Gila galak  | kucing, primate, anjing  | Rabies |
| KGS  | Keguguran atau sendi membengkak  | ruminan  | Brucellosis |
| MMU  | Mati meningkat pada unggas  | ayam, puyuh, itik  | Bird Flu |
| MTD  | Mati mendadak  | babi, ruminan, kuda  | Anthrax |
| PLL  | Pincang, air liur dan lepuh  | ruminan, babi  | Foot and Mouth Disease |

There is an additional syndrome it is possible to report. Why do you think this might be useful?

|  |  |  |  |
| --- | --- | --- | --- |
| PLB  | Unusual or potentially important disease  | Disease that may be: * Highly contagious (spreads rapidly), or High mortality (many animals die), or Zoonotic (might affect humans), or Unusual signs or behaviour (not like normal disease), or Exotic (may have come from outside Indonesia)
 | monogastric, bird, ruminant  |

##### Activity

* Group Exercise – Healthy and unhealthy animals and production

Divide the participants into small groups, each group is to work through the following questions. Participants are to write the answers to the questions in their workbook. Ask them to let you know when they think they have finished. Go around the room and monitor their progress.

Question 1 - List characteristics (signs) of healthy chickens (write as many as you can)

Question 2 - List signs of disease in chickens (characteristics of unhealthy chickens).

Question 3 – List the effects of disease on production

**Answers to Questions 1, 2 and 3**

|  |  |  |
| --- | --- | --- |
| **Healthy** | **Unhealthy** | **Effects of disease on production**  |
| Head straightStraight neckClean, smooth feathersClean ventMoves easilyBright eyesStrong legs and feetCrows or sings well | Drooping headClosed eyesFluffed feathersDirty ventNot movingLegs bentNot crowing (singing)Reduced appetite | DeathsDecreased egg productionDecreased weight gain/growthDecreased reproduction |

Question 4 – List some of the most common diseases that cause production losses or deaths in chickens?

**Answer to Question 4**

|  |  |
| --- | --- |
| * External Parasites
* Internal Parasites
* Poor Nutrition
* Poor management
 | * Infectious Diseases
* Avian Influenza
* Fowl Pox
* Infectious Laryngotracheitis
* Leucosis
* Marek’s Disease
* Newcastle disease
 |

Question 5 – Pick 3 of the signs from those listed in Question 2 and give a list of diseases (differential diagnoses) that can cause these signs

**Answer to Question 5** – this is for discussion. The answers may vary depending on the area the participants are from and the prevalence of diseases within that area.

Question 6 - What is the syndrome iSIKHNAS uses to detect a priority disease in chickens? What is the priority disease that iSIKHNAS is it trying to monitor with this syndrome reporting?

**Answer to Question 6**

* MMU - Poultry mortality
* Village chickens and other poultry, wild birds: sudden mortality in the space of 2 days with or without clinical signs
* Layer: mortality over 1% in two days. In vaccinated birds, a decrease in egg production. Broiler: mortality over 1% in two days, generally affecting birds around 20 days

The priority disease that this syndrome is trying to detect is Avian Influenza.

##### Ask if there are any questions or confusions

##### Participants should complete the following key concept statements in their workbooks

* Key concepts

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements. Let me know when you have finished.

* **Diseases in animals** will often result in reduced health and production and may result in death.
* Most **signs** **of disease** that we can see just provide an indication of the organs that are affected but not necessarily the specific disease.
* The word **syndrome** is used to refer to a particular sign or a defined collection of signs.
* A **differential diagnosis** is a disease that could cause the clinical signs that have been observed.
* Where there is one disease that is highly likely to be causing the signs in a sick animal this is called a **definitive diagnosis**.
* Monitoring
* Facilitator’s observation of participants
	+ Full attendance
	+ The participant’s contributions to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants
	+ Key concepts are filled out correctly in participant’s workbook

# Session 4: Causes of disease

* Materials needed
* Video file - T1a\_3
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercises - Discussion of video content
* Group exercise – Sickness in chickens and farms workers
* Key concepts
* Session objectives

2.6 Explain how and why disease occurs in some animals and not in others using the terms host, agent and environment to assist the explanation.

Session steps

##### Introduction to the key content of the session

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this session we are going to talk about….

how and why disease occurs in some animals and not in others

what the terms host, agent and environment mean when talking about epidemiology

##### Curiosity raising activity

##### Play video or present content

Play video if available *-* **T1a\_3**

##### Review and discuss content

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Do you remember what was said about host, agent and environment in the video? Can someone try to explain what the terms mean and why it helps us to think in these terms?

##### Short activity

Quick competency check - What are we looking for when we talk about “body systems”? Can you name some body systems and what role do they play in our understanding of disease. How will it help our work to understand them better?

|  |  |  |
| --- | --- | --- |
| **System of the Body** | **Organs in the Body** | **Job or function** |
| Musculo-skeletal | muscle (meat) bones | Support and move the body |
| Digestive | stomach, liver, intestine, pancreas | Digest and absorb feed |
| Circulatory | heart, blood vessels | The brood carries substances around the body |
| Respiratory | muzzle, windpipe, lungs | Breathing |
| Urinary | kidneys, bladder | Get rid of poisons and waste (urine) |
| Nervous | brain, nerves spinal cord | Pass messages around the body, control the body |
| Sensory | eyes, ears, nose skin | Sense and detect things outside the body |
| Reproductive | testes, penis ovaries, uterus, vagina, vulva, udder | Produce and feed young |
| Lympho-reticular | lymph nodes, spleen | Protect against infectious diseases, produce blood |

##### Activity

* Group Exercise - Sickness in chickens and farm workers

Divide the participants into small groups which are different to the last session. Each group is to work through the following questions. Participants are to write the answers to the questions in their workbook.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()There is a little background information you will need to read. This is in your workbooks. After Question 3 there is further information in your workbooks that is necessary to be able to answer the last 2 questions.

Background information

A village reporter (pelsa) reports to iSIKHNAS that a farmer has sudden death in his chickens. iSIKHNAS sends you a message of the problem. You ring the farmer and he tells you that this is mainly a problem in his young chickens. They are not eating and do not have much energy. Some of his chickens that were sick are still alive.

You already know that from time to time at his village there are chickens with fluffed feathers, drooping wings, coughing, sneezing and with watery-greenish diarrhoea.

Question 1 - Discuss what body systems may be affected by a disease to produce the observed signs?

**Answer to Question1**

All body systems could be affected: neurological, respiratory, musculoskeletal, gastrointestinal, circulatory, reproductive.

Question 2 - Discuss if this should be reported as a sign or as a *priority syndrome*?

**Answer to Question 2** – this is for group discussion. To ensure all cases of HPAI are detected all cases that match the syndrome definition should be reported as a priority syndrome.

* MMU - Poultry mortality
* Village chickens and other poultry, wild birds: sudden mortality in the space of 2 days with or without clinical signs

Question 3 - Produce a list of differential diagnoses that could explain some or all of these signs of disease.

**Answer to Question 3**

Newcastle disease

Avian influenza (Highly pathogenic HPAI)

Duck plague

Acute poisoning

Fowl cholera

Laryngotracheitis

Fowl pox (diphtheritic form)

Psittacosis (psittacine birds)

Mycoplasmosis

Infectious bronchitis

Aspergillosis,

Management errors such as deprivation of water, lack of or nutritionally deficient feed and poor ventilation

***Further information***:

A disease investigation with the Dinas veterinarians was conducted.

The farm was visited, sick chickens examined and post mortems conducted on dead chickens.

Post mortem findings included congestion and mucous exudate in the trachea, heavy lungs that sink in water and haemorrhages in the lining of the trachea and proventriculus.

Blood samples and cloacal and tracheal swabs were collected and sent to the laboratory.

With the history, clinical examination, signs of disease along with the post-mortem findings and laboratory findings the team reached a definitive diagnosis of Newcastle disease. The team is confident that this is not HPAI or any other disease on the differential diagnosis list.

Newcastle disease technical information is provided in Appendix 1.

Question 4 - Describe some of the causes of disease that may be associated with Newcastle Disease and for each cause indicated whether it can be classified as host (something to do with the chicken) environment or agent (something to do with the Newcastle Disease virus).

**Answer to Question 4**

Host

* Age - young chickens are more susceptible than older chickens
* Immunity – chickens with no previous exposure or non-vaccinated are a higher risk

Agent

* the ability of the strain to cause infection and disease. Some stains cause mild disease with low death rates, while other can cause severe disease with high death rates

Environment

* high population density resulting in more contact between birds to infective material (exhaled air, respiratory discharges, faeces, eggs laid during disease, carcass of dead chickens from the disease, contaminated water or food)
* contact with wild birds or other potential sources of infection

Question 5 - In your area discuss which months of the year Newcastle disease is most likely to occur. Explain why ND might occur in some months and not in others.

**Answer to Question 5** – this is for group discussion and the answers may vary depending on the area the participants are from and the prevalence of diseases within that area.

##### Review the key concepts in the Workbook

Participants are to complete the following key concept statements in their workbooks

* Key concepts

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements.

A cause is an event, condition or characteristic that plays a role in whether or not a specific disease occurs.

* Monitoring
* Facilitator’s observation of participants
	+ The participant contributes to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants
	+ Key concepts are filled out correctly in participant’s workbook

# Session 5: How disease progresses

* Materials needed
* Video file - T1a\_4
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercises - Discussion of video content
* Group exercise – Sickness in chickens and farm workers continued
* Key concepts
* Method of assessment
* Session objectives

2.7 Outline the progression of infectious disease in individuals and populations

Session steps

##### Introduction to key content in Session 5

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this session we will be looking at the

the progression of infectious disease in individuals and populations

##### Play video or present content

Play video if available *-* **T1a\_4**

##### Discuss content

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this video we learnt about infectious agents, contagious diseases, susceptibility, exposure, incubation periods, carrier animal, herd immunity, and how these concepts help us explain how diseases progress within an individual or population. Let us discuss any points that you are not sure of first?

##### Activity

* Group Exercise - Sickness in chickens and farm workers continued
* Note to Facilitator

Divide the participants into small groups which are different to the last session. Each group is to work through the following questions. Participants are to write the answers to the questions in their workbook.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Now we are in small groups you need to work through the following questions. At the end, when everyone is finished we will discuss each question and the answers.

Firstly there is a little background information you will need to read, this is in your workbooks.

Further information:

Newcastle Disease has been diagnosed as the cause of the disease outbreak in this village. Poultry farmers in the village are interested in learning more about the disease.

Question 1 - Newcastle disease is an infectious and contagious disease. Brainstorm how exposure to the disease might have occurred in this village.

**Answer to Question 1**– this is for group discussion and the answers may vary depending on the area the participants are from.

There is often a seasonal pattern to NDV outbreaks with cases more likely to occur in periods when more birds are brought to market (increased mixing) or when migratory birds travel to new locations. Newcastle disease can survive several weeks in the environment especially in cool weather.

Q2 - What is the range of the incubation period for Newcastle disease? What incubation times have you seen?

**Answer to Q2**

The incubation period ranges from 2-15 days and is most commonly ~5-6 days.

Q3 - What are the possible outcomes for a chicken if it is infected with Newcastle virus?

**Answer to Q3**

A chicken can: recover and be immune for a period of time, recover and be susceptible to infection again, or die. A carrier state is possible in other species of birds and not generally reported in chickens.

Q4 - Describe the spread of NDV in a completely susceptible flock and in a flock where most of the chickens are immune to the disease.

**Answer to Q4**

When NDV is introduced into a susceptible flock of chickens it will rapidly spread through the entire flock (within days). Young birds are most susceptible and signs will depend on the strain of virus (respiratory, digestive or nervous systems).

Respiratory signs include gasping, coughing and sneezing. Digestive signs include watery-green diarrhoea. Nervous signs include tremors, paralysed wings and legs, twisted necks, circling, spasms, and complete paralysis. The head and neck (including comb and wattles) may be swollen and cyanotic (bluish in colour).

Affected animals are often depressed and refuse to eat and there may be a sudden drop or complete stop in egg production. Eggs may be abnormal in colour, shape, or surface, and have watery albumen.

Large-scale outbreaks and mass mortality are less common when NDV is endemic in a region.

Q5 - How does vaccination prevent disease?

**Answer to Q5**

Vaccination of chickens provide immunity to the individual chicken to reduce the chance of disease occurring. If a sufficient proportion of the population is vaccinated then chicken that have not been vaccinated (new or missed) may be protected due to herd immunity.

##### Review key concepts in Workbook

* Key concepts

Participants are to complete the following key concept statements in their workbooks

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements.

An infectious agent is a living organism that is capable of causing a disease in susceptible animals.

A contagious disease is an infectious disease that can spread directly from animal to animal.

The incubation period is the period of time from infection till the animal develops clinical signs of disease.

Herd immunity describes a form of immunity that occurs when a significant portion of a population of animals is immune and this provides a measure of protection for individuals who have not developed immunity

* Monitoring
* Facilitator’s observation of participants – The participant contributions to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants - Key concepts are filled out correctly in participant’s workbook

# Session 6: Spread of disease

* Materials needed
* Facilitator’s notes and a copy of the participant’s manual
* Computer and projector
* Video file - T1a\_5
* Flipchart paper and markers
* Whiteboard and pens
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercise - Discussion of video content
* Group exercise - Small group discussion and answering of workbook questions
* Key concepts
* Method of assessment
* Session objectives

2.8 List methods of transmission and maintenance for major infectious diseases of animals in Indonesia

Session steps

##### Introduction to the key content in Session 6

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this section we will be going through the material found in section 2.8 of the Basic Field Epidemiology Manual.

After this introduction I will play the video we can discuss the content presented after the video concludes. This will allow you to explore the topic area talked about and tell some stories of where you may have seen these things during your work.

Following this discussion there are some exercises and examples to work through. These can be found in you workbook under Session 6: Animal Health and Disease 4.

##### Describe course objectives

In ![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]() this session we will be looking at the way in which disease is transmitted and how it remains in an animal or the environment etc ….

2.8 List methods of transmission and maintenance for major infectious diseases of animals in Indonesia

##### Play video or present content

Play video if available *-* **T1a\_5**

##### Discuss content

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this video we learnt about how an infectious agent gets into and out of a host and then how it can spread between different populations of animals. We also learnt about strategies infectious agents use to survive throughout time. Let us discuss any points that you are not sure of first?

##### Activity

* Group Exercise - Sickness in chickens and farm workers continued

Divide the participants into small groups which are different to the last session. Each group is to work through the following questions. Participants are to write the answers to the questions in their workbook.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Now we are in small groups you need to work through the following questions. At the end, when everyone is finished we will discuss each question and the answers.

Firstly you will need to read technical information for Newcastle Disease in the Appendix of your workbook.

Further information:

Read through the technical information for Newcastle Disease in the Appendix and answer these questions.

Q1 - Describe mechanisms of spread for Newcastle Disease in village chickens and commercial poultry farms and classify them as *direct* or *indirect.*

**Answer to Q1**

* Newcastle Disease virus may be present in eggs laid by chickens with the clinical disease and in all parts of the carcass of birds that are infected when they die or are killed. - Direct
* Infected birds shed lots of virus during incubation, clinical disease and even during early stages of recovery in birds that survive. - Direct
* Chickens may be infected by aerosol spread from other infected birds or by ingesting contaminated water or food. - Direct and Indirect
* Movement of infected birds is a common way of spreading disease as is faecal contamination of people, equipment, food etc. from infected farms to uninfected farms.- Indirect

Q2 - Describe strategies other than vaccination that might reduce the risk of introduction of ND into a flock of poultry.

**Answer to Q2**

General husbandry measures are also important in controlling Newcastle disease.

* Keep chicken housing areas clean and dispose of dead birds, droppings, feathers etc.by burning or burial. This will reduce the number of other birds coming into contact with them and reduces the potential environmental contamination.
* Keep your chickens in good condition so there is little stress and their immune system is strong
	+ Provide good food and water and housing for birds.
	+ Prevent or treat for internal and external parasites if necessary.
* Protect you farm from having Newcastle disease - Biosecurity
	+ Don’t buy sick birds and try and have a quarantine area where new birds can be kept separate to other birds for ~2 weeks to make sure they don’t develop any disease and introduce disease into the flock.
	+ Only buy good clean feed
	+ Don’t let other people that have chickens interact with your chickens especially if there is disease around

##### Participants are to complete the following key concept statements in their workbooks

* Key concepts

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements.

Transmission refers to the spread of an infectious agent from one host to another susceptible host.

Portal of entry refers to how an infectious agent gains entry into a host animal to establish infection.

Portal of exit refers to how an infectious agent exits the infected host to be transmitted into a susceptible host to establish a new infection.

Spread refers to the movement of infection from an infected population to a susceptible population

* Monitoring
* Facilitator’s observation of participants – The participant contributions to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants - Key concepts are filled out correctly in participant’s workbook

# Session 7: Disease Investigation 1

* Materials needed
* Video file - T1a\_6
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercises- Discussion of video content
* Group exercises - Small group discussion and answering of workbook questions
* Key concepts
* Method of assessment
* Session objectives

3.1 Describe the approach to a new disease investigation

3.2 Relate the obtained diagnostic information to differential diagnoses

Session steps

##### Introduction to Session 7

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this section we will be going through the material found in sections 3.1 to 3.2 of the Basic Field Epidemiology Manual.

After this introduction I will play the video we can discuss the content presented after the video concludes. This will allow you to explore the topic area talked about and tell some stories of where you may have seen these things during your work.

Following this discussion there are some exercises and examples to work through. These can be found in you workbook under Session 7: Disease Investigation 1.

##### Describe course objectives

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()For this session the learning objectives are to be able to ….

3.1 Describe the approach to a new disease investigation

3.2 Relate the obtained diagnostic information to differential diagnoses

##### Play video or present content

Play video if available *-* **T1a\_6**

##### Discuss content

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this video we learnt about the importance of the history, clinical exam, the examination of the environment, and collecting samples for laboratory testing when starting a disease investigation. Let us discuss any points that you are not sure of first?

##### Activity

* Group Exercise: Investigation of abortion in pigs

Divide the participants into small groups which are different to the last session. Each group is to work through the following questions. Participants are to write the answers to the questions in their workbook.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Now we are in small groups you need to work through the following questions. At the end, when everyone is finished we will discuss each question and the answers.

Firstly there is a little background information you will need to read, this is in your workbooks.

Background information:

You notice that the number of pig abortions reported to iSIKHNAS in your area is higher when compared to other areas.

You ask iSIKHNAS for a report of investigations into abortion in pigs. You receive the report from iSIKHNAS and look at the data thoroughly. You notice that a definitive diagnosis (infectious agent) is found in about 25% of cases where specimens were submitted to the laboratory.

From your Epidemiology training you know the presence of an infectious agent does not necessarily mean that it is the cause of disease. Sometimes the laboratory isolates 2 or 3 agents from the same sample that is submitted. This is most likely due to the difficulties in investigating abortions rather than a problem with the laboratory.

You begin to discuss with farmers how they and you might investigate cases of abortion to determine what might be causing the disease in pigs in your area.

Q1 - Discuss how this sort of disease problem might be investigated in your area and what steps you would take.

**Answer to Q1** – this is for group discussion and the answers may vary depending on the area the participants are from and the prevalence of diseases within that area.

The overall concepts that need to be covered in their answer are:

* Determine the history of the problem in your area, host, animal, and environment. Is this only reported in commercial piggeries or is the problem reported evenly between commercial and village producers.
* Determine a differential diagnosis list.
* Discuss developing an epidemiological approach to the investigation as this is a disease in multiple animals and multiple locations.

Differential Diagnosis list for abortions in pigs



Q2 - What problems are often experienced during disease investigations that may interfere with your ability to identify the causes?

**Answer to Q2** – this is for group discussion and the answers may vary depending on the area the participants are from.

Some general issues are:

* Time delays in reporting to iSIKHNAS, visiting the property, collecting the sample, transport of sample to laboratory
* Getting help from the Dinas Vet.

Q3 - Are all abortions in pigs reported in your area? What happens to the early foetuses that are too small to see or be noticed? How do you investigate these cases?

**Answer to Q3** – this is for group discussion and the answers may vary depending on the area the participants are from and the prevalence of diseases within that area.

To investigate abortions that are too small to be see or noticed you the participants need to consider measuring reproductive performance. A performance indicators such as the number of pregnancies that result in live piglets can be used to track the number of unseen abortions on one farm or across a number of farms.

Q4 - How might missed cases affect an investigation?

**Answer to Q4** – the missed cases will cause you to underestimate the size of the problem and will cause a problem in finding cases to investigate. Farmers may also be unwilling to participate as they may not be convinced there is a problem.

##### Participants should complete the key concept statements in their Workbooks

* Key concepts

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements.

The four activities of the first part of a disease investigation are:

1. The history

2. Clinical examination

3. Examination of the environment

4. Collection of the samples for laboratory testing

* Monitoring
* Facilitator’s observation of participants – The participant contributions to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants - Key concepts are filled out correctly in participant’s workbook

# Session 8: Disease Investigation 2

* Materials needed
* Video file - T1a\_7
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercise - Discussion of video content
* Group exercise - Small group discussion and answering of workbook questions
* Key concepts
* Method of assessment
* Session objectives

3.3 Outline the field epidemiological approach to disease investigations

3.4 Describe the cases and assign animals to cases and non-cases based on initial findings

Session steps

##### Introduction to Session 8

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this section we will be going through the material found in sections 3.3 to 3.4 of the Basic Field Epidemiology Manual.

After this introduction I will play the video we can discuss the content presented after the video concludes. This will allow you to explore the topic area talked about and tell some stories of where you may have seen these things during your work.

Following this discussion there are some exercises and examples to work through. These can be found in you workbook under Session 8: Disease Investigation 2.

##### Describe course objectives

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()For this session the learning objectives are to be able to ….

3.3 Outline the field epidemiological approach to disease investigations

3.4 Describe the cases and assign animals to cases and non-cases based on initial findings

##### Play video or present content

Play video if available *-* **T1a\_7**

##### Discuss content

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this video we learnt about when to use the epidemiological approach, what case definitions are and why they are important, and how to assign animals as cases or non-cases. Let us discuss any points that you are not sure of first?

##### Activity

* Group Exercise: Investigation of abortion in pigs – continued

Divide the participants into small groups which are the same as the last session. Each group is to work through the following questions. Participants are to write the answers to the questions in their workbook.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Now in your groups you need to work through the following questions. At the end, when everyone is finished we will discuss each question and the answers.

Firstly there is a little background information you will need to read, this is in your workbooks.

Background information:

During this period you know there has been an increase in vaccination within your areas and this has not seemed to reduce the number of abortions. You heard that overseas there may be some newly identified causes of abortion in pigs. You start to consider that the role of an infectious agent may not be the cause of the increase in abortion in your area.

Q1 - What are the main reasons to conduct an epidemiology investigation into this increase in abortion in pigs?

**Answer to Q1** – During the last session a differential diagnosis list may have been discussed. The main reasons for investigating abortions in pigs are:

* It could be an exotic disease
* It could be a zoonotic disease
* It could be a new emerging disease
* It has an animal health impact and decreases production
* It has a financial impact on the farmers and to your district and Indonesia

Q2 - The initial case definition for your investigation into abortion in pigs is provided by iSIKHNAS. Discuss the strengths and weaknesses of this case definition and the associated information.

**Answer to Q2** – this is for group discussion and the answers may vary depending on the area the participants are from. The participants may use different codes to report this disease. Get them to write a list on the Flipchart paper and discuss the results.

In general the iSIKHNAS definitions used to report disease will be broad and not very specific for a target disease.

* Strengths – being broad all potential cases will be reported. This helps insure no cases are missed.
* Weakness – being broad cases not of interest can be included. This can cause an overestimation of the disease problem.

For a more detailed (epidemiological) investigations a special case definition needs to be developed for the situation that you are investigating.

Q3 - In groups develop a case definition for pig abortion that may be used in your epidemiologic investigation.

**Answer to Q3** – this is for group discussion and the answers may vary depending on the area the participants are from. Get participants to write a list on the Flipchart paper and discuss the results.

Participants need to consider the following things when developing a case definition

* Confirmed, suspect, non-case
* Host (male, female, foetus)
* Agent (differential diagnoses)
* Environment (location, population density, etc.)
* Time
* Management (Artificial insemiantion)

##### Participants should complete the key concept statements in their Workbooks

* Key concepts

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements.

A case definition is a set of standard criteria for deciding whether an individual study unit of interest has a particular disease or other outcome of interest.

A case is an animal that is affected by the disease.

An animal that is healthy and does not meet the case definition can be called a non-case.

* Monitoring
* Facilitator’s observation of participants – The participant contributions to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants - Key concepts are filled out correctly in participant’s workbook

# Session 9: Collecting data and counting cases

* Materials needed
* Video file - T1a\_8
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercise - Discussion of video content
* Group exercise - Small group discussion and answering of workbook questions
* Key concepts
* Method of assessment
* Session objectives

3.5 Describe how you would collect data on cases and non-cases

3.6 Use counting of cases and local populations (animals in one or more areas) to describe patterns of disease

Session steps

##### Introduction to Session 9

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this section we will be going through the material found in sections 3.5 to 3.6 of the Basic Field Epidemiology Manual.

After this introduction I will play the video we can discuss the content presented after the video concludes. This will allow you to explore the topic area talked about and tell some stories of where you may have seen these things during your work.

Following this discussion there are some exercises and examples to work through. These can be found in you workbook under Session 9: Disease Investigation 3.

##### Describe course objectives

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()For this session the learning objectives are to be able to ….

3.5 Describe how you would collect data on cases and non-cases

3.6 Use counting of cases and local populations (animals in one or more areas) to describe patterns of disease

##### Play video or present content

Play video if available *-* **T1a\_6**

##### Discuss content

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this video we learnt about how to collect data and how to look at the data by time, animal, and place to describe patterns of disease. Let us discuss any points that you are not sure of first?

##### Activity

* Group Exercise: Investigation of abortion in pigs

Divide the participants into small groups which are the same as the last session. Each group is to work through the following questions. Participants are to write the answers to the questions in their workbook.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Now in your group you need to work through the following questions. At the end, when everyone is finished we will discuss each question and the answers.

After Question 1 there is some more background information you will need to read, this is in your workbooks.

Q1 - Discuss possible way you would collect the data of cases and non-cases with the new case definition for you investigation.

**Answer to Q4** – this is for group discussion and the answers may vary depending on the area the participants are from.

* Outline the first steps that will be taken when conducting a visit to a property that have cases that fit the cases definition

Background information

Using the case definition you decided on in the Session 8 farms were identified that had previous cases. These farms were then monitored from the start of 2014 for 4 months as part of an initial investigation. Farms 4 and 14 did not participate in the study because they sold all their pigs at the end of 2013. Below is some of the data that was collected.



Q2 - In groups create an epidemic curve to explore this disease problem over time.

Answer to Q2



Q3 – Discuss what information this epidemic curve can tell us about the problem.

**Answer to Q3 –** The epidemiological curve does not show a typical rise and fall pattern as seen with contagious diseases outbreaks. This epidemic curve could be due to a mixture of the normal background rate of abortions and a possible non-contagious cause of abortion. These two factors would produce a relatively level pattern of disease over time as seen here.

Q4 - On the village map below of farms included in the investigation mark the farms with and without abortions. Describe the disease problem by place - farm.

**Answer to Q4**

* Of the 14 farms that met the case definition and were included in the investigation data was collected on a total of 26 sows.
* 11 (42%) sows aborted and 15 (58%) sows farrowed.
* The 11 sows that aborted came from 4 of the 14 farms (farms- 2, 7, 8, and 16).
* Farms 7 and 8 accounted for 9 of the 11 abortions (82%).





Q5 - Describe the disease problem by host characteristics – age, age group, treatment

**Answer to Q5 –**

The 26 pigs ranged from 1 year of age to 8 years of age. There were 4 abortion in 1 year old sows, 5 abortion in 2 year old sows, 1 abortion in a 4 year old sow, and 1 abortion in a 6 year old sow.

1 and 2 year old sows accounted for 9 (82%) of the abortions.

All the 1 and 2 year old sows came from farms 7 and 8.

6 (55%) of the sows that aborted were treated for disease during their pregnancy.







Some participants may look at treatments by the individual farm. This is possible but as been left out for the majority of participants to keep the example less confusing.

Q6 - Discuss how looking for patterns of disease has helped you develop ideas about possible causes.

**Answer to Q6 –** From the simple analysis above we can get a better understanding of the disease problem and possible causes. By looking for patterns in time, animal, and place we can get the following insights

* Most of the cases are from farms 7 and 8
* Most abortions are in pigs 1 or 2 years of age.
* More than half of the sows that aborted were treated for
* The abortions on farms 2 and 16 maybe background abortions. These are abortions that would occur normally and may not be associated with abortions on farms 7 and 8. The evidence for this idea is the sows on that aborted on farms 2 and 16 are 4 and 6 years old respectively. Whereas sows on farms 7 and 8 are 1 and 2 year olds. Additionally farms 2 and 16 are not in close proximity to farms 7 and 8

##### Review key concepts and complete workbook

* Key concepts

Participants are to complete the following key concept statements in their workbooks

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements.

In order to describe occurrence of disease we need to count cases and non-cases on the affected farms.

* Monitoring
* Facilitator’s observation of participants – The participant contributions to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants - Key concepts are filled out correctly in participant’s workbook

# Session 10: Making sense of the data you collect

* Materials needed
* Video file - T1a\_9
* Session structure

This session is structured as follows

* Introduction to the session and learning objectives
* Play the video associated with this session
* Group exercises - Discussion of video content
* Group exercise - Small group discussion and answering of workbook questions
* Key concepts
* Method of assessment
* Session objectives

3.7 Outline how data analysis methods could be used to describe the extent and severity of disease.

3.8 Outline how you would develop ideas on possible causes and control measures

Session steps

##### Introduction to Session 10

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this section we will be going through the material found in sections 3.7 to 3.8 of the Basic Field Epidemiology Manual.

After this introduction I will play the video we can discuss the content presented after the video concludes. This will allow you to explore the topic area talked about and tell some stories of where you may have seen these things during your work.

Following this discussion there are some exercises and examples to work through. These can be found in you workbook under Session 10: Disease Investigation 4.

##### Describe course objectives

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()For this session the learning objectives are to be able to ….

3.7 Outline how data analysis methods could be used to describe the extent and severity of disease.

3.8 Outline how you would develop ideas on possible causes and control measures

##### Play video or present content

Play video if available *-* **T1a\_9**

##### Discuss content

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()In this video we learnt about to use data that has been collected to describe a disease problem, do some simple analyses and look at the attack rate between groups and then how to use this information to come up with ideas on possible causes and how to control it. Let us discuss any points that you are not sure of first?

##### Activity

* Group Exercise: Investigation of abortion in pigs - continued

Divide the participants into small groups which are the same as the last session. Each group is to work through the following questions. Participants are to write the answers to the questions in their workbook.

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()Now in your group you need to work through the following questions. In the next session each group will present their answers for question 3 and 4. So use this time to work out the answers and there will be time in the next session to finalise you presentation. After the presentation we will get everyone as a group to give feedback on your groups presentation.

Q1 – Calculate attack rate of abortion for sows 1 and 2 years of age and compare this with the attack rate for sow older than 2 years of age.

**Answer to Q1 –**



* the attack rate for sows receiving treatment for a disease during pregnancy is

$$\frac{9}{9+1}=0.90=90.0 \%$$

* the attack rate for sows receiving treatment for a disease during pregnancy is

$$\frac{2}{2+14}=0.125=12.5 \%$$

* We can compare these two numbers as 90% vs. 12.5% or we can calculate a Relative Risk. This is interpreted as sow that are 1 or 2 years of age are 7.2 times more likely to have an abortion.

$$\frac{0.9}{0.125}=7.2$$

Q2 – Calculate attack rate of abortion for sows receiving treatment for a disease during pregnancy and compare this with the attack rate for sows not receiving treatments.

**Answer to Q2 –**



* the attack rate for sows receiving treatment for a disease during pregnancy is

$$\frac{6}{6+3}=0.667=66.7 \%$$

* the attack rate for sows receiving treatment for a disease during pregnancy is

$$\frac{5}{5+12}=0.294=29.4 \%$$

* We can compare these two numbers as 66.7% vs. 29.4% or we can calculate a Relative Risk. This is interpreted as sows that were treated for a disease during pregnancy are 2.3 times more likely to have an abortion than sows that were not treated for a disease during pregnancy.

$$\frac{0.667}{0.294}=2.3$$

Q3 – Draw conclusions on the investigation up until this point. Outline your ideas of possible causes of disease. What ideas do you have for further disease investigations?

**Answer to Q3 –**

There were 14 farms involved in the investigation and data was collected on a total of 26 sows. 11 (42%) sows aborted and 15 (58%) sows farrowed. The 11 sows that aborted came from 4 farms (farms- 2, 7, 8, and 16). Farms 7 and 8 accounted for 9 of the 11 abortions (82%).

The 26 pigs ranged from 1 year of age to 8 years of age. There were 4 abortion in 1 year old sows, 5 abortion in 2 year old sows, 1 abortion in a 4 year old sow, and 1 abortion in a 6 year old sow. 1 and 2 year old sows accounted for 9 (82%) of the abortions. All the 1 and 2 year old sows came from farms 7 and 8.

The epidemic curve does not show a typical rise and fall pattern as seen with a contagious disease outbreaks. This epidemic curve could be due to a mixture of the normal background rate of abortions and a possible non-contagious cause of abortion. These two factors would produce a relatively level pattern of disease over time as seen here.

The abortions on farms 2 and 16 maybe background abortions. Background abortions are abortions that would occur normally and may not be associated with abortions on farms 7 and 8. The evidence for this idea is the sows on that aborted on farms 2 and 16 are 4 and 6 years old respectively. Whereas sows on farms 7 and 8 are 1 and 2 year olds. Additionally farms 2 and 16 are not in close proximity to farms 7 and 8.

Sows that were 1 or 2 years of age were 7.2 times more likely to have an abortion than sows that were older. Additionally we found sows that were treated for a disease during pregnancy were 2.3 times more likely to have an abortion than sows that were not treated for a disease during pregnancy.

Possible cause of disease could be

* The cause of disease need to be related to farms 7 and 8 and to younger pigs. There are many possibilities for this from
	+ Infectious disease that affect pigs but due to immunity in older pigs abortions are not seen as often in older pigs. Younger pigs are more susceptible due to lack of immunity. Example disease - influenza
	+ Nutritional cause. Example - younger sows are fed a supplement or poorer feed that is not fed to older sows
	+ Management issues of younger sows. Examples - younger sows are kept in a different area or managed different to older sows. There may be access to toxins, treatments

Possible further investigations need to be consulted with the Dinas veterinarian. These further investigations could include a detailed investigation into farms 2, 7, 8, and 9. Especially an environmental examination and detailed treatment and feed history. A new case definition and new cases to have laboratory samples submitted. Detailed data on cases and non-cases to be collected. Advanced epidemiological investigation may be conducted.

Q4 - What possible disease control measures are there?

**Answer to Q4 –**

Possible disease control measures include

* Farms do not bring new pigs into their farm – biosecurity measures to try and prevent entry of an infectious cause
* Keep young sows and old sows separate to prevent possible spread of infection between groups
* Movement restriction – affected farms are not to move pigs off their property. If it is an infectious causes then reducing the number of infected properties and therefore total number of infected animals
* After site visits look to control possible management issues and/or possible feed supply and access to toxin issues.

##### Complete the key concepts in the Workbook.

* Key concepts

Participants are to complete the following key concept statements in their workbooks

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()If there are no more questions or discussion points, then in your workbook fill in the words that are missing in the key concept statements.

We analyse data to describe patterns of disease and identify possible causes and control measures.

* Monitoring
* Facilitator’s observation of participants – The participant contributions to group discussion or exercises are of acceptable quality and quantity
* Facilitator’s observation of participants - Key concepts are filled out correctly in participant’s workbook

# Session 11: Using an epidemiological approach to routine cases

* Materials needed
* Facilitator’s notes and a copy of the participant’s manual
* Computer and projector
* Flipchart paper and markers
* Whiteboard and pens
* Course evaluation forms
* Session structure

This session is structured as follows

* Summary of the training course and learning objectives
* True and false questions
* Discussion and questions about the course
* Group exercise presentation – Investigation in abortions in pigs
* Course evaluation hand outs
* Session objectives

Review the course objectives

Commence the course evaluation process

Session steps

##### Introduction to Session 11

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()During this section we will be summarising the course, reviewing the course objectives and learning objective to see what we have learnt in the last 3 days.

You will then complete the True and False question on the entire course. These can be found in you workbook under Session 11: Disease Investigation 5.

We will then have time for questions about things that you don’t understand. As a group we will try and answer all the questions. If we cannot I will take note of the question and talk to the Dinas vet and find the answer for you.

##### Review course objectives

* Note to Facilitator

You to go over the course objectives to remind the participants what the aim of their learning was over the last 3 days. If participants have any questions or concerns address them as they are raised.

* Course objectives

![C:\Users\Catriona Mackenzie\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.IE5\GAPAK8AW\MC900442068[1].wmf]()For para-veterinarian to be able to use field epidemiology skills together with individual animal clinical skills to provide diagnostic, treatment and disease prevention services for the benefit of Indonesian livestock and their owners.

In order to achieve this, para-veterinarians working in village settings with limited resources need to be able to:

Explain the difference between sign or syndrome, disease and diagnosis;

Describe an approach to diagnosis of disease in animals that involves collection of evidence through history, clinical examination, environmental examination, laboratory testing and epidemiological investigation;

Assess and explain options for farmers to treat and prevent diseases in their livestock;

Contribute data and information into and use information derived from relevant Animal Health Information Systems such as iSIKHNAS to assist in the above activities.

##### Review learning objectives

* Note to Facilitator

Now go over the learning objectives and which day/session they were addressed in. Again this is to remind the participants what their learning was over the last 3 days. If participants have any questions or concerns address them as they are raised



##### True and False Questions

Facilitator

Please complete the True and False question now. These can be found in you workbook under Session 11: Disease Investigation 5.

|  |  |  |  |
| --- | --- | --- | --- |
|  | Statement | TRUE | FALSE |
| Session 2 | 1. Epidemiology is the study of the patterns and causes of disease in individuals
 | T | F |
| 1. Epidemiology draws on information from multiple disciplines (clinical veterinary medicine, pathology, microbiology, and others) to draw conclusions about the nature of disease in a population.
 | T | F |
| 1. Patterns of disease at a population level can be described and analysed to help understand the cause and behaviour of disease.
 | T | F |
| 1. Epidemiology skills should be used together with individual animal clinical skills, to provide better animal health services to livestock owners.
 | T | F |
| Session 3 | 1. Disease in animals always has an effect on production
 | T | F |
| 1. A syndrome is a collection of signs
 | T | F |
| 1. A definitive diagnosis is only reached when multiple pieces of diagnostic information agree that one disease is significantly more likely than any other
 | T | F |
| Session 4 | 1. There is only one cause of disease
 | T | F |
| 1. The host’s characteristics are the only things that influence if disease occurs in an individual
 | T | F |
| 1. Causal webs are helpful to show relationships between different causes of disease
 | T | F |
| Session 5 | 1. Some contagious diseases can spread through susceptible population of animals very quickly
 | T | F |
| 1. All infectious agents are contagious
 | T | F |
| 1. Once an animals is exposed to an infectious agent, the number of days till signs of disease are seen is referred to as the incubation period
 | T | F |
| Session 6 | 1. Carrier animals are able to excrete the infectious agent
 | T | F |
| 1. Some infectious agents can be transmitted through saliva
 | T | F |
| 1. People can act as a vector to spread infectious agents between populations of animals
 | T | F |
| Session 7 | 1. Taking a history requires asking the farmer about movements of animals on and off the farm
 | T | F |
| 1. The value gained from an environmental examinations is based on knowledge of how to perform a clinical exam
 | T | F |
| 1. Information from the initial part of an investigation is not useful till laboratory results are received
 | T | F |
| Session 8 | 1. The epidemiological approach are important when there is a rapidly spreading disease.
 | T | F |
| 1. The advantage the epidemiological approach is that you can often draw conclusions about the likely causes or possible control measures.
 | T | F |
| 1. A case definition criteria cannot be altered during an investigation
 | T | F |
| Session 9 | 1. Collecting data on cases and non-cases only involves the clinical examination of animals.
 | T | F |
| 1. A highly contagious disease produces an epidemic curve that has a steep rise and a progressive decline.
 | T | F |
| 1. Describing patterns of disease by time, animal, and place helps us understand the disease, its impact, and helps to explain how and why the disease occurred.
 | T | F |
| Session 10 | 1. There are only a few ways to analyse data that is collected to help us understand the disease.
 | T | F |
| 1. Attack rates are a useful way of comparing the proportion of animals affected based on other factors such as age.
 | T | F |
| 1. Often control measures can be implemented after the initial investigation and modified after more information is available from the epidemiological investigation.
 | T | F |

Answers to True and False Questions

1. False
Epidemiology is the study of the patterns and causes of disease in populations, not individuals
2. True
Epidemiology does use information from many sources to draw conclusion
3. True
4. True
5. True
6. True
7. True
8. False
There are multiple causes of disease. Many things need to occur for an animal to become diseased
9. False
Host, Agent, Environment factors determine if a disease is occurs in an individual
10. True
11. True
12. False
All contagious agents are infectious but not all infectious agents are contagious.
13. True
14. True
15. True
16. True
17. True
18. False
The value gained from environmental examinations is based on the understanding about multiple cause of disease
19. False
Information from the initial part of an investigation is useful immediately to create a differential diagnosis list
20. True
21. True
22. False
The case definition criteria can be altered during an investigation if more detailed information, such as post mortem results, becomes available.
23. False
Collecting data on case and non-cases involves other activities such as taking the history from the farmer.
24. True
25. True
26. False
There are many ways to analyse data to help us understand the disease. There are many complex statistical analyses.
27. True
28. True

##### Discussion and questions about the course

* Note to Facilitator

Open the whole group up to discussing the course content, if there are any areas that participants feel that they are still not sure then you can revisit these areas in the manual, workbook, or watch the appropriate video again. If the group cannot answer the question then this question back to the Dinas vet to find the answer for the participant. This is useful feedback for the course developers as well.

##### Activity

* Group Exercise: Investigation of abortion in pigs - presentations
* Note to Facilitator

Now have the participants return to the groups they have been working in for the Group exercise - Investigation of abortions in pigs. Each group is to present their answers for Q3 and Q4 from session 10.

After each group get everyone to comment on their presentation. Not only comment on content and ideas about the disease investigation but also comment on presenting style and how clearly they communicated.

* Monitoring
* Facilitator’s observation of participants – The participant contributions to group discussion or exercises are of acceptable quality and quantity
* Course evaluation hand-outs

##### Participants are to complete the course evaluation forms

* Note to Facilitator

Hand out the course evaluation form to all participants. They are to fill these out and hand back to you before the participants leave.

# Session 12: Course Evaluation, Conclusion, and Closing

* Materials needed
* Participant certificates
* Session structure

This session is structured as follows

* Course evaluation
* Presentation of certificates
* Other presentations
* Conclusions
* Formal closing
* Session objectives

Session steps

##### Collect course evaluation forms

##### Presentation of participant certificates

##### Training course conclusions

##### Formal closing

# Annexe 1 Video Scripts

## Session 2 –

In this video we will discuss what Field Epidemiology is and how it can help you with your work and about how field epidemiology skills used *together* with clinical skills to allow you to provide better care for animals.

Para-veterinarians provide animal health services to livestock owners.

Para-veterinarians improve animal health and production by

• diagnosing,

• treating,

• and preventing disease in animals.

They are also a link between farmers and the government.

Para-veterinarians use clinical veterinary skills to examine, diagnose and treat sick animals.

This training will provide additional skills in field epidemiology. Field epidemiology skills will build on your clinical skills and help you to:

• understand causes of disease at the population level to explain why diseases are occurring, even when the cause may be unknown

• provide better disease treatment and prevention advice to farmers

Field epidemiology skills involve looking at diseases in groups of animals - the population level.

Field epidemiology skills will also help you provide good data to iSIKHNAS and to use iSIKHNAS information to help monitor, prevent, and treat disease within your area.

The following example illustrates the advantages of epidemiological skills.

We start with a single sick animal.

On Budi’s farm a single calf develops an abscess at the navel… where the umbilical cord attached to the calf during pregnancy.

The calf becomes depressed and stops drinking.

Pak Paimin the Para-veterinarian examines the calf, detects the swelling at the navel, diagnoses an abscess, and cuts it to drain the pus.

He also treats the calf with antibiotic so it can make a complete recovery.

This example involves veterinary clinical skills being applied to a single sick animal.

Now we extend the example to one where epidemiology skills are more useful.

On Soleh’s farm there are many cows and this season a large number of calves have been born.

Most of the calves have developed abscesses on the navel.

Soleh wants his animals treated so they can recover. He also wants to know why so many of this animals developed the disease,and what he can do to prevent it from happening again next year.

In this example, field epidemiology skills, together with veterinary clinical skills, allows you to investigate this sort of problem, treat the sick animals, as well as tell the owner why this might have happened and how he can prevent it from happening again.

Here are some more examples of the sorts of problem where field epidemiology skills, together with veterinary clinical skills will help you to provide better advice to animal owners.

Field epidemiology skills involve understanding why disease occurs at one place or time and not another.

Field epidemiology skills will help you to provide advice to animal owners to stop animals dying.

Field epidemiology skills will help you to investigate and control a disease even when the cause or causes may be unknown or not well understood

Field epidemiology skills will help you to explain how and why disease occurs through understanding the interaction between multiple causal factors

Now we go back to the earlier example where there are many sick calves at Pak Soleh’s farm.

Ibu Putri the Para-veterinarian visits the farm and examines the animals and the farm and talks to the owner.

She found all the calves that had abscesses on the navel were born in a small yard that was very dirty.

All the calves that were born out in paddocks on the grass were healthy.

She concluded that the calves were sick because they were born in a contaminated yard which exposed them to bacteria, this environmental situation most likely caused the increase in disease.

She advised Soleh that cleaning the calving yard or calving cows in clean pasture will help to reduce the risk of abscess in the future.

Field epidemiology skills helped Ibu Putri to understand why the animals had gotten sick and to make better advice to the farmer.

The take home messages from this story are:

Field Epidemiology will help you understand disease within populations and this will help explain why disease is occurring

The definition of Epidemiology is the study of the patterns and diseases in populations

To be a really good para-veterinarian, you need veterinary clinical skills and field epidemiology skills.

Together these two skills will help you provide better disease treatment and control advice to farmers.

Field epidemiology skills will also help you to use iSIKHNAS. Lots of para-veterinarians can enter data on animal health and disease into iSIKHNAS. The information which is available from iSIKHNAS will help you to monitor and control diseases within your area.

As farmers learn that you can provide better health care and advice, they will ask for your help more often.

There might then be more opportunity for Para-veterinarians to treat animals and increase their income.

Healthy animals are also more productive so farmers will make more money.

Epidemiology applies systematic, science-based approaches to study disease and causes of disease in a group of animals (population).

Epidemiology involves looking at the group of animals with the disease being investigated and other animals in the same location that did not get the disease.

Comparing these two groups often allows us to identify causes to explain why disease occurred.

The reason a disease occurs, at a particular time and place, and only in some animals and not others is because causes of disease are present for some animals and not for others.

If we can understand the causes then we may be able to develop management practices to prevent disease.

There are a number of diseases of animals in Indonesia that are capable of causing disease in humans.

Epidemiology skills will help you to identify the presence of zoonotic diseases and describe measures that you and others can use to prevent exposure to zoonotic diseases.