

2019 | Facilitator Guide

ONE HEALTH RISK ANALYSIS



This is a product of the One Health Central and Eastern Africa (OHCEA) for health professionals' training with support from the United States Agency for International Development (USAID).

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OHCEA
8 Countries
16 Universities
24 Institutions



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Preface

This module is One of the 16 One Health Training Modules developed by the One Health Central and Eastern Africa Network (OHCEA). OHCEA is an international network, currently of 24 institutions of higher education in public health, veterinary sciences, pathobiology, global health and environmental sciences. These are located in 16 universities in 8 countries in Eastern, Central and Western Africa regions. The universities currently forming OHCEA are: Universite des Montagnes and University of Buea (Cameroon), University of Lubumbashi and University of Kinshasa (DRC), Jimma University, Addis Ababa University and Mekelle University (Ethiopia), Moi University and University of Nairobi (Kenya), Université Cheikh Anta Diop (Senegal), Muhimbili University of Health and Allied Sciences and Sokoine University of Agriculture (Tanzania), University of Rwanda and University of Global Health Equity (Rwanda), Makerere University and Mbarara University of Science and Technology (Uganda).

The OHCEA network's vision is to be a global leader in One Health, promoting sustainable health for prosperous communities, productive animals and balanced ecosystems. OHCEA seeks to build capacity and expand the human resource base needed to prevent, detect and respond to potential pandemic disease outbreaks, and increase integration of animal, wildlife and human disease surveillance and outbreak response systems. The overall goal of this collaboration is to enhance One Health policy formation and implementation, in order to contribute to improved capacity of public health in the region. OHCEA is identifying opportunities for faculty and student development as well as in-service public health workforce that meet the network's goals of strengthening One Health capacity in OHCEA countries.

The 16 modules were developed based on One Health Core Competencies that were identified by OHCEA as key elements in building a skilled One Health workforce. This network is supported by two United States University partners: Tufts University and the University of Minnesota through the USAID funded One Health Workforce Project.

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OHCEA extends her gratitude to those who participated in earlier works that informed the development of this module as well as reviewers and editors of the module.

Sections/parts of the materials for this course were adopted from RESPOND SEAOHUN One Health Course Modules: <https://seahunonehealth.wordpress.com/ecosystem-health/>

- enable working across sectors and disciplines for a stronger and more effective public health sector.
- allow universities to be key drivers of the future workforce as they forge partnerships and drive change.
- combine human health, animal health, infectious diseases with principles of ecology and environmental sciences.

The modules can be used at both pre-service and in-service levels as full courses, workshops or integrated into course materials for professionals who impact disease detection, prevention and response, allowing them to successfully function as an integral part of a larger, multi-disciplinary, team of professionals. This is key to creating a stronger sustainable Public Health workforce.

Each module contains a Facilitator Guide, Student Guide, PowerPoint slides and a folder of resources/ references for users. These modules are iterative and are continuously being revised. For any inquiries, please email: OneHealthModules@ohcea.org or wbikaako@ohcea.org

These 16 modules were developed by collaborative efforts of multiple disciplines and teams of people from eight different OHCEA partner countries with the support of two US university partners namely Tufts University and University of Minnesota. A team of sixty (60) people were engaged in the development of these modules. All the materials represent contribution by the faculty and leadership of the OHCEA network institutions and the technical and managerial support of the OHCEA Secretariat. The modules were built off previous One Health modules developed by SEAOHUN- network: <https://seahunonehealth.wordpress.com/ecosystem-health/> with addition of more Africa-specific materials, examples and case studies relevant and applicable to the region. Each module was reviewed by OHCEA network faculty including US university partners with technical expertise as well as partners with field experience that allows for OH application and appreciation of the local African context.

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Overview of the One Health Risk Analysis Training

One Health is an important global approach based on the concept that human, animal and environmental health are interdependent. Therefore, professionals working in these areas best serve the population by collaborating to understand all the factors involved in disease transmission, ecosystem health, and the emergence of novel pathogens and emerging and re-emerging zoonotic agents, as well as environmental contaminants and toxins. These factors are capable of causing substantial morbidity and mortality, and impacting on socioeconomic growth, including in less developed countries (SEAOHUN, 2014). The One Health approach is a worldwide strategy for expanding and promoting interdisciplinary integrations, collaborations and communications in all aspects of healthcare for humans, animals and the environment (FAO, 2008).

Risk Analysis is a research tool that encompasses qualitative, deterministic and probabilistic health assessment, which requires interdisciplinary collaborations to effectively characterize risk. Risk can be defined as the likelihood of occurrence of an adverse event and the severity of the consequences if the result does occur. The tool is intended to provide decision-makers with an objective appraisal of the risk posed by a particular action and is important in assessing and overcoming public health threats.

This One Health Risk Analysis Training Module is one of the 16 One Health soft skills and technical modules developed by OHCEA. They combine human-animal health sciences, the occurrence of infectious disease and outbreak response with principles of ecology and environmental sciences, focused on One Health educational and training documents (modules.) The goal is to produce skilled and knowledgeable manpower on matters related to One Health. This module is intended to build the skills, knowledge and ability of participants to effectively look for answers to One Health related risk challenges beyond one's own discipline and to successfully function as an integral part of a larger, multi-disciplinary team of professionals. The module is also intended for training workshops targeting One Health professionals responsible for human, domestic animals, wildlife and ecosystem/environmental health interfaces.

The module will serve as a training material for multidisciplinary professionals and the processes involved in One Health risk identification, analysis, management, communication and forecasting (in view of environmental conditions, climate change, ever changing human behavior and practices) to promote and champion the One World-**One Health**-One Medicine aspirations.

Goals of the Training

This module is intended to help participants achieve the following goals:

- i) Understand the importance and application of One Health risk analysis.
- ii) Know how to conduct a One Health risk assessment using qualitative, semi-quantitative and quantitative techniques.
- iii) Understand how to implement One Health risk management.
- iv) Appreciate effective One Health risk communication.
- v) Appreciate gender diversity and mainstreaming in One Health risk analysis.

Learning Objectives of the Module

The learning objectives of the module are presented in the sub-modules section.

Training and Learning Methods

- i) Lectures by PowerPoint presentations, brainstorming, videos/movies, group discussions
- ii) Individual and group exercises, illustrative lectures, individual reflection, demonstrations
- iii) Observation site/facility visits (field visits), brain teasers (a pre- and post-training quiz)

Learning Materials

This Facilitator Guide is designed to be used with the following materials:

- i) Risk Analysis Reference materials
- ii) Risk Analysis Students Guide
- iii) PowerPoint presentations

Program

Session 1	Session 2	Session 3	Session 4	Session 5
<p>Introduction to One Health Risk Analysis:</p> <ul style="list-style-type: none"> • Concepts • Terminologies • Purposes • Principles • Components • Frameworks • Types, causes and methods of risk analysis 	<p>Overview of Risk Assessment:</p> <ul style="list-style-type: none"> • Principles • Approaches/ Methods: qualitative, semi-quantitative and quantitative • Steps • Risk assessment report write-up 	<p>Field Visit</p> <ul style="list-style-type: none"> • Performing actual risk assessment (exercises) • Presenting group exercises on the field risk assessment activity 	<p>Overview of Risk Management:</p> <ul style="list-style-type: none"> • Principles • Frameworks • Process • Steps • Stakeholder analysis (engagements) • Risk mobilizations • Risk mitigation • Monitoring and management • Characteristics of effective risk management strategies 	<p>Overview of Risk Communication:</p> <ul style="list-style-type: none"> • Principles • Concepts • Definitions • Strategies • Purpose • Elements • Challenges • Barriers, channels/ tools • Key One Health risk messages (mapping, development and summarization) • Consideration of drivers of socio-cultural norms, beliefs and values in One Health risk communication
Focus on One Health risk analysis concepts, types of risks and their sources	Focus on One Health risk assessment tools and procedures	Applying One Health risk assessment tools and approaches	Focus on One Health risk management process	Post training assessment, final training evaluation and closing remarks Departure

Target Audience

The module targets undergraduate and post-graduate learners, middle cadre trainees and in-service personnel from multiple disciplines and sectors (government, private, NGOs, and civil society) as well as policy makers. It can also be adopted for continuous professional development by health and health-related organizations and professionals such as medical, veterinary, pharmaceutical, nursing, public health, environmental and technology.

Session 1: Introduction To One Health Risk Analysis

Sub-module Overview





This sub-module provides an overview of the learning objectives and gives the participants an opportunity to learn more about one another's background, discipline, and skills, including the One Health concept. It also highlights the issues, terms and concepts of risk analysis in the context of One Health. By way of introduction, participants shall explore the types and sources of different One Health-related risks and the need for multi-stakeholder engagements.

Session on Learning Objectives and Activities

Learning Objectives

By the end of this session, the participants should be able to:

- i) explain the One Health concept.
- ii) define basic terminologies of One Health risk analysis.
- iii) describe the purpose of One Health risk analysis.
- iv) describe the components of the One Health risk analysis process.
- v) explain how One Health risk analysis framework is used.
- vi) describe types of One Health related risks.
- vii) apply risk analysis methods for prioritizing One Health related risks.

Time	Activity/Policy	Facilitator Instructions (More Facilitator Notes have been included at the end of the session)
 15 min	Registration 	<ol style="list-style-type: none">i) Have participants sign the OHCEA attendance register.ii) Explain logistics (e.g., breaks, meals, etc.).iii) Issue per diem.iv) If the short course is residential, check on housing accommodations.
 30 min	Welcome 	Facilitator welcoming remarks and introductions Participant introductions: <ol style="list-style-type: none">i) In pairs, have participants share their:<ul style="list-style-type: none">• Name• Where they are from• Type of work and position• The latest One Health activity they have been engaged inii) Let them prepare 1-minute introduction of their partner to the class.iii) Go around the room and have each pair present their partner to the class.

Expectations



Set up:

- i) Have two flipcharts in the front of the room: one titled “Expectations” and the other “Concerns.”
- ii) Give each participant two different colored sticky notes.
- iii) Ask participants to write down their expectations for the short course on one of the sticky notes (specify color) and their concerns about the course on the second sticky notes (specify color).
- iv) Have participants place their expectation sticky notes on a flipchart titled “Expectations” and their concerns sticky notes on another flipchart titled “Concerns”.
- v) Organize the sticky per common themes.
- vi) Explain the agenda for the week and the goals of the short course highlighting the expectations that will be met over the week and the expectations that will not be met. Comment and address concerns.

Goals of the Course

This module is intended to help participants achieve the following goals:

- i) Understand the importance and application of One Health Risk Analysis.
 - ii) Know how to conduct a One Health risk assessment using qualitative, semi-quantitative and quantitative techniques.
 - iii) Understand how to implement One Health risk management.
 - iv) Appreciate effective One Health risk communication.
 - v) Appreciate gender diversity and mainstreaming in One Health Risk Analysis.
- Explain that this course is sponsored by OHCEA. OHCEA is the One Health Central and Eastern Africa network comprised of 24 academic institutions from eight African countries consisting of Public Health and Veterinary schools with two US partners. The US partners are: Tufts University and the University of Minnesota. This project is funded through the USAID - Emerging Pandemics Threat 2 grant. OHCEA's vision is to be a global leader in One Health promoting sustainable health for prosperous communities, productive animals and balanced ecosystems. OHCEA seeks to expand the human resource base needed to detect and respond to potential pandemic disease outbreaks.



Guest Speaker and Pre-Test



- i) In advance, be sure the speaker is prepared to address the group. Share with the speaker the short course goals and desired outcomes and what you would like the speaker to emphasize in her/his address.
- ii) Introduce the invited guest speaker to “officially open the course.”
- iii) Pass out copies of the pre-test. Tell participants they have 15 minutes to complete the pre-test. Explain that a pre-test is used to gauge how much they will have learned over the week; a post-test will be administered at the end of the course. The two tests will be compared. There is no grade associated with the pre-test. When participants finish, they can begin their break.



120 min

Pre-Training Reading Material:



Send out the following 2 documents to participants to read before they come to the training:

One Health: Interdependence of people, other species and the planet by Meredith A. Barret and Steven. A. Osofsky.

<https://rmportal.net/groups/one-health-students-online-platform/one-health-interdependence-of-people-other-species-and-the-planet/view>

IUCN-OIE Guidelines for Wildlife Disease Risk Analysis

<https://portals.iucn.org/library/sites/library/files/documents/2014-006.pdf>

The participants should also watch the movie Contagion as it will be used as an example in the class.



15 min

Discovery Activity: What is One Health?



- i) Begin the session by having the participants watch the following videos:

One Health: from Concept to Action by CDC

<https://www.youtube.com/watch?v=TG0pduAYESA>

One Health: from Idea to Action:

<https://www.youtube.com/watch?v=gJ9ybOumITg&t=4s>

Briefly discuss the two videos with the participants.



20 min



- ii) Have each participant take 5-7 minutes to think about and legibly write down on separate sticky notes the answers to the following questions:
 1. Define One Health approach.
 2. Identify two examples of One Health in practice.
 3. Identify two to three advantages of multiple disciplines working together to promote One Health.
- iv) Have them display these sticky notes on the wall in the three separate sections. Then in a plenary, review the following:

1. What are the common things identified?
2. What are the differences?
3. Is there anything that surprised anyone?

Come up with a group description One Health.

There are many different definitions of One Health by different health organizations, but for purposes of this course, we will adopt the American Veterinary Medical Association (AVMA) definition of One Health (www.avma.org)

AVMA: One Health is defined as the integrative (collaborative) effort of multiple disciplines working together locally, nationally, and globally to attain optimal health for people, animals, and the environment. Together, the three make up the One Health triad, and the health of each is inextricably connected to the others in the triad.

The common theme of One Health is multiple disciplines working together to solve problems at the human, animal and environmental interface. Collaborating across sectors that have a direct or indirect impact on health involves thinking and working across silos and enhancing resources and efforts while valuing the role each different sector plays. To improve the effectiveness of the One Health approach, there is a need to create a balance and a greater relationship among existing groups and networks, especially between veterinarians and physicians, and to amplify the role that environmental and wildlife health practitioners, as well as social scientists and other disciplines play to reduce public health threats.

This presentation introduces One Health, the interdependence between humans, (PPP No. 1) animals and the environment and why disciplines need to work together. The session introduces One Health core competencies, answers the questions: Why One Health and why now? And introduces the idea of using One Health approaches to solve wicked problems.

Debrief the session by asking participants to reflect on what One Health is and any questions they may have related to the PowerPoint presentation.

As part of this presentation, discuss the One Health core competencies, and how risk analysis is a key competency required to be effective One Health change makers.



20 min

Overview of One Health Concepts





15 min

Discovery Activity: What is Risk Analysis



PPP No. 2

Introduce Risk Analysis

Give the participants two different sticky notes. On one sticky note, ask the participants to share different ideas of what they think risk and risk analysis is. On the second sticky note, ask the participants to give an example of something they would consider a risk and how they would analyze this risk. Place these sticky notes in two different piles. Afterwards, all the sticky notes should be read out aloud. Use this opportunity to identify what their ideas of risk are and what they think.

Risk can be defined as the likelihood of occurrence of an adverse event and the severity of the consequences if the result does occur. Risk analysis is a research tool that encompasses qualitative, deterministic and probabilistic health assessment. This tool requires interdisciplinary collaborations to effectively characterize risk. It is intended to provide decision makers with an objective appraisal of the risk posed by a particular action and is important in assessing and overcoming public health threats.

Other definitions of risk analysis:

- i) Decision-aiding method which, according to the OIE, involves hazard identification, risk assessment, risk management and risk communication.
- ii) Evaluation of the likelihood of entry, establishment and spread of a disease and the associated potential biological and economic consequences and its impact on the public.
- iii) The potential, likelihood or probability for realization of unwanted adverse consequences, to human or animal life, health, property, or the environment.
- iv) It is a systematic, disciplined approach for making food safety decisions, developed primarily in the last two decades. risk analysis is a powerful tool for carrying out science-based analysis and for reaching sound, consistent solutions to food safety problems. (WHO/FAO).

Inform the participants that there are two ways of looking at risk:

Inherent: this refers to assessing risk without explicitly labeling it as such for example in the fields of Epidemiology, Ecology, Engineering Business and Insurance, among others.

Codified: These are specific standardized processes that are supported by policy. Examples of this are:

- Codex Alimentarius (focuses on food safety)
- Invasive species (UN Convention on Biological Diversity)
- OIE-IUCN (related to animal movement)



45 min

**Discovery
Activity:
Importance
of
Risk Analysis**



This session allows participants to begin to think through questions they might want to answer when tackling a challenging scenario. It is an introductory teaser to risk analysis. Provide the participants with the following scenarios. The participants should think through and answer the questions:

1. Why is risk analysis important in this scenario?
2. What risks are you thinking of?
3. What questions would the risk analysis be answering/ seeking to answer?

Scenario 1:

El-Nino induced drought was reported to cause negative effects on human, animal and environmental health and productivity in parts of East Africa. Drought tends to have severe environmental, economic and social impacts. It aggravates environmental degradation through ecosystem and climatic effects, including deforestation, livestock feed shortage and overgrazing, soil erosion, forest fires, biodiversity loss and water pollution, and consequently, increased prevalence of diseases to humans and animals.

So far, it has resulted in shortage of feed and associated deaths and illness in animals and food and water shortage in the human population. To mitigate the impacts of the drought, Governments and other development partners are providing animal feed and veterinary services to drought affected animals and food and water aid to human populations.

Scenario 2:

There was a report by International Livestock Research Institute that milk and dairy feed in and around Addis Ababa, Ethiopia, were found to be contaminated with aflatoxins. Consequently, consumers panicked and stopped purchase of milk and milk products consumption fearing aflatoxicosis/aflatoxin residue. On top of this, imported milk products from different countries are being consumed throughout the country. To intervene, responsible government officials and experts addressed the public and reported that the concentration of aflatoxin in milk and dairy feed is less than the expected level and advised the public not to avoid purchasing local milk and its products.

Scenario 3

Wildlife trade, both formal and informal is a potential driver of disease introduction and emergence. The United States alone imported approximately 1.5 billion live animals between 2000 and 2006. This activity has a negative impact on wildlife conservation of threatened species that are traded, pushing certain populations to the border of extinction. Public health concerns associated with wildlife trade threats are reflected in proposed legislation.

Legislative proposals aim to prevent these risks by banning wildlife imports and creating “white lists” of species that are cleared for importation. These approaches pose economic harm to the pet industry and place substantial burden on importers and/or federal agencies to provide proof of low risk for importation of individual species. (Information from *Bueno et al: risk prioritization tool to identify the public health risks of wildlife trade: Zoonosis and Public Health 2014*)

At the end of this discussion, ask participants to suggest other scenarios from their own work/experience that they have worked on or witnessed and the reason why they think a risk analysis would be important.

On a sticky note, ask participants to list what they would consider as potential One Health related risks in their countries. One risk per note. Put the notes up on the wall and discuss them with the class.



60 min

Group Activity on the Codified Frameworks for Risk Analysis



Divide the participants into three groups. Each group is assigned one of the codified frameworks below.

- Codex Alimentarius (focuses on food safety)
- Invasive species (UN Convention on Biological Diversity)
- OIE (related to animal movement)

They have 45 minutes to research their framework, define what it means, and identify the risk analysis principles behind that framework. Each group then gets 10 minutes to present its framework in a plenary and the class will discuss these different frameworks. They should also identify at least one article or reading material related to the framework and share this with the class.

These articles will be added to the resource folder for them to use through-out the training.

Debrief by informing the participants that these frameworks will be used in this training throughout. (Frameworks are included in the PowerPoint presentations)



25 min

Risk Analysis Framing Question



It is important to come up with risk analysis questions before even embarking on the process of risk analysis. This encourages one to identify the problem, specify the research question and begin to analyze the difficult and easy parts to answer. Scoping the problem is the first step in any risk assessment.

The following questions must be considered prior to commencing detail assessment of the risk in question.

1. What is the specific hazard of concern?
2. What are the vector/vehicle/of the hazard of concern?
3. What specific risk do we want to assess?
4. What particular timeframe are we interested in?
5. What is the available budget?
6. Who should be involved?

Give some examples of risk analysis questions below and discuss these with participants based on the above principles. You may also ask the participants to give examples of risk analysis questions they are familiar with.

1. What is the risk of diseases being transmitted between gorillas and people at national parks in Rwanda?
2. What is the risk of contracting leptospirosis for young boys through swimming in Kuala Lumpur river?
3. What is the risk of introducing disease through the reintroduction of wildlife reared in zoos/sanctuaries into natural habitat?
4. What is the risk of using diclofenac in livestock for vulture populations?
5. What is the risk of Nairobi becoming an urban heat island?
6. What is the risk of adults in Addis Ababa developing Upper Respiratory Infections from vehicular associated air pollution?
7. What is the risk of a *boda boda* driver in Kampala being hit by a car?
8. What is the risk of zoonotic disease transmission from African rodents imported to the United States causing an outbreak in humans?
9. What is the risk of antimicrobial use in aquaculture for watersheds?
10. What is the risk for the introduction of HPAI H5N1 (through migratory birds / poultry trade/wild bird trade) into (wild bird/domestic/human population?) in a given country?

Discuss the fact that risk questions can be broad or specific but they must have these three components:

- A specific hazard....
- In a specific population...
- In a specific place...

A fourth component may be added

- In a specific timeframe (in assessment of relative risks, this might not be added)

For example: specific hazard- antimicrobials

- Specific population- Aquaculture
- Specific place- watersheds



40 min

Video - Deadly Animals Among Us



Show the video - Deadly Animals Among Us - Killer outbreak series (youtube.com/watch?v=lpOKSE4F_6Y8gl=UG) (or a similar video to this one). This video tells the story of the 2003 outbreak of Monkey pox in humans in the US. This outbreak originated from Prairie dogs that had been infected by an African rat imported into the United States.

After watching this video, the participants will break into pairs and each group should come up with a risk analysis question based on the video. Discuss these questions in the plenary with a focus on the above points. They need to ensure that they can include/ identify a specific hazard, a specific population, and a specific place in their question.

They should list who they consider to be the vulnerable populations in this video - their list will include people like pets and pet owners, hospital workers, nurses, doctors, emergency workers, veterinarians, epidemiologists, pet distributors and sellers, people who own other types of livestock that could transmit the disease.

This video will be used throughout the class this week to tackle various aspects of risk analysis and to guide participants through the process of risk analysis.

In looking at risk analysis, other key questions that should be asked are:

1. Who/what/where is at risk?
 - Individual
 - General population
 - Life stages such as juveniles or adults
 - Population sub-group
2. What are the hazards of concern?
 - Environmental
 - Physical (changes to a habitat)
 - Chemical (single, multiple, cumulative risk)
 - Mechanical (traffic accidents, injuries at work)
 - Microbiological or biological (disease or invasive species)
 - Nutritional (for example fitness or metabolic state)
 - Psychosocial - depression, isolation, work stress, loss of livelihoods
 - Natural resources to community, noise, "invasions", war

These questions are important for risk analysis but also add a One Health component to the whole process.

Potential question: What is the risk of zoonotic disease transmission from African rodents imported legally to the United States causing an outbreak in humans? This potential question was quite specific e.g.

- Focused on a species - African rodents, instead of just all animals imported into the US.



30 min

Case Study: Mining in Lake Tshangalele



- Instead of just focusing on a disease, specified zoonotic disease which narrowed it down further.
- Geographic region - specified Africa, which means not all rodents but only those endemic to Africa

Have the participants read the case study on mining in Lake Tshangalele.

Mining in Lake Tshangalele



In a plenary session, review this case study;

1. What are some possible risk analysis questions?
2. Who is at risk?
3. What is at risk?
4. Where is the risk?
5. What are the hazards of concern?

Let them come up with one question related to animals, one related to humans and one related to the environment.

Divide the participants into 4 main groups.

Assign the following four topics:

- Bush meat consumption and hemorrhagic fevers
- Rift Valley Fever outbreak in Uganda
- Asian Vulture Crisis in India
- Lead poisoning in Flint Michigan

Inform the participants that the topic assigned to them will be their risk analysis topic throughout the week and they will take responsibility to research on that topic and know as much as possible about it. Give them 15 minutes to think through a risk analysis question related to their topic and to present that question to the rest of the groups for discussions. As a take home assignment, they will be required to do some preliminary research on their topic.



30 min

Components of Risk Analysis



Introduce the different components of risk analysis

In this section, present the different components of risk analysis. These will then be reviewed in the ensuing sections one by one. Based on the OIE Framework, risk analysis constitutes four steps: hazard identification, risk assessment, risk management and risk communication.

It is easier to think of the sections this way.

Hazard Identification

1. What can go wrong?
2. How can it go wrong?
 - pathogens introduced
 - importation/re-introduction, etc.

Risk Assessment

1. How likely is it?
2. What is the probability of something going wrong?
3. What are the consequences?
 - L, M, H – Probability, %

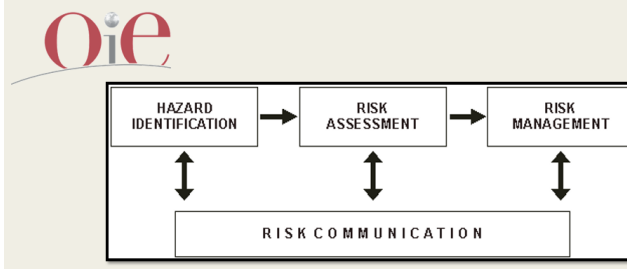
Risk Management

1. How do we minimize risk?
2. What can be done to reduce the likelihood or minimize the consequences?
 - Testing, vaccination, health certification, regulation

Risk Communication

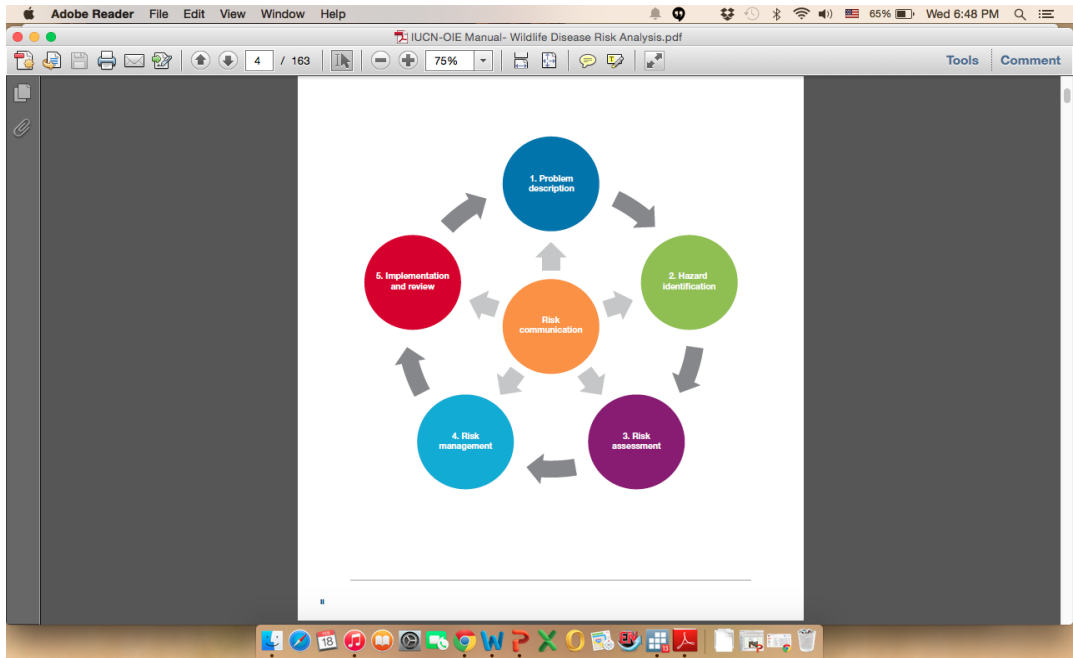
1. Who are the people or stakeholders involved?
2. Do people understand?
 - Keep all stakeholders involved

World Organization for Animal Health



Although these OIE Guidelines are for animal movement specifically livestock, they can be used across the board. There are newer guidelines - OIE/IUCN Guidelines for wildlife disease risk analysis. (**Guidelines are in the resources folder**).

Some teams add extra components to the risk analysis model as below:



Above image obtained from IUCN Guidelines for disease risk analysis



10 min

Session Debrief



Debrief the session by summarizing the major key points. Remind participants to research their topic as this will be key for the next day's sessions.

Session 2: Risk Assessment

Time

Activity/Policy

Facilitator Instructions



10 min

Introduction



This session deals with One Health risk assessment. It has been designed to help participants understand basic information about the definition, principles, purpose, steps, methods, approaches, tools as well as qualitative, semi-quantitative and quantitative risk assessment and how to report results of risk assessment. With this, the participants will be able to achieve the following learning objectives.

Learning Objectives

Participants will be able to:

- i) define the different hazards and begin to construct a model for that.
- ii) define risk assessment and learn its purpose.
- iii) describe the principles, methods/ approaches of One Health risk assessment.
- iv) differentiate among qualitative, semi-quantitative and quantitative risk assessment techniques.
- v) list the steps of qualitative and quantitative One Health risk assessment.
- vi) apply theoretical knowledge and practical skills to conduct qualitative, semi-quantitative and quantitative One Health risk assessments.



30 min

Group Activity- Review of the Risk Question



Start this session by allowing the participants 20 minutes to work on their risk analysis question for their specific topic. Each group should then present their question to the plenary. The plenary should help them to refine the question or make it better. After all groups are comfortable with their question, you can then move forward.



15 min

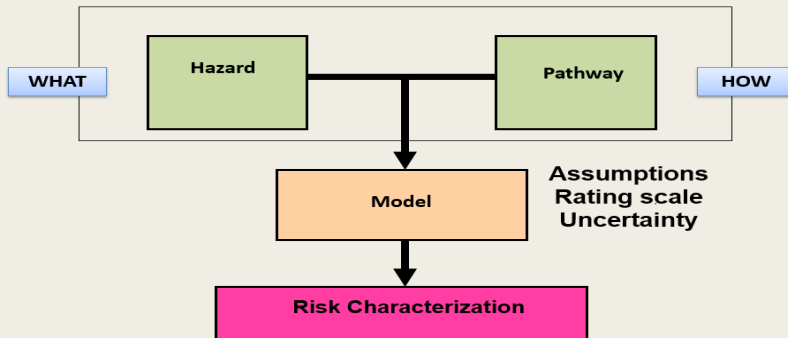
Introduction to Risk Assessment



Present the image below to the class and in a plenary, discuss the simple model. Hazard identification is most of the time included under the risk assessment process as seen below.

Risk assessment evaluates the probability of entry, the establishment or spread of a disease or contagion (hazard) under existing conditions (pathway), predetermined control measures, and the associated potential biological and economic consequences of the establishment of the disease (risk characterization).

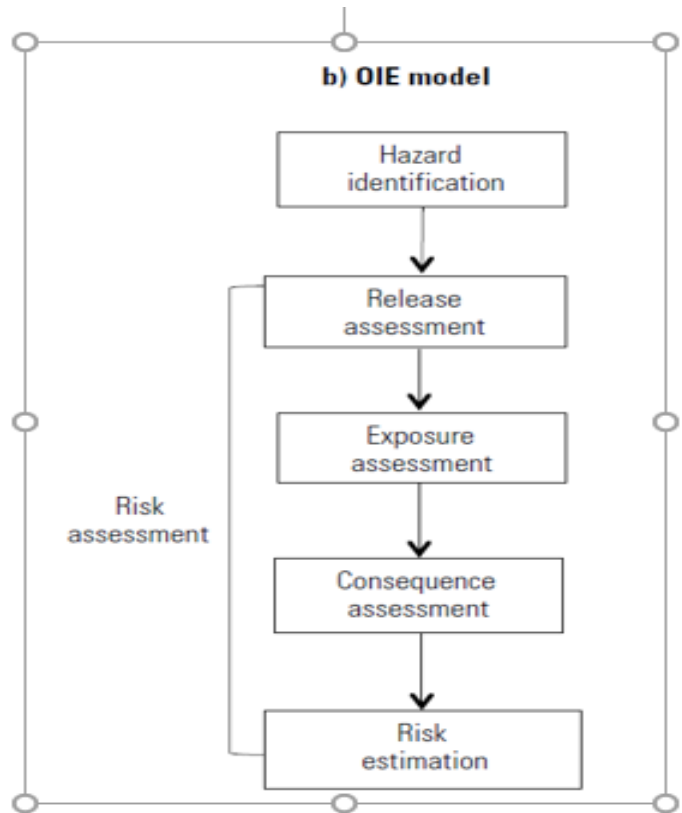
Risk Assessment



Risk assessment is a systematic, evidence based approach for quantifying and describing the nature, likelihood and magnitude of risk associated with the current condition and the same values resulting from a changed condition due to some action.

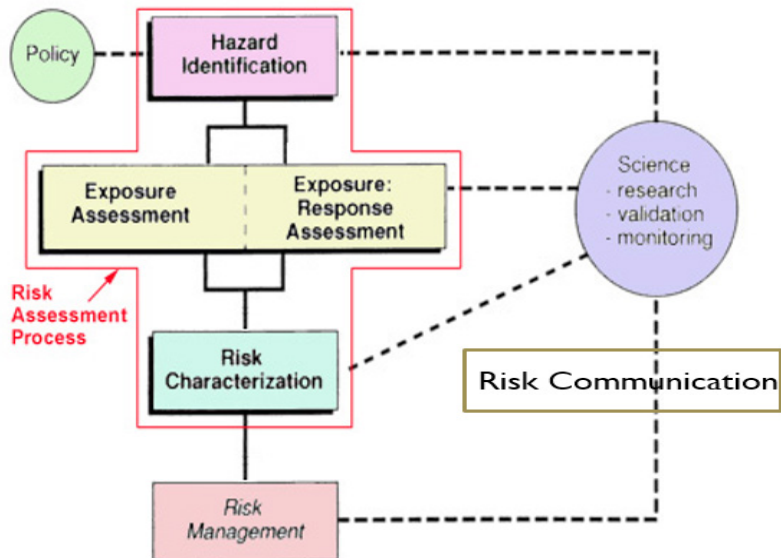
It is a broad term that encompasses a variety of analytic techniques that are used in different situations, depending upon the nature of the risk, the available data, and needs of decision makers.

Risk assessment is where the evidence is gathered, organized, analyzed, and used to support decision making. The process identifies and addresses uncertainty which is then conveyed to decision makers for their consideration.



There are four main steps in risk assessment as presented in the following picture.

In the codex Alimentarius Framework, the picture might look slightly different





30 min

Hazard Identification



Group Activity

As we discussed previously, hazards can be in many forms. They can be:

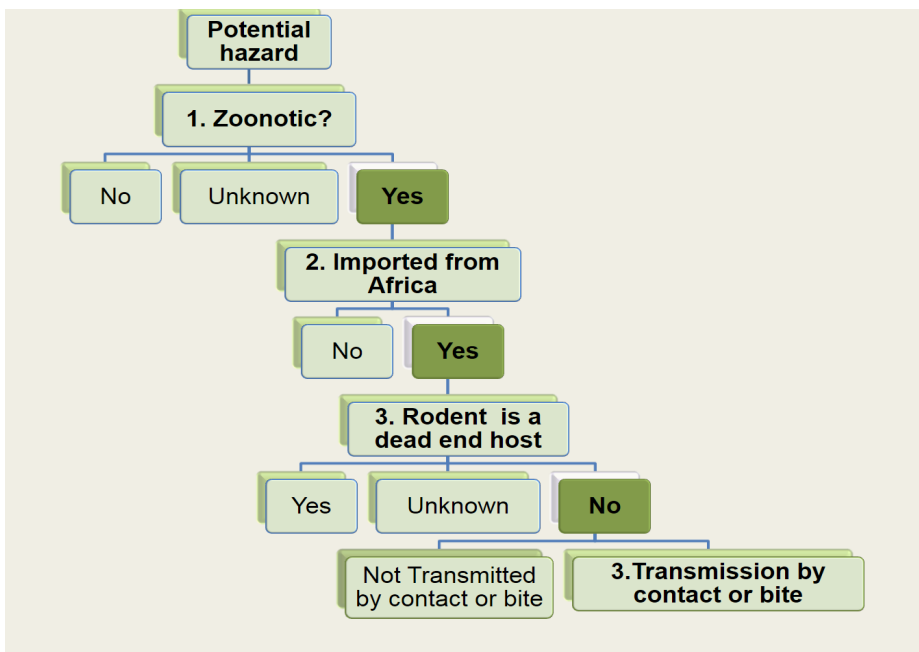
- i) Environmental
- ii) Physical (changes to a habitat)
- iii) Chemical (single, multiple, cumulative risk, e.g. toxins)
- iv) Mechanical (traffic accidents, injuries at work)
- v) Microbiological or biological (disease or invasive species)
- vi) Nutritional (for example fitness or metabolic state)
- vii) Psychosocial - depression, isolation, work stress, loss of livelihoods
- viii) Natural resources to community, noise, invasions, war

If a hazard is not identified, the risk due to that hazard cannot be assessed and risk managers will be unable to put measures in place to control that risk (except by chance).

Focusing on the video: *Deadly Animals Among Us*, list all the potential hazards associated with the risk question and prioritize for assessment if necessary.

Review the potential question

1. What is the risk of zoonotic disease transmission from African rodents imported into the United States causing an outbreak in humans? With this question, propose a hazard identification visual as below.
2. What is the risk of a Prairie dog purchased at a pet store transmitting an infection of Monkey pox in the United States?
3. What is the risk of an epidemiologist investigating a zoonotic disease outbreak in traded wildlife acquiring the disease?



Ask the groups to identify the hazard related to their case. Remember each group was assigned a case to work on for the week.

An important set of questions and steps must be considered when determining whether to conclude if a pathogenic agent is a hazard or not.

Ask each group to then go ahead and develop a hazard diagram for their hazard, based on their question as the one above. Each group should work on a flip chart and after completing their picture, hang it up on the wall for everyone to visualize and present this to the plenary.

Debrief the group and make any comments that will improve their visuals.

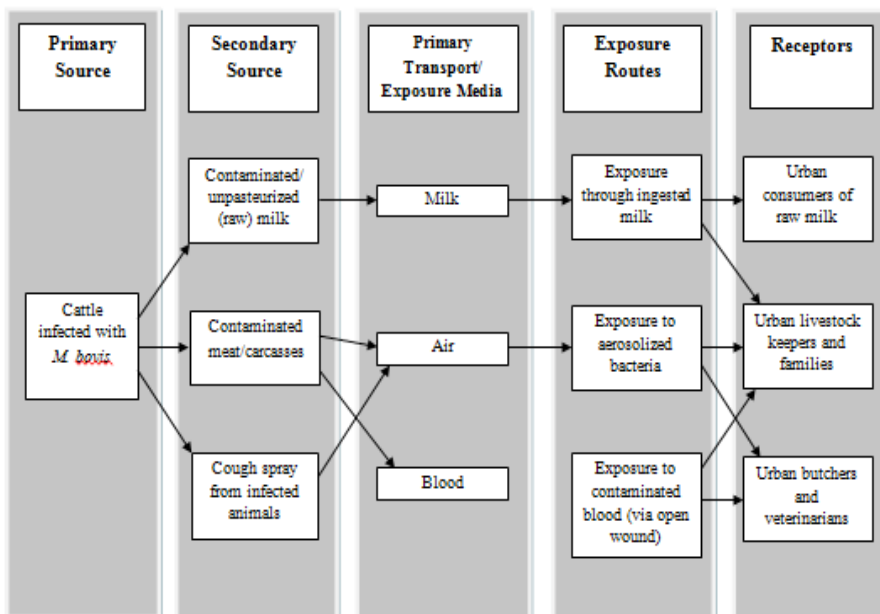
Introduce the conceptual model for hazard identification, exposure and release. This conceptual model illustrates the sources of hazard, how the hazard is released, transported, and finally reaches the populations at risk.

It is also important to rank/prioritize the hazard for:

- i) Linking question to potential hazards.
- ii) Listing all diseases potentially important to the question or issue.
- iii) Establishing criteria for importance based upon the question.
- iv) Modeling high priority hazards.

The following conceptual model is for Bovine TB transmitted through milk in Ethiopia. It was developed by Emily Mitchard at Tufts University. This can be used as an example.

Conceptual Model:
Exposure to *Mycobacterium bovis* in livestock keepers, Addis Ababa
Emily Mitchard



75 min

Conceptual Model for Hazards and Exposure Routes





45 min

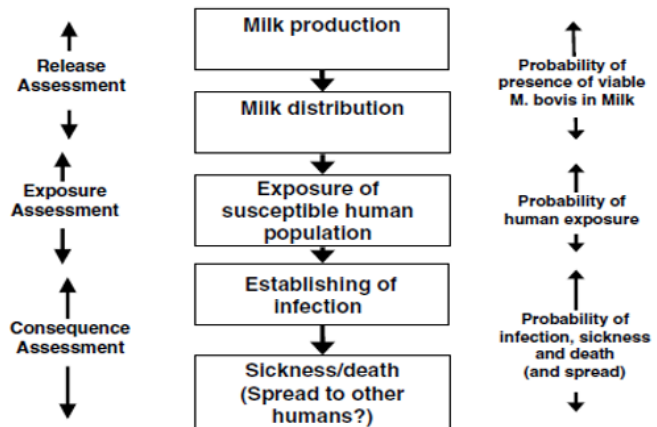
PowerPoint Presentation on Exposure, Release and Consequence Assessment



In this session, using a PowerPoint presentation and examples on bovine TB, walk the participants through release assessment, exposure assessment and consequence assessment. It is important to stress that four conditions are needed to have a risk:

1. A source of risk
2. A release process
3. An exposure process
4. A causal process

Risk assessment for milk pathway



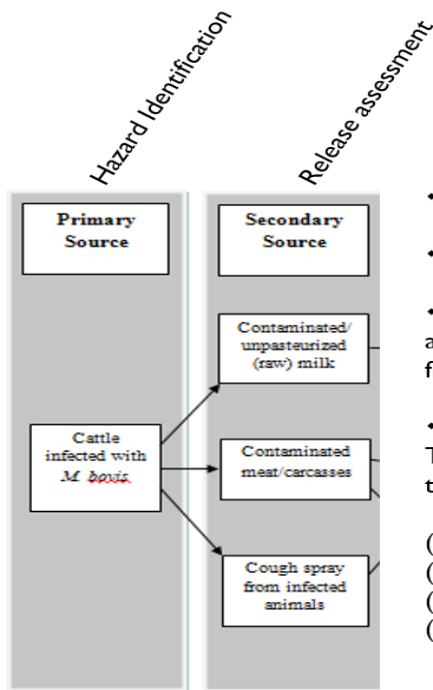
This pathway determines an orderly series of events which would ultimately lead to the acquisition of BTB by humans.

The above image was obtained from Risk Analysis and Bovine TB a Re-emerging Zoonoses by Etter et al. Annals N.Y. Acad Sci 1081 61-73(2006)

<http://onlinelibrary.wiley.com/doi/10.1196/annals.1373.006/full>

Release (Entry) assessment: What is the risk that the pathogen is released into the area of concern?

- The release assessment describes the probability of emission of each potential hazard (pathogen) in each situation depending on the amounts and timing, various actions, events or measures.



❖ **Hazard identification**

- ❖ Estimation of statistical probabilities
- ❖ evaluation of the consequences of all risks associated with the transmission of BTB from animals to humans

❖ **Release assessment**

The probability of releasing viable *M. bovis* to bordering communities from:

- (a) cattle
- (b) contaminated carcasses and meat
- (c) contaminated milk
- (d) bush and meat



45 min

Hazard Identification, Release and Exposure Group Activity

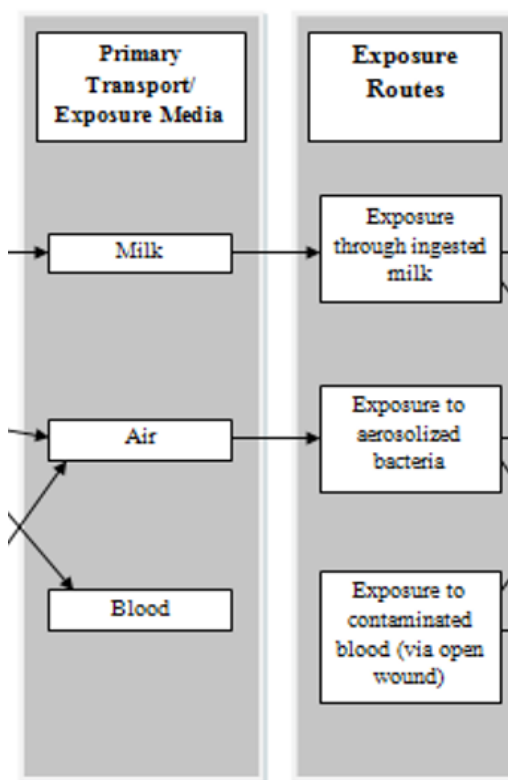


Ask the participants to prepare a similar model outlining the hazard and release assessment of their topic/case. This should be presented for discussion to the plenary. After the presentation, move on to exposure assessment and present a brief lecture on what it is.

Exposure: What is the risk that a human will be exposed to the pathogen once it is released?

- Describes the mechanisms by which animals and humans can be exposed.
- The amount, timing, frequency, duration of exposure, exposure pathways (ingestion, inhalation, or insect bite), and considering the number, species and other characteristics of the animal and human populations exposed.
- Consider biological factors linked to the country and related merchandise.

The image below describes the mechanisms by which exposure happens.



Ask participants to add the exposure section to their charts.



60 min

Consequence Assessment



Present the section on consequence assessment: What is the risk of having consequences?

The consequence assessment describes the potential consequences of a given exposure. Among the consequences include the following:

Direct consequences

- i) Loss of production and those related to infection or disease of animals.
- ii) The consequences for public health.
- iii) The adverse effects on the environment.

Indirect consequences

- i) Costs related to monitoring and control
- ii) Compensation costs
- iii) Potential trade losses

Consequence assessment in the case of bovine TB include the probability of:

- i) becoming infected
- ii) becoming diseased
- iii) dying
- iv) becoming a potential for release source for human-to-human transmission

Review the video: Deadly Virus Among Us and list the consequences of the hazard. They should include:

Direct consequences

- i) Infected/diseased people and animals
- ii) Loss of production and those related to infection or disease of animals
- iii) Costs to public health
- iv) The adverse effects on the environment

Indirect consequences

- i) Costs related to prevention, monitoring and control
- ii) Compensation costs
- iii) Costs related to banning of importation of Prairie dogs
- iv) Hospitalization costs
- v) Emotional costs of losing a pet
- vi) Panic in a community

Consequence Assessment Score

Level of Impact:		Negl. = 0, Low = 1; Medium = 2; High = 3	
		Score	Definition
For Human Health	A. Extent		
	B. Intensity		
	C. Duration		
	D. Effect		
	Total (A-D)		
Economic	A. Extent		
	B. Intensity		
	C. Duration		
	D. Effect		
	Total (A-D)		
Environmental	A. Extent		
	B. Intensity		
	C. Duration		
	D. Effect		
	Total (A-D)		

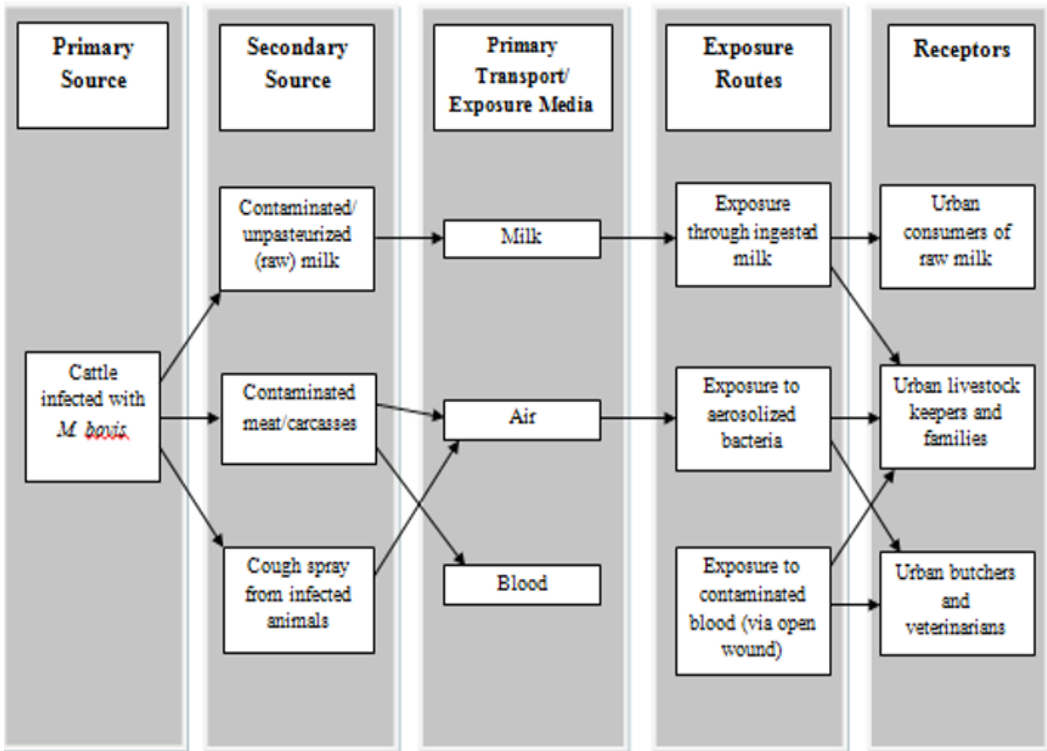
The following score table is very effective in presenting consequence information.

Give the groups 30 minutes to prepare a consequence assessment score table for their topics and present these to the plenary. They should remember to include extra columns that demonstrate impact on animals, or maybe wildlife. Discuss these consequence assessment scores for the different groups and debrief.

To complete the picture, they should then add the section on who/ what/ is at risk or where is the risk. Who are the vulnerable at-risk populations?

Let them display their full model on the wall for the plenary to review. Give the groups 30 minutes to prepare a consequence assessment score for their topics and present these to the plenary. They should remember to include extra columns that demonstrate impact on animals, or maybe wildlife.

Discuss these consequence assessment scores for the different groups and debrief.



Conceptual Model-Exposure to Mycobacterium bovis in livestock keepers in Addis Ababa, Ethiopia developed by Emily Mitchard from Tufts University



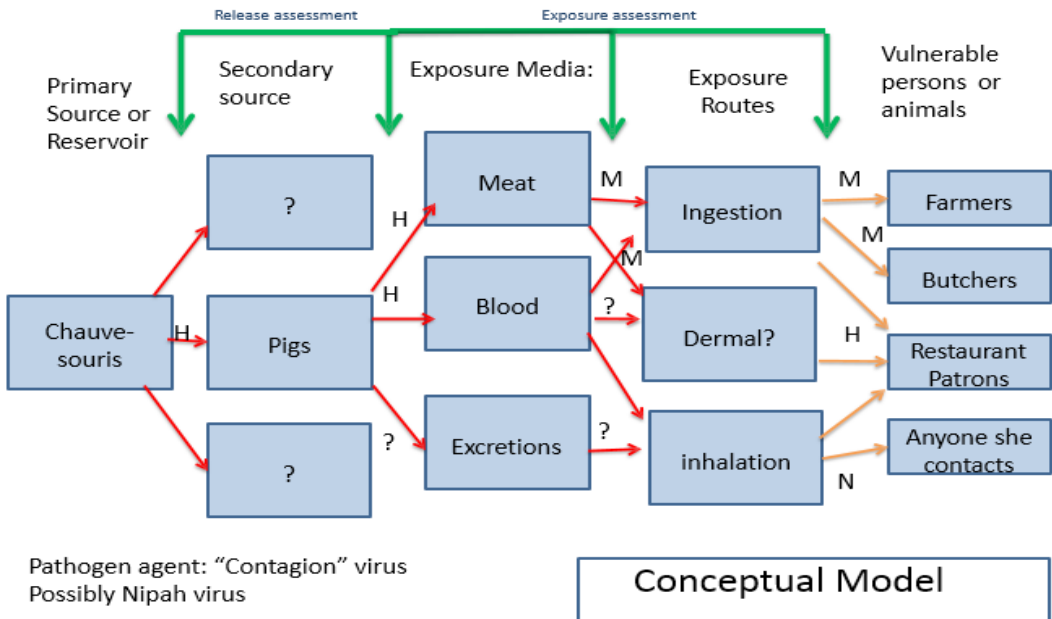
60 min

Conceptual Model for the Movie Contagion Pathogen



The participants were requested to watch the movie Contagion prior to attending the workshop. If they were not able to do this, it is important to schedule the first night as a movie night and have them watch this movie. The movie Contagion focuses on an outbreak of an infection that originates from bats into pigs and into humans and ends up spreading around the world. The bats experience a habitat interruption/environmental disruption leading to their displacement. This creates a good One Health scenario.

In this session, since the participants are now familiar with the different stages of risk assessment and developing a conceptual model, break them down into three groups. Each group should then develop a conceptual model for the contagion pathogen. Their final model should resemble the model below.



Model Obtained from Vietnam Risk Analysis Training Manual - 2013



60 min

Case Studies on Foot and Mouth Disease (FMD)



Divide the participants into groups: Ask them to refer to the case studies:

- i) Risk Analysis: Foot-and-Mouth Disease (FMD)
Risk from importation of fresh (chilled or frozen), maturated, deboned beef from a region in Brazil into the United States
- ii) A Quantitative Risk Assessment study for the likelihood of introduction of new FMD Virus through importation of cattle from Sudan to Egypt: An edification article.

Some groups should work on the first case study while others work on the second case study.

Let them outline the elements and components of risk analysis that stand out and present in the plenary.

The groups should analyze the elements below in their case study. Guide the discussions and check on the key elements and components of risk analysis including:

- i) The different risk managers and risk assessors involved in the processes outlined in the case studies
- ii) Framing of the risk analysis question
- iii) Hazard identification
- iv) Risk assessment including the type of risk assessment done

- v) Components of the risk assessment including release, exposure and consequence assessments, and risk estimation
- vi) Identification of the risk pathways
- vii) Exposure, variability and uncertainties identified
- viii) Data needs and collection done
- ix) How risk mitigation and management is done
- x) How risk communication is undertaken

Revisit this discussion after the field trip and guide it towards comparing the responses that the participants gave on their field trip exercise with what they have observed in the case studies.



60 min

PowerPoint Presentation on Approaches/ Methods for Assessment



Present a PowerPoint (PPP No. 4) on the methods of risk assessment: qualitative, semi-quantitative and quantitative. For a quantitative analysis, data needs are more extensive:

- i) Number of herds or flocks, animals or people likely to experience health problems of varying severity over time;
- ii) Probability distributions, confidence intervals and other means of expressing the uncertainties in these estimates;
- iii) Representation of the variance of all the initial parameters of the model;
- iv) Sensitivity analysis to rank the parameters according to their influence on the variance of the risk estimate;
- v) Analysis of how these parameters are dependent and correlated.

Inform participants that for the purpose of this training, the focus will be on using qualitative methods for their topics to assess risk.

After this, also review the sources and type of data they will have to collect to complete their risk analysis. These sources can be in various forms:

- Direct observation
- Data collected in the field
- Key informant interviews
- Desktop review of literature

Debrief: Wrap up the sessions by reviewing the conceptual maps and discussing with participants what they found easy, difficult and any challenges they faced developing the conceptual model for their topic.



Risk Estimation Presentation

60 min

Risk estimation consists of integrating the results of previous assessments (emission, exposure and effects) for a summary of risks associated with hazards identified at the outset. Thus, risk estimation considers the entire mechanism of risk from hazard identified to unwanted outcome.

Through this training, qualitative methods will be used to estimate risk. Participants should feel free to read about the other methods mentioned. The categories of estimation can range from negligible to very high as seen in the following table:

Probability category	Interpretation
Negligible	Events is so rare that it does not merit to be considered
Very low	Events is very rare but cannot be excluded
Low	Events is rare but does occur
Medium	Events occurs
High	Events occurs
Very high	Events occurs almost certainly

Using examples from the Monkey pox video, show the risk estimation (included in the PowerPoint), then have the groups prepare their risk estimation based on release, exposure and consequence. Remind them to take into consideration their sources of data, since that is important and relevant. The following is an example of how their tables should look like.

CONSEQUENCE ASSESSMENT	Type of information	Certainty	Risk Score
What is the likelihood of 1 or more humans getting infected with the pathogen?	G	MC	M
What is the likelihood of 1 or more humans getting sick?	PR	C	H
What is the likelihood of 1 or more humans dying as result of getting sick?	PR	C	M
What is the likelihood of long-term consequences from getting sick with this pathogen?	PR	C	M
What is the likelihood of 1 human spreading the disease to another human?	PR	C	H

Consequence Assessment Score = M/H

PR- peer reviewed literature, G- grey literature, MC -moderately certain, C- certain, L- low, M- medium, H- High



30 min

Debrief



Debrief this session by discussing the different risk estimation results. This will conclude the session on risk assessment. At this point, prepare the class for the field day visit the next day. They will be required to go out into the community and identify risk points and develop a risk analysis based on the findings. They will also have an opportunity to begin to think risk management and how to communicate with the different stakeholders.



720 min

Field Visit



This session involves a full day field visit. Participants will be assigned to groups to visit:

1. an abattoir/slaughter house
2. a livestock market
3. a fishing village
4. a waste disposal site

In their groups, they will make observations and ask relevant questions to enable them to develop a risk analysis conceptual model for the sites they visited. The field visit should take about 4-6 hours.

The participants should take notes on practices observed and all factors that may influence transmission of One Health related diseases/toxins/agents that could impact human, animal and environmental health.

They should think through the following questions.





1. Did you observe any potential One Health risk/hazard (jobs, agriculture, livestock, food consumed, food and water supply, food preservation, environmental sanitation, waste management, trade, tourism, and so on)? If yes, frame questions of the risks.
2. Who are the different vulnerable populations and the stakeholders?
3. What are the possible recommendations to manage the identified risks?
4. How would you communicate this information to different audiences?

They will use the rest of the afternoon to complete their conceptual model; identifying the risk analysis problem, and developing a conceptual model. They will then begin to identify ways to manage the risks they identified, and communication mechanisms.

Their reports will then be presented in a session, before embarking on risk management.

Revisit this discussion on the FMD case studies after the field trip and guide it towards comparing the responses that the participants gave on their field trip exercise with what they have observed in the case studies.

Session 3: Risk Management

Time	Activity/ Policy	Facilitator Instructions
 5 min	Introduction 	<p>This session on One Health Risk Management will deal with the definition, steps and principles of One Health risk management, stakeholder analysis, mobilization of resources, mapping strategy on how to integrate gender, socio-cultural norms, beliefs and values in managing risk, etc. It will equip participants with knowledge and skills on One Health risk management and enable them to be good risk managers.</p> <p>Learning Objectives</p> <p>By the end of this session, the participants should be able to:</p> <ol style="list-style-type: none">define One Health risk management.identify the steps for One Health risk management.identify relevant stakeholders and rationalize their roles in One Health risk management.learn about resource mobilization (human, financial and materials) used for risk management.identify strategies to integrate gender issues, socio-cultural norms, beliefs and values in One Health risk management.apply effective prevention, control and mitigation measures to manage One Health risks and/or hazards.evaluate the implementation of One Health risk management measures. <p>Instructional activities:</p> <ul style="list-style-type: none">• PowerPoint overviews• Case studies, projects, PBL• Simulations and case studies
 20 min	Risk Management Definitions 	<p>Working in pairs, participants should start this session by searching on the Internet for the definition of risk management. They should write the definition on sticky notes and put them up on the wall.</p> <p>Through a plenary discussion:</p> <ol style="list-style-type: none">identify key words that appear repeatedly in the responses provided.identify any words that are singular or different and discuss why they were included.come up with a definition of risk management.



30 min

Risk management is the process (distinct from risk assessment) of weighing policy alternatives, in consultation with all interested parties, considering risk assessment and other factors relevant for the health protection of consumers and for the promotion of fair-trade practices; and if needed, selecting appropriate prevention and control options. It combines a set of methods to deal with the risk (real or perceived) and these can vary from risk reduction and mitigation to risk prevention.

It is based on decision analysis:

- body of knowledge helps decision-makers to choose among alternatives
- captures uncertainty and trade-off inherited in the alternative

Risk management is further defined as the process of identifying, evaluating, selecting, and implementing actions to reduce risk to human, animal and environmental health (OIE).

There are two key purposes under risk management:

- (a) To review potential risk reduction or management options and evaluate their likely outcomes. On this basis, decisions and recommendations can be made to mitigate risks associated with the identified hazard.

The questions asked in risk management include:

1. What can be done to decrease the likelihood of a hazardous event?
2. What can be done to reduce the implications once a hazardous event has happened?
 - (b) Implementation and review: to formulate an action and contingency plan and establish a process and timeline for monitoring evaluation and review of risk management actions. The review may result in a clearer understanding of the problem and enable refinement of the analysis.

The questions to be asked under implementation and review are:

1. How will the selected risk management options be implemented?
2. Once implemented, are they having the desired effect, if not how can they be improved?

Risk management reduces or eliminates risks in ways that:

- i) are based on the best available scientific, economic, and other technical information.
- ii) account for their multi-source, multi-media, multi-chemical and multi-risk contexts.
- iii) are feasible, with benefits reasonably related to their costs.

- iv) give priority to preventing risks, not just controlling them.
- v) use alternatives to command-and-control regulation.
- vi) are sensitive to political, legal, socio-cultural considerations.
- vii) include incentives for innovation, evaluation, and research.

Review of video on Monkey pox. After this brief introduction, revisit the Monkey pox scenario in view of risk management.

What was done to reduce the likelihood of the hazardous effect?



25 min

Group Activity



Risk management in Contagion and Monkey pox.

Divide the class into two groups. One group will look at Contagion, while another group will look at Monkey pox. The groups should brainstorm and answer the questions posed below:

1. What can be/was done to decrease the likelihood of that hazardous event?
2. What can be/was done to reduce the implications once a hazardous event has happened?
3. How will/were the selected risk management options implemented?
4. Once implemented, are they having the desired effect, if not how can they be improved?

The groups should come up with extra examples of what can be done in these two scenarios. They should also examine the different disciplines and stakeholders involved and see if there was need to involve other disciplines.



60 min

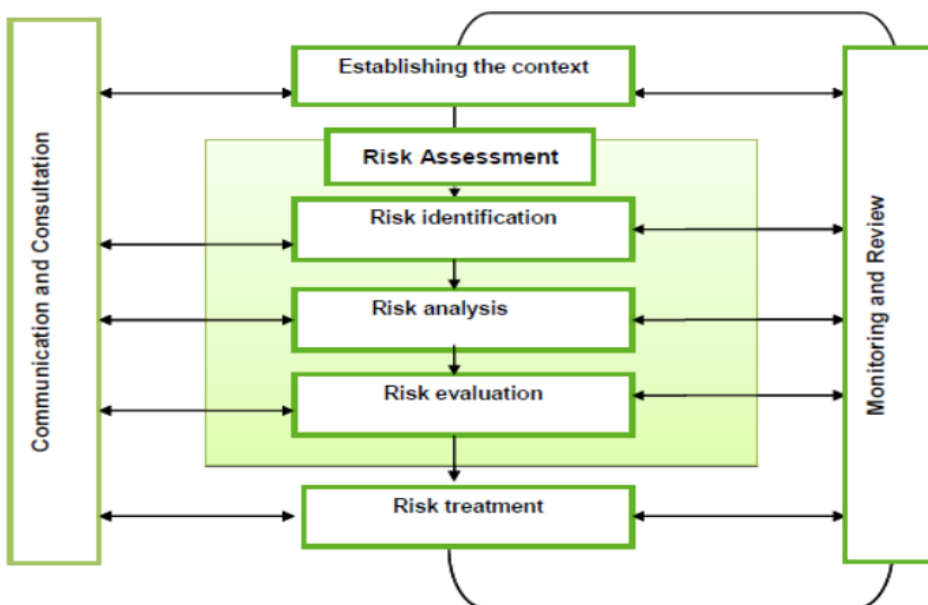
PowerPoint Presentation on Risk Management



Present the PowerPoint (PPP N0. 6) on risk management. This PowerPoint allows the participants to walk through all the key areas of risk management and covers in more details the different steps. Participants should be encouraged to do more research in their own time about risk management.

The stages within the framework used for risk management include the following:

- i) Define the problem and put it in context.
- ii) Analyze the risks associated with the problem in context.
- iii) Examine options for addressing the risks.
- iv) Make decisions about which options to implement.
- v) Take actions to implement the decisions.



- Conduct an evaluation of the action results.



45 min

Risk Management of the Different Topics/Cases



After the presentation, the group should go back to their topics and develop a risk management plan, answering the questions above.

These will then be presented in a plenary session.



45 min

Gender, Culture and High-Risk Diseases



In 2015, the World Health Organization (WHO) designated the following 11 diseases as high risk for severe outbreaks. Ten of these diseases are of zoonotic origin: Arenaviral hemorrhagic fevers (including Lassa Fever, Crimean Congo Hemorrhagic Fever (CCHF), Filoviral diseases (including Ebola and Marburg), Middle East Respiratory Syndrome Coronavirus (MERS-CoV), other highly pathogenic coronaviral diseases (such as Severe Acute Respiratory Syndrome, (SARS), Nipah and related henipaviral diseases, Rift Valley Fever (RVF), Severe Fever with Thrombocytopenia Syndrome (SFTS) and Zika.

Divide the participants into pairs. Assign each pair one of the diseases.

In relation to their disease, they should identify the health threat, the environmental component, the animal component (vector or reservoir), the human component as well as other One Health competencies that intersect with these three.

All participants should answer the following questions:

1. Are there cultural habits that increase the risk of the disease? I.e. they should identify the risk in relation to gender and cultural issues.

2. Are gender roles likely to impact the risk of the disease (differences) among men/women?
3. How can they take gender issues into consideration in their management plan?

Participants should then present their findings keeping the presentations to a maximum of five minutes. This should open a discussion on the importance of other factors that influence risk and affect release, exposure and consequences in assessment.

Ask the participants to read through the following brief case studies.

As they read, they should pay specific attention to gender-based risks - at exposure level and release level. They should also clearly underscore the role of gender among the different stakeholders and the most vulnerable populations, and the significance of that. How does this affect management strategies and risk communication?

Spend some time discussing the case studies and the role that gender plays in risk analysis.

Intestinal Parasitic Infections in Rural Communities of Northeast Thailand

This study presents a survey of the prevalence of intestinal parasitic infections among the people in rural Thailand. The community-based cross-sectional study was conducted in villages in Khon Kaen Province, Northeastern Thailand, from March to August 2013. A total of 253 stool samples from 102 males and 140 females, aged 2-80 years, were prepared using formalin-ethyl acetate concentration methods and examined using light microscopy. Ninety-four individuals (37.2%) were infected with one or more parasite species. Presence of parasitic infection was significantly correlated with gender ($P=0.001$); nearly half of males in this survey (49.0%) were infected. Male individuals, those aged 61-80 years, those who had completed only the primary school, and those in the laborer sub-category exhibited the highest prevalences of *O. viverrini*.

A similar picture for *S. stercoralis* was found. Again, males and those of lower educational attainment exhibited the highest prevalence in their categories. Merchants and persons aged 41-60 years had the highest prevalence of parasitic infections in the occupation and age categories, respectively. The present study showed a significant correlation between gender and parasitic infections ($P=0.001$), with males having a higher prevalence for all parasite species. This result was similar to the previous findings. The gender difference may be due to male-specific behavioral factors such as the eating of raw meat, alcohol drinking with colleagues, and taking risks with their work in the farm.

Full article found at <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3916464/>



20 min

Case Study 1





20 min

Case Study 2



Burden of Brucellosis in human, livestock and wild animals in East and Central Africa

Wildlife infected with brucellosis can transmit the disease to domestic livestock or humans while domestic animals commonly transmit the disease to humans. *Brucella* organisms, which are small aerobic intracellular coccobacilli, localize in the reproductive organs of host animals, causing abortions and sterility. *Brucella* organisms are shed in large numbers in the animal's urine, milk, placental fluid, and other body fluids. The main route of entry for *Brucella* organisms into a host is oral, by the ingestion of food or water contaminated with secretions or aborted fetal remains from infected cows, or by licking the vaginal secretions, genitals, aborted fetuses or newborn calves of infected cows. While the venereal route is not generally considered to be epidemiologically important in transmitting brucellosis in cattle, infected semen used in artificial insemination could be important. Infected cows shed *Brucella* organisms in their milk and this is key in its transmission to calves and humans. In dairy herds, milking is another mode of transmission that must be considered because the bacteria are highly likely to be transmitted from cow to cow if the same teat-cups are used for milking. Vertical transmission accounts for 60% -70% of the fetuses born to infected mothers. Female calves can also be infected during birth when passing through the birth canal, or by suckling colostrum or milk from infected cows.

The most rational approach for preventing human brucellosis is the control and elimination of the infection in animals. Eradication by testing and culling is the most effective way of eliminating the disease in regions with low prevalence. However, adequate information on the burden of brucellosis in human, domestic and wild animals is lacking. In addition, in man, clinical misdiagnosis of brucellosis for another condition say malaria, often occurs in conditions with febrile clinical manifestation thereby prompting unnecessary treatments. Treatment for the disease is protracted for over three weeks and this has psychological and economic implications to such patients.



20 min

Case Study 3



Gender based vulnerabilities, risks and opportunities in Laos

(Taken from European Union Commission report: study on the gender aspects of the Avian Influenza crisis in South East Asia, June 2008)

http://ec.europa.eu/world/avian_influenza/docs/gender_study_0608_en.pdf

Women through their roles as backyard poultry producers and (market) sellers and as caretakers (slaughter of poultry and preparation of food, raising of children, care for the sick) for their family and as health care workers in hospitals and health facilities are at risk of contracting avian influenza. The risk factor is even increased as women have less education than men and are often ignored for poultry production and management training courses or specific courses for avian influenza prevention and control.

Women are exposed to avian influenza infections due to their roles in poultry production, marketing and food preparation. Women are usually responsible for slaughter, preparation and cooking of poultry and poultry products. Raw duck blood is a preferred dish. Women are also caretakers of the family. In many ethnic communities, men are often exclusively attending trainings and meetings. Men often do not allow women to participate and they hardly share what they learn from the meetings/trainings with their wives and children. Moreover, most village veterinarians and volunteer health workers are men. As most women particularly in rural and remote areas are not comfortable dealing with men, it significantly deprives them of support and services for their livelihoods and health care needs.

Language barriers can also increase the avian influenza risks for women in ethnic communities. Many women, because of their less schooling and isolation, do not speak the national Lao language and this limits their ability to understand the avian influenza campaign messages, which are usually in Lao language and not adapted to the local situation, and to interact and communicate with avian influenza campaign agents who would mostly only speak in Lao.

Debrief: After discussion of these case studies, every group should review gender-based risks in relation to their topic. They will be given 15 minutes to do and this will be discussed in a plenary session.



25
minutes

Identifying Stakeholders in Cases/Topics



To successfully conduct a risk analysis, identifying the stakeholders and the vulnerable populations is crucial.

- Stakeholder analysis is the process of identifying and generating knowledge about the key stakeholders around an intervention.
- Understanding the behavior, interests, inter-relations and intentions can be used to assess the influence, resources and effect these stakeholders can have on the viability of the intervention.

Present the following information to the participants.

Considerations for stakeholder analysis.

- **Understanding the culture and context:** To successfully interact with stakeholders and collect information, it is important to understand the culture and context of the various stakeholders, and how best to approach and interact with them. This is also an area where gender considerations need to be taken into account.
- **Knowing the level of analysis:** The level of analysis (local, regional, national or international) influences how data is collected and who to consider as key stakeholders.
- **Being practical about the extent of analysis:** The timeline and scope of the intervention including resource limitations frequently determines the scope of analysis.
- **Identifying the analysis team:** Analysis can be conducted by an individual or a team. A team can provide a more objective perspective of stakeholders while an individual ensures consistent and more reliable approach.

Using the information in the PowerPoint, discuss with participants how to determine the level of stakeholder engagement.

The participants should then in relation to their cases/topics, create a stakeholder list, their roles and the level of engagement of each stakeholder. Remind them to consider marginalized communities as well as gender-based differences among the stakeholders.

They should also brainstorm on the following questions:

1. Who does the problem affect most?
2. What section of this problem-affected group is most likely to be able to change?
3. Which ones will be resistant to change or difficult to engage?
4. Who is in a position to help bring about change to address the problem?
5. Who has a vested interest in maintaining the status quo (no change)?



30 mins

Stakeholder Mapping



6. Who wants to see the problem addressed (what community support for change is there and who are these supporters?)
7. What government or organizational jurisdictions or responsibilities are involved or should be involved?

You have been provided with a set of sticky notes.

- i) On a sticky note, write a name of a stakeholder or player in your case. One name per note. Write as many stakeholders as you can think of. Identify them by their roles. Consider their gender as well especially at the community level.
- ii) Line the sticky notes on the plain piece of paper according to whether they are international, national, regional or local.
- iii) Draw a circle around those stakeholders with lots of power and authority using a red marker.
- iv) Draw a square around those players with the most interest in the activity or who are impacted the most/ or most vulnerable.
- v) Using a red marker, draw arrows that show flow of decision-making (power and authority) from one stakeholder to another.
- vi) Using a green marker, draw arrows that show flow of resources (funding) from one stakeholder to another.
- vii) Using a blue marker, draw arrows that show communication flow from one stakeholder to another. Have the groups discuss the map and the following questions:
 1. Who has power and authority?
 2. Who do you think should have power and yet does not?
 3. Who is being left out of the different arrows and yet considered important and how do you include them?
 4. Can you identify any gender differences in power, communication flow and resource flow?

Groups should display their stakeholder maps and based on this, have an interactive discussion on the different stakeholders in their cases and the significance of these stakeholders to their whole risk analysis plan including risk management.

(This exercise was adopted from the University of Minnesota OH-SMART tool (<https://www.vetmed.umn.edu/centers-programs/global-one-health-initiative/one-health-systems-mapping-and-analysis-resource-toolkit>) and from work done by Professor Jodi Sandfort of UMN on Policy Field analysis

Session 4: Risk Communication

Time

Activity/Policy

Facilitator Instructions



20 min

Introduction



Session 4 focuses on defining One Health Risk Communication, description of methods and tools used in one Health risk communication, how to develop key messages for One Health risk communication, understanding the barriers in One Health risk communication and roles of and responses of stakeholders.

Learning Objectives

By the end of this session, the participants should be able to:

- i) define One Health risk communication.
- ii) describe methods and tools of One Health risk communication.
- iii) develop key messages on One Health risk communication.
- iv) communicate the information to the stakeholder's timely, transparently, effectively and adequately.
- v) justify the issues on gender, socio-cultural norms, beliefs and values while communicating One Health risks.

Instructional Activities:

- Small group discussions
- Seminars
- Case studies



30 min

Risk Communication



To effectively communicate about risk, it is important to understand why people are exposed to risk, and why people behave the way they do. Do a brief introduction of the social determinants of health, which are defined by WHO as, 'circumstances in which people are born, grow up, live, work and age, and the systems put in place to deal with illness. These circumstances are in turn shaped by a wider set of forces: economics, social policies and politics.

Briefly brainstorm what some of these circumstances and shapers are, and how they link up with a Systems Thinking approach in One Health and then show the class the following picture on the social determinants of health.



(Image obtained from Whitehead and Dahlgren: *Concepts and Principles for tackling Social inequities in Health*, WHO 2006)



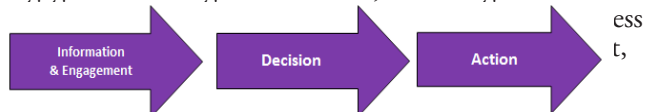
120 min

Briefly discuss the picture: What are the key issues identified in the picture that determine the health of individuals?

Risk **communication** is an open, two-way exchange of information and opinion about risk that leads to better understanding and better risk management decisions by all involved.

Risk communication(s) refers to the real-time exchange of information, advice and opinions between experts or officials and people who face a threat (hazard) to their survival, health or economic or social well-being. Its ultimate purpose is that everyone at risk can take informed decisions to mitigate the effects of the threat (hazard) such as a disease outbreak and take protective and preventive action.

Risk communication uses a mix of communication and engagement strategies and tactics, including but not limited



It is critical to have a plan in place to deal with a crisis before it happens. Communicating information about possible life-threatening issues can be difficult, but if it is not done well, the communicator can put the public at greater risk by creating misunderstanding or possibly inciting panic. Professional communicators owe it to the people and agencies they represent, as well as to the public, to be prepared to deal with a crisis – natural or manmade.

Establishing trust and credibility are two of the cornerstones of effective risk communication. When an issue is of high concern, such as the most recent Ebola outbreak, trust and credibility on the part of communicators is essential. Without them, your message will not be heard, people will not make informed decisions, and problems can escalate. Using risk communication best practices can help manage risks better.



30 min

PowerPoint Presentation on Risk Communication

Present the introduction on risk communication using PowerPoint (PPP No. 7). This brief presentation will introduce the idea of risk communication to the participants stressing the points mentioned above.



30 min

Think Pair and Share



Present the following scenarios to participants and have them find solutions through think, pair and share technique. They should think of an answer, pair with a neighbor, share with each other and then have one of them share with the rest of the group the solutions they came up with.

Scenario 1

- i) You are spokesperson for the National Emergency Taskforce leading a government response to an outbreak of anthrax in wildlife in a national park that has spilled over to domestic animals and humans. Over 500 hippos have so far died.
- ii) Following the initial press release about the outbreak, you are misquoted in the international media - misinformation which may cause undue concern or alarm and massively affect the tourism industry (outrage!).
- iii) As a spokesperson, how should you address inconsistent messages about the outbreak?

Scenario 2

- i) You receive information that there seems to be a “strange disease” / hemorrhagic fever outbreak in a remote town.
- ii) As a One Health leader, how can you communicate appropriate risk messages and ensure that you are communicating to the right audience (take gender roles into consideration; who has access to what communication channels)?
- iii) Identify one audience, one to two communication vehicles and develop 3 key points (messages).

Scenario 3

- i) There is an outbreak of Marburg in Kween district, eastern Uganda. Marburg is known to be a hemorrhagic fever with high fatality rates. The index cases died three days ago.
- ii) A traditional burial was done. The dead was a renowned businessman trading between Uganda and Kenya. He had more than ten wives and three of them are presenting with signs and symptoms of Marburg. His caretaker, who was his closest sister, has developed signs and symptoms too.
- iii) The health worker requests that they isolate anyone who meets the case definition. However, the community at large thinks that this could be witchcraft because the disease is congregated in one family. They have hidden the suspected cases and promise to strangle any health worker who comes around asking for the case.
- iv) As a One Health champion, how best would you communicate this incidence to the media and the community at large so that they are able to understand the consequences of not reporting suspected cases?



30 min

Examples of Success and Failures with Risk Communication



Ask the class to give a few examples from experience of what they would consider successes or failures on risk communication. Share the following examples and with each one, discuss why they think it was a success or failure.

- i) The movie, Contagion, and how the CDC and Department of Health communicated.
- ii) The reaction of the Chinese government to the outbreak of SARS in 2003 compared to the reaction of the Singapore government.
- iii) WHO and the swine flu pandemic in 2010.
- iv) The media reports of the United Kingdom government as opposed to the Australian government during the BSE outbreak.

(More information in the facilitator notes)

This activity will be done based on their case /topic. In their groups ask them to do the following:

- i) Develop an interim plan for risk communication and information dissemination to educate the public regarding exposure risks and effective public response on an emergency of your choice.

- ii) As part of the plan, identify key One Health spokespersons that can effectively communicate with the public and media to prepare for and respond to. Who did you select and why?
- iii) Establish an emergency public information system, including call-down lists of One Health contacts, backup personnel who can be activated to address communications, and information dissemination issues during the emergency. Ensure you are being gender sensitive.
- iv) Establish mechanisms for tracking and monitoring message dissemination and exposure, media coverage, audience reaction and feedback, and changing communication issues and priorities.
- v) Consider how to communicate to multiple audiences based on their gender, culture age, literacy status, etc.

Participants need to appreciate how outrage during risk communication is managed:

- i) Calm the audience down respectfully and reasonably
- ii) Listen to their concerns
- iii) Apologize for any mistake the organization has made
- iv) Communicate facts and evidence after you have demonstrated listening
- v) Respectfully acknowledge anger and fear
- vi) Explain the actual danger
- vii) Cite credible third parties (experts, scientific research etc.)
- viii) Correct misinformation
- ix) Resolve rumors



20 min

Developing a Risk Communication Plan



Tips During Risk Communication

- i) Community engagement is not an option.
- ii) Communities must be at the heart of any health emergency response.
- iii) Identify and involve stakeholder groups e.g. VHTs, Local Councilors, army, police, DISO, schools, teachers, boda bodas, taxi operators, private clinics
- iv) Respect for social and cultural values of the population.
- v) Involve influential people in the community i.e. clan leaders, elders, chiefs, religious leaders.
- vi) Identify the most effective locally available protection advice and solutions during the outbreak response.
- vii) Communicate risk reduction behaviors that are realistic, effective and culturally appropriate.
- viii) Identify community information needs and use trusted sources of information.



45 min

Debrief



Debrief on Message Basics

- i) Know your audience, keep messages short and focused (single sentences & headlines), save the background information for later, give action recommendations in positive terms (“do” rather than “don’t do”).
- ii) Prioritize messages; first and last, must do, should do, could do, use visuals (graphics, demos), use non-technical language, use common figures of speech, do not overwhelm with numbers/probabilities.
- iii) Be gender sensitive and endeavor to keep trust among community members.



120 min

Developing Policy Briefs



Performing a risk assessment and analysis is a long process and usually the resulting documents are huge. However, the key people who read these documents need to be able to receive the information in a summary form. Presenting a 400-page document to a minister is one way of ensuring that nothing is ever done. Therefore, there is need to practice being precise and to get the message across to the right people. This section will therefore focus on developing policy briefs.

Selecting a Topic for Brief

Session 1: A policy brief is:

- i) A short document that presents the findings and recommendations of a research project to a non-specialized audience.
- ii) A medium for exploring an issue and distilling lessons learned from the research.

- iii) A vehicle for providing policy advice.
- iv) A stand-alone document focused on one topic and is usually between 2-4 pages, maximum 1500 words.

Participants will develop a policy brief based on their field day assigned topic. They were in the community and identified risks to the community and presented on those, and this is an opportunity to speak to stakeholders who are in a position to make a difference.

Give participants 15 minutes to reflect on their case for the field day.



20 min

Know Your Audience



A policy brief has a specific target audience. The participants should think through who their audience is going to be.

1. Are they community members or policy makers, government officials or first responders?
2. Are they women or men?
3. Are they knowledgeable about this topic?
4. How open are they to the message?
5. What questions need answers?
6. What are their interests/concerns?
7. What does it take to reach specific readers such as media, decision makers?

Have the participants identify their target audience for their brief.



30 min

Leading Statement



Lead with a short statement. The brief statement should:

- i) answer the question why.
- ii) explain the significance/urgency of the issue.
- iii) describe the objective.
- iv) give an overview of findings and conclusions.
- v) create curiosity for the rest of the brief.

For example: Analyze the following statement and see if it answers all the questions above.

“Elephants are one of the big five wildlife species; their survival is one of the holy grails of conservation. Unfortunately, because of their size and migratory behavior, elephants often encounter people. This is especially true in densely populated Southeast Asia.

A new study from Sri Lanka looks at one strategy to address this problem - electric fences.” *From: Elephants and Electric Fences. A study from Sri Lanka EEPSEA 2005 IDRC/CDRI*

Have participants spend the 15 minutes creating a short leading statement for their brief. They should then share their statement with the team in a plenary session



120 min

PowerPoint Presentation on How to Prepare Policy Briefs



Give a PowerPoint presentation (PPP No. 8) on how to prepare policy briefs.

Have participants work on their briefs for about one hour.

Have participants share the summary of their briefs in a plenary session. Other participants should analyze and critique their brief. They can bring home the brief to finish it overnight. They will continue working on their briefs and bring it home with them if they need to ensure that it is complete.



30 min

Debrief, Reflection and Conclusion of the Workshop



Conclude the workshop allowing the participants time to reflect on the training.

Give them time to fill out the post-test and OHCEA evaluation form. If a guest speaker is invited to close the ceremony and give out certificates, then that should conclude the workshop. Any logistics issues should also be dealt with.

Detailed Facilitator Notes

Definition of One Health

Regardless of which of the many definitions of One Health is used, the common theme is collaboration across sectors that have a direct or indirect impact on health. It involves thinking and working out of silos and optimizing resources and efforts while respecting the autonomy of the various sectors.

To improve the effectiveness of the One Health approach, there is need to establish better sectoral balance among existing groups and networks, especially between veterinarians and physicians. It is also essential to increase the participation of environmental and wildlife health practitioners, as well as social scientists and development partners. The American Veterinary Medical Association (AVMA) defines One Health approach as the collaborative effort of multiple disciplines working locally, nationally and globally to attain optimal health for people, animals, and the environment.

Recent roots for the advocacy and usage of the One Health approach can be traced to a story about Ebola Virus Disease (EVD) published in the Washington Post of April 7, 2003, where Rick Weiss quoted William Karesh, DVM as follows; “Human or livestock or wildlife health can’t be discussed in isolation anymore. There is just one health. And the solutions require everyone working together on all the different levels”. In the years thereafter, Karesh and colleagues Robert Cook, VMD and Steve Osofsky, DVM, launched a series of conferences around the world with the theme of One World – One Medicine - One Health.

To improve the effectiveness of the One Health approach, there is need to create balance and a greater relationship among existing groups and networks, especially between veterinarians and physicians, and to amplify the role that environmental and wildlife health practitioners, as well as social scientists and other disciplines play to reduce public health threats.

In less than 10 years, One Health has gained significant momentum. It is now a movement and it is moving fast. The approach has been formally endorsed by the European Commission, the US Department of State, US Department of Agriculture, US Centers for Disease Control and Prevention (CDC), World Bank, World Health Organization (WHO), Food and Agriculture Organization of the United Nations (FAO), World Organization for Animal Health (OIE), United Nations System Influenza Coordination (UNSCIC), various universities, NGOs, and many others.

The current One Health movement is an unexpected positive development that emerged following the unprecedented Global Response to the Highly Pathogenic Avian Influenza. Since the end of 2005, there has been increasing interest in new international political and cross-sectoral collaborations on serious health risks. Numerous international meetings and symposia have been held, including major initiatives in Winnipeg (Manitoba, Canada, March 2009), Hanoi (Vietnam, April 2010), and Stone Mountain (Georgia, US, May 2010), as well as four international One Health Scientific Congresses, the last of which took place in Melbourne, Australia, in December 2016.

Aim of One Health

To improve health and well-being through the prevention of risks and the mitigation of effects of health crises that originate at the interface between humans, animals and their various environments. For that purpose, there is need to promote a multi-sectoral and multi-disciplinary collaborative approach as well as promote a “whole of society” approach to health risk mitigation, as a systemic change of perspective in the management of risk. One Health is now more of an approach than a new concept. It is rapidly becoming an international movement based on cross-sectoral collaborations.

The Benefits of One Health

The benefits of a One Health approach include:

- i) Improving animal and human health globally through collaboration among all the health sciences, especially between the veterinary and human medical professions to address critical needs.
- ii) Meeting new global challenges head-on through collaboration among multiple professionals in veterinary and human medicine as well as environmental, wildlife and public health.
- iii) Developing centers of excellence for education and in-service-training in specific areas through enhanced collaboration among colleges and schools of veterinary medicine, human medicine, and public health.
- iv) Increasing interactive opportunities for multiple professionals as well as adding to our scientific knowledge to create innovative programs to improve health.

Rationale for One Health Approach

Due to increasing globalization and interface between humans, livestock and wildlife, coupled with increased global travel; the world has become a 'village'. Many emerging infectious disease and health issues are linked to increasing contact between humans and wildlife, intensification and integration of food production, and the expansion of international travel. As a result, an increased number of infectious diseases emerged during the 20th century; scientists began to recognize the new threats and challenges to societies; most importantly it was recognized that these threats largely originated from animals. Of the 1,415 microbes that are known to infect humans, 61 percent come from animals. For example, rodents transmit plague and typhus to humans, and domestic livestock are the original source of highly contagious diseases such as measles, mumps, and pertussis. One important exception is *Mycobacteria tuberculosis*. Genetic evidence suggests that *Mycobacteria tuberculosis* originated in human populations and spread to animals. Chimpanzees were a reservoir host for the human immunodeficiency virus.

The risk factors for emergence and re-emergence of disease include; illegal trade in wildlife globally, continuous evolution of pathogens, increasing food insecurity and limited access to safe food products, which have resulted in the consumption of bush meat and invading the space of wildlife. There is an increase in different species seeking new habitats. Therefore, the collaboration between sectors is imperative to combat the threat of disease emergence and re-emergence. The objective of One Health approach is to create stronger and more efficient integrated health systems with inputs from multiple stakeholders, in addressing global health issues.

Scope of One Health

The scope of One Health is very wide. It covers the collaborative efforts from the following disciplines; animal, agriculture and veterinary science, clinical medicine, and research, biosafety and biosecurity to combat bioterrorism, conservation science, and environmental science. The scope also includes the sectors responsible for combating existing and emerging diseases and zoonosis, biomedical research and medical and veterinary diagnosis, surveillance, control, response and recovery directed at natural and/or intentional threats that are chemical, toxicological or radiological in nature. One Health also covers ethics, entomology, food safety and security, global food and water systems, global trade and commerce, health of the environment and environmental conservation. The approach further includes in its wide coverage implications of climate change, infectious disease ecology and integrated systems for disease detection, land use production systems and practice, mental and occupational health as well as public health, awareness and communication, support of biodiversity, wildlife promotion and conservation.

One Health Problems as “Wicked Problems”

According to (Rittel & Webber, 1973) as cited by Head and Alford (2008), the likelihood of achieving clear and agreed solutions is hindered by the differences in aspirations, values and perspectives found in social groups. Subsequently, this creates problems that are generally ‘ill-defined’ because of relying more on political judgments rather than scientific certitudes. Such problems are ‘wicked’ i.e. they are inherently resistant to clear and agreed solutions.

According to the Australian Public Service Commission (APSC 2007) as cited by Head and Alford (2008), the features of wicked problems include:

- i) Difficult to clearly define
- ii) Many interdependencies and multi-causal aspects
- iii) Proposed measures may have unforeseen effects
- iv) Problems may be unstable and continue evolving
- v) No clear and correct solution
- vi) Problems are socially complex with many stakeholders
- vii) Responsibility stretches across many organizations
- viii) Solutions may require behavioral changes by citizens and stakeholder groups

Wicked problems are seen as linked to social pluralism (multiple stakeholder interests and values), institutional complexity, and scientific uncertainty (fragmentation and gaps in knowledge).

Note: Uncertainty is mentioned in this course as one of the factors considered while doing a Risk Analysis.

Wicked problems can be resolved by laying emphasis on new processes and thinking (APSC 2007) as cited by Head and Alford (2008). These include: holistic, not partial or linear thinking; innovative and flexible approaches; the ability to work across agency boundaries; increasing understanding and stimulating a debate on the application of the accountability framework; effectively engaging stakeholders and citizens in understanding the problem and in identifying possible solutions; developing skills in communication, big picture thinking and influencing skills and the ability to work cooperatively; a better understanding of behavioral change by policy makers; a comprehensive focus and/or strategy and tolerating uncertainty and accepting the need for long-term focus.

Annex: Tips for Activity 1

It is clear that no one discipline or sector of society has enough knowledge and resources to prevent the emergence or resurgence of diseases in today's globalized world. Solving today's threats and tomorrow's problems cannot be accomplished with yesterday's approaches. We are in an era of 'One World, One Health' and we must devise adaptive, forward-looking and multidisciplinary solutions to the challenges that undoubtedly lie ahead.

Why now...

As a result,

Human populations are growing and expanding into new geographic areas (urbanization and industrialization).

More people live in close contact with wild and domestic animals. Close contact provides more opportunities for diseases to enter animals, humans and the environment. In addition, increased waste generation affects the environmental, animal and human health.

Increased food safety concerns

Contamination of foods of animal origin with drugs, and antimicrobial resistance

The earth has experienced changes in climate and land use because of deforestation and intensive farming practices.

Disruptions in environmental conditions and habitats provide new opportunities for diseases to pass to animals.

International travel and trade have increased (globalized world).

Diseases can spread quickly across the globe.

Case Study: Mining in Lake Tshangalele: Environmental and Health Impact Assessment in the Democratic Republic of Congo



Improvised ventilation for a mine shaft at the Tilwezembe site, near Kolwezi, Katanga



<http://www.amnesty.org/en/news/chinese-mining-industry-contributes-abuses-democratic-republic-congo-2013-06-19>

To provide incentives and attract investors to the mining sector, a new mining code was enacted in the DRC in July, 2002. The new code attracted several new mining companies generally of smaller size compared to those operating at the time of the reform. For economic reasons, small mining operations tend to operate closer to large populations creating health and environmental problems. To mitigate

the environmental impact of extractive industries, the government of DRC has recently enacted an environment framework law. However, this 2011 legislation still needs other implementation measures to guarantee its effectiveness.

The increase in mining operations in Lubumbashi, a city of 1.3 million inhabitants and the surrounding areas has led to air and water pollution, directly affecting humans, animals and the food chain. The mines are estimated to provide direct employment to between 200,000 and 280,000 permanent full-time miners and are located only 0.1 km from the edge of the city (see Figure). During the peak season, the total number of miners reaches an estimated 400,000 workers. About 74% of miners are diggers while the remaining are sorters and washers.

Miners and their families are exposed to heavy metals through dust inhalation as well as food and water contamination. In Shinkolobwe and Kolwezi, miners are exposed to radiation of up to 24 mSv/year. Poor sanitary conditions in miners' camps also favor epidemics. Recent studies have shown a significant risk of heavy metal contamination in humans, goats and fishes. Massive excavations related to copper mining operations affect the ecosystem such that the natural habitat of rodents and other animal carriers of pathogens that may cause known and unknown diseases are invading human habitats creating a serious health risk.

In 2011, an outbreak of an unknown disease with hemorrhagic fever-like symptoms caused several deaths and hospitalizations in Kapolowe health district, 114 Km North West of Lubumbashi. However, follow up was not made as there was generally poor understanding of these exposures and their specific effects, and they did not have adequate capacities to study and mitigate these problems.

Evidence suggests that fish from Lake Tshanga-Lele located in the same district are heavily contaminated. Fish from this lake constitute a main source of protein for the population of the city of Lubumbashi. Illnesses of unknown origin have also been observed in goats within the same area. These kinds of exposures from mining and activities related to it may be associated with significant disease burden. The WHO estimates that environmental risk factors contribute to 24% of the global burden of disease from all causes, and to 23% of deaths, emphasizing that this is likely a conservative estimate because for many diseases, the associations are poorly understood (Prüss-Üstün and Corvalán, 2006).

Case Study: Ebola Diaries: Lessons from Previous Ebola Outbreaks Help with the Response in Guinea by Marie Claire Mwanza, a Social Mobilization Expert

Marie Claire Therese Fwelo Mwanza, a social mobilization expert with 27 years' experience at WHO, helped end five of the DRC's seven Ebola outbreaks through effective community engagement. In 2014, Marie Claire played a role in bringing DRC's latest Ebola outbreak to an end in three months. Then, she, and 60 colleagues she trained, went to Guinea to support the outbreak response there.

"In Guinea, there were rumors that blood was being sold. For us, this was déjà-vu. In the 2012 Ebola outbreak in Isiro and Dungu in Oriental Province, DRC, families hid their sick loved ones in the forest because of such rumors. These rumors instilled so much fear; the community revolted and attacked Médecins Sans Frontières.

Nearly 60% of the community believed the rumors, so we had to correct it. This was not easy, as we ourselves had only words to work with, but we knew what we needed to do: understand the rumors, find a way to gain the trust of communities and engage communities in helping to dispel the myths. This was similar to what would be needed in Guinea.

Understanding Communities and Tailoring Messages

This is how we handled it in DRC: first, we had to understand why this was happening, so we trained 50 medical students – nurses – to conduct quick surveys in the communities. They reported that people heard, ‘when you go to an Ebola treatment unit (ETU), your heart is punctured and 20 liters of blood are drawn. Your genitals are cut off and your blood and organs are sold on the international black market.’

Equipped with this information, we redeveloped our messaging to better educate people about what was really taking place in ETUs, but the rumors did not go away. Why? Because people needed to see it with their own eyes.

Then, we invited three community leaders to visit an ETC. We dressed them in personal protective equipment (PPE) and took them into the Red Zone where they saw firsthand that patients were being given food, that they were not being killed or having their organs cut. After this, we invited them and Ebola survivors to go door-to-door with us and share their stories. Ebola survivors shared personal advice with their testimonies: ‘If you come quickly, you will have a better chance to survive. I was saved because I went to the ETU earlier.’ These testimonies rebuilt trust with the community, who then not only trusted us but even began bringing in the sick and collaborating to help find contacts. They now understood why it was important to go to an ETU.

It was the same thing for safe burials. Communities refused them. So, we dressed a family member in PPE and took him with us to help bury his loved one. He saw for himself that we were not cutting out his loved one’s organs before burying him. This is how we stopped the 2012 Ebola outbreak in DRC in six months – through community engagement.

Nearly 40 Years Later, another Outbreak in the Birthplace of Ebola

In 2014, DRC faced its seventh Ebola outbreak. This time it was in Boende, in Equateur Province, about 1,000 km from Isiro. This province was the birthplace of DRC’s first Ebola outbreak in 1976. Using our experience, we were able to work together with communities to stop the outbreak in just three months. It was very interesting: how the communities themselves helped, how they even showed the surveillance teams where the contacts were and how they engaged with each other and with the authorities in this work.

In Boende, the response emphasized engaging communities in the contact tracing alongside the social mobilization and surveillance teams. We formed partnerships with the communities through dialogue and we gave them both the responsibility and the power from the beginning.

Encouraging Active Participation Yields Positive Results

During this outbreak, there was a 7-year old with Ebola who was taken to a treatment center. When he arrived, he saw ‘the cosmonauts,’ health workers dressed in PPE. He was so scared to see them; he always kept his eyes closed. When he survived, he happily returned home, but he still kept his eyes closed. His parents were sad and complained. They thought he had become blind at the ETU. WHO sent a psychologist and a social mobilization team to visit the family. The psychologist talked with the boy, who said he was scared to open his eyes. In the end, he finally opened his eyes and he could see.

In Guinea, we used a similar approach and took it even further. Not only did we engage communities to help with educating their neighbors about Ebola, but also encouraged them to actively participate in community surveillance and contact tracing. We trained 250 community members as surveillance officers and 25 supervisors for the active surveillance of Ebola in their communities.

We spoke with the community to help them understand the risks and to obtain their help in searching for and notifying us of suspected illnesses and contacts, visitors and deaths at the community level. First, we talked with affected families. We told them, ‘You have this sick (or deceased) family member. You do not want another one. To avoid this, we must list and find all contacts. Here are the dangers of Ebola that can happen to your family members if we do not find all contacts...’

It is very important to be compassionate during these conversations. Our conversations were careful and effective. Afterwards, families themselves created contact lists and helped contact tracers find contacts, even those located 50 km away. This made all the difference.”

Source: *www.who.int*, retrieved 7th March 2018

Case Study: (Available in the resource pack)

Risk Analysis: Foot-and-Mouth Disease (FMD) Risk from Importation of Fresh (Chilled or Frozen), Maturated, Deboned Beef from a Region in Brazil into the United States

Case Study: (Available in the resource pack)

A Quantitative Risk Assessment Study for the Likelihood of Introduction of New FMDV through Importation of Cattle from Sudan to Egypt: An Edification Article

Case Study: (Available in the resource pack)

Effects of Global Climate on Infectious Disease: The Cholera Model

What is Risk Assessment?

Risk assessment is *a systematic, evidence-based approach for quantifying and describing the nature, likelihood, and magnitude of risk associated with the current condition and the same values resulting from a changed condition due to some action*. Risk assessment should be flexible, and based on the best available information that is in accord with current scientific thinking. It should also be consistent and transparent to ensure fairness and rationality in decision-making. It is important to document the uncertainties, the assumptions made, and the effect of these on the final risk estimate. It is amenable to updating when additional information becomes available. Follow both qualitative and quantitative risk assessment methods.

Risk assessment is meant to provide decision-makers with complete information, in order to help them to make informed decisions and to better assess the impact of these decisions to protect health in the face of scientific uncertainty. It is done by trained, experienced, knowledgeable and capable personnel.

The World Trade Organization (WTO) defines Risk Analysis as the evaluation of the likelihood of entry, establishment or spread of a pest or disease within the territory of an importing member, according to the sanitary or phytosanitary measures which might be applied, and of the associated potential biological and economic consequences. Or, Risk Analysis is the evaluation of the potential for adverse effects on human or animal health arising from the presence of additives, contaminants, toxins or disease-causing organisms in food, beverages or feedstuffs.

The World Organization for Animal Health (OIE) defines risk assessment as the component of an analysis which estimates the risks associated with a hazard. Risk assessment may be qualitative or quantitative. For many diseases, particularly for those diseases listed in this Terrestrial Code where there are well developed internationally agreed standards, there is broad agreement concerning the likely risks. In such cases, it is more likely that a qualitative assessment is all that is required. Qualitative assessment does not require mathematical modeling skills to carry it out and so is often the type of

assessment used for routine decision-making. No single method of import risk assessment has proven applicable in all situations, and different methods may be appropriate in different circumstances.

When to Use Qualitative Risk Assessment

- i) Where the hazards presented by the undertaking are few or simple. This can be a very straightforward process based on informed judgment and reference to appropriate guidance.
- ii) Where the hazards and risks are obvious, they can be addressed directly, and no complicated process or skills will be required.
- iii) Routine non-controversial tasks
- iv) When theory, data, time or expertise is limited
- v) When other methods are going to be cost prohibitive and have a low probability of successful analysis
- vi) When quantitative analysis is likely to result in inconclusive results

When to Use Semi-Quantitative Risk Assessment

In many intermediate cases where the hazards are neither few and simple nor numerous and complex, for example if there are some hazards that require specialist knowledge, such as a particular complex process or technique, it may be appropriate to supplement the simple qualitative approach with a semi-quantitative assessment.

When to Use Quantitative Risk Assessment

This is used where the hazards presented by the undertaking are numerous and complex, and may involve novel processes. In such cases, detailed and sophisticated risk assessments will be needed. It is appropriate to carry out a detailed quantitative risk assessment in addition to the simple qualitative assessment.

Tips/Information on Stakeholder Analysis

Get together with people in your organization, officials, and others already involved in or informed about the effort and start calling out categories and names. Part of the point of brainstorming is to come out with anything that comes to mind, even if it seems silly. On reflection, the silly ideas can turn out to be among the best, so be as far-ranging as you can. After 10 to 15 minutes, stop and discuss each suggestion, by identifying each as a primary, secondary, and/or key stakeholder.

- i) *Primary stakeholders* are the people or groups that stand to be **directly affected**, either positively or negatively, by an effort or the actions of an agency, institution, or organization.
- ii) *Secondary stakeholders* are people or groups that are **indirectly affected**, either positively or negatively, by an effort or the actions of an agency, institution, or organization.
- iii) *Key stakeholders*, who might belong to either or neither of the first two groups, are those who can have a positive or negative effect on an effort, or who are important within or to an organization, agency, or institution engaged in an effort.
- iv) *Collect categories and names from informants in the community* (If they are not available to be part of a brainstorming session), particularly members of a population or residents of a geographic area of concern.

- v) *Consult with organizations* that either are or have been involved in similar efforts, or that work with the population or in the area of concern.
- vi) *Get more ideas from stakeholders* as you identify them.
- vii) If appropriate, *advertise*. You can use some combination of the media – often free, through various community service arrangements – community meetings, community and organizational newsletters, social media, targeted emails, announcements by leaders at meetings and religious gatherings, and word of mouth to get the word out. You may find people who consider themselves stakeholders whom you have not thought about.

Important Questions

1. Who does the problem affect most?
2. What section of this problem-affected group is most likely to be able to change?
3. Which ones will be resistant to change or difficult to engage?
4. Who is in a position to help bring about change to address the problem?
5. Who has a vested interest in maintaining the status quo (no change)?
6. Who wants to see the problem addressed (what community support for change is there and who are these supporters?)
7. What government or organizational jurisdictions or responsibilities are involved or should be involved?

Examples of Success and Failure in Risk Communication (borrowed from Guest et al, eds (2013). Oxford Handbook of Public Health Practice 3rd ed.)

Success

Singapore showed good risk communication during the outbreak of severe acute respiratory syndrome (SARS) in 2003, when the Prime Minister acknowledged that it made sense for other countries to restrict travel to Singapore until SARS was under control. In contrast, China urged people not to cancel trips to Guangdong Province; Hong Kong asserted that Hong Kong was absolutely safe and did not have an outbreak, and Toronto was slow to take action. Singapore also communicated well over the decision to close schools, which a minister explained was not on medical grounds, but because teachers and doctors reported that parents were concerned about risks to their children.

Failure

The WHO was accused of a lack of transparency in its decisions about the swine (H1N1) flu pandemic in 2009–2010, with some loss in the credibility of WHO and trust in the global public health system.

Success and Failure

The complex saga of bovine spongiform encephalopathy (BSE) in cattle and its possible links with a new variant of the human disease, Creutzfeldt–Jakob disease (vCJD), aroused considerable public concern as shown in the examples of communicating the BSE–CJD epidemic in the United Kingdom and Australia.

United Kingdom

The Ministry of Agriculture was perceived to be secretive, and was criticized for denying the possibility of a link between BSE in cattle and vCJD in humans. The Minister for Agriculture denied risks of

human infection from BSE, but later a group of 'eminent scientists' reported that they had stopped eating British beef. Articles in the press contained estimations of wildly differing numbers of people who may have contracted vCJD.

Australia

The government provided easy access to information via the media and a telephone information line to prevent the release of contradictory information and to acknowledge that there were risks involved, although small. Co-ordinated media liaison between government agencies helped to promote balanced reporting by the Australian media. It is not possible to say whether the government's media strategy would have been as effective if BSE had been discovered in Australia.

Key points: Avoid secrecy, the denial of risk, and contradictory messages. Acknowledge uncertainty promptly. (*Adapted from Banwell and Guest, as cited by Guest et al (eds.), 2013*).

OHCEA Event Evaluation – Risk Analysis Training

Facilitators: _____

Dates: _____

OHCEA supported you to attend the Risk Analysis training. Please take a few minutes to fill out the following confidential questionnaire. Your responses will help us better understand the value of this event and improve future programs. Thank you!

Please circle your response to each of the following

1. This event met my expectations.
 - (a) Strongly disagree
 - (b) Disagree
 - (c) Agree
 - (d) Strongly agree
 - (e) Don't know
2. This event was relevant to my personal interests.
 - (a) Strongly disagree
 - (b) Disagree
 - (c) Agree
 - (d) Strongly agree
 - (e) Don't know
3. This event was relevant to my professional interests.
 - (a) Strongly disagree
 - (b) Disagree
 - (c) Agree
 - (d) Strongly agree
 - (e) Don't know
4. The information presented was new to me.
 - (a) Strongly disagree
 - (b) Disagree
 - (c) Agree
 - (d) Strongly agree
 - (e) Don't know
5. The amount of information provided was:
 - (a) Not enough
 - (b) About right
 - (c) Too much
6. This event helped clarify my understanding of "One Health."
 - (a) Strongly disagree
 - (b) Disagree
 - (c) Agree

- (g) Strongly agree
- (h) Don't know

7. The pre-event logistics were well organized.

- (a) Strongly disagree
- (b) Disagree
- (c) Agree
- (d) Strongly agree
- (e) Don't know

8. The event itself was well organized.

- (a) Strongly disagree
- (b) Disagree
- (c) Agree
- (d) Strongly agree
- (e) Don't know

9. Overall, I found this event to be worthwhile.

- (a) Strongly disagree
- (b) Disagree
- (c) Agree
- (d) Strongly agree
- (e) Don't know

10. I intend to take actions in my work because of what I have learned at this event.

- (a) Strongly disagree
- (b) Disagree
- (c) Agree
- (d) Strongly agree
- (e) Don't know

11. Describe what, if any, actions you will take in your work because of this event.

12. What were the strengths of this event?

13. What can be done to improve this event?

14. What single most important lesson did you learn from this event?

15. Please write any additional comments you may have about this event.

16. Did you present at this event?

- (a) Yes
- (b) No

17. (a) If yes, what was the topic of your presentation?

18. What is your *primary* area of work?

- (a) Nursing
- (b) Human Medicine
- (c) Veterinary Medicine
- (d) Wildlife Medicine
- (e) Public Human Health
- (f) Public Veterinary Health
- (g) Other (please specify): _____

8. Which sector do you represent?

- (a) Government
- (b) Private sector
- (c) Education
- (d) Non-governmental organization (NGO)
- (e) Research
- (f) Other (please specify): _____

7. What is your sex?

- (a) Male
- (b) Female

3. Nationality: _____

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