ONE HEALTH RISK ANALYSIS

Student Guide
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This module is One of 16 One Health Training Modules developed by the One Health Central and Eastern Africa network (OHCEA), a network of 8 countries, 21 institutions of Public Health and Veterinary Medicine in Africa: Kenya, Uganda, Tanzania, Rwanda, Ethiopia, Democratic Republic of Congo, Cameroon and Senegal. 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 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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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, and professionals working in these areas best serve the population by collaborating, to better understand all the factors involved in disease transmission, ecosystem health, the emergence of novel pathogens and emerging and reemerging zoonotic agents, as well as environmental contaminants and toxins that 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 and 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. This tool 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. Risk analysis is a tool 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 soft skills and technical competencies developed by OHCEA, that combines 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 (module), to produce manpower skilled and knowledgeable on matters related to OH. This module is intended to build the skills, knowledge and ability of trainees to effectively look for answers to OH 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 focused on One Health professionals responsible for human, domestic animal, wildlife and ecosystem/environmental health interfaces.

The training module on One Health Risk Analysis will serve as a training material for animal, human 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) so as to promote and champion the One World-One Health-One Medicine aspirations.

Goals of the Training

The module has the following four goals:

☞ Understand the importance and application of OH Risk Analysis
☞ Know how to conduct a One Health risk assessment using qualitative, semi-quantitative and quantitative techniques
☞ Understand how to implement OH risk management
☞ Appreciate effective OH risk communication
☞ Appreciate gender diversity and mainstreaming in One Health risk analysis
Learning Objectives of the Module
▪ The learning objectives of the 5-day training course are presented in the sub-modules section

Training/Learning Methods
▪ Lectures by Power point presentations, Brainstorming, Videos/movies, group discussions
▪ Individual and group exercises, illustrative lectures, individual reflection, demonstrations
▪ Observation site/ facility visits (Field Visits), Brain teasers (a pre- and post-training quiz)

Learning Materials
This guide for students is designed to be used with the following materials:
▪ Risk Analysis Reference materials
▪ Power points

Programme/Agenda

<table>
<thead>
<tr>
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<th>Day 2</th>
<th>Day 3</th>
<th>Day 4</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Introduction to OH risk analysis: Concepts, terminologies, purposes, principles, components, frameworks of risk analysis, and types and causes risks, and methods of risk analysis,</td>
<td>Overview of risk assessment: principles, approaches/ methods, steps, qualitative, semi-quantitative and quantitative</td>
<td>Field Visit and performing actual risk assessment (Exercises), and presenting group exercises on the field risk assessment activity</td>
<td>Overview of risk management: principles, frameworks, process, steps, stakeholder analysis (Engagements), risk mobilizations, Risk mitigation, monitoring and management, Characteristics of Effective Risk Management Strategies</td>
<td>Overview of risk communication: principles, concepts, definitions, strategies, purpose, elements, challenges, barriers, channels/ tools, Key OH risk messages (mapping, development and summarization, Consideration of divers socio-cultural norms, beliefs and values in OH risk communication)</td>
</tr>
<tr>
<td>Focus on OH risk analysis concepts, types of risks and their sources</td>
<td>Focus on risk assessment tools and procedures</td>
<td>Applying risk assessment tools and approaches</td>
<td>Focus on risk management process</td>
<td>Post training assessment, final training evaluation and closing remark</td>
</tr>
</tbody>
</table>

Target Audience
▪ The module can be used by undergraduate and post-graduate learners, faculty, middle cadre trainees and in-service personnel from multiple disciplines and sectors (government, private, NGOS, and civil society). This module can also be adopted for continuous professional development by health professional organizations such as medical, veterinary, pharmaceutical, nursing, public health, environmentalists and technologist’s professionals
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Session 1: Introduction to One Health Risk Analysis

Sub-module Overview:
This sub-module will provide an overview of the learning objectives and gives the participants an opportunity to learn more about each other’s background, disciplines, and skills; including the One Health concept as well as issues, terms and concepts of risk analysis in the context of OH. By way of introduction, participants shall explore the types and sources of different OH related risks and the need for multi-stakeholder engagements.

Session on Learning Objectives and Activities

Learning Objectives:
▪ Explain the One Health concept
▪ Define basic terminology of OH risk analysis
▪ Describe the purpose of OH risk analysis
▪ Describe the components of the OH risk analysis process
▪ Explain how OH risk analysis framework is used
▪ Describe types of One Health related risks
▪ Apply risk analysis methods for prioritizing One Health related risks

Time Activity/Policy Participant instructions

Registration 15 min
• Sign the OHCEA attendance register

Welcome 30 min
Facilitator welcoming remarks and introductions.

Introductions:
• In pairs, share your:
  o Name
  o Where you are from
  o Type of work and position
  o The latest One Health Activity you have been engaged in
• Prepare 1-minute introduction of your partner to the class
• Go around the room and have each pair present their partner to the class.

Expectations
There are two flipcharts set up in the front of the class: one titled “Expectations” and the other “Concerns.”

• You have been provided with two different colored Post Its® notes
• Write down your expectations for the short course on one of the Post Its® notes (in the specified color) and your concerns about the course on the second the Post Its® notes (in the specified color)
• Place your expectation Post Its® notes on a flipchart titled “Expectations” and your concerns Post Its® notes on another flipchart titled “Concerns”
Goals of the Short-Course

- Understand the importance and application of OH Risk Analysis
- Know how to conduct a One Health risk assessment using qualitative, semi-quantitative and quantitative techniques
- Understand how to implement OH risk management
- Appreciate effective OH risk communication
- Appreciate gender diversity and mainstreaming in One Health risk analysis

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 Schools 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.

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**Guest Speaker and Pre-Test**

- The guest speaker will officially open the workshop

Pre-test. You have 15 minutes to complete the pre-test. A pre-test is used to gauge how much you will have learned over the week; a post-test will be administered at the end of the course. The two tests will be compared at the end of the training to check on knowledge gain. There is no grade associated with the pre-test.

**Break**

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**Prior reading material:**

- It is expected that you read the following material prior to coming to this course:
  
  *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*


- It is expected that you watched the movie *contagion* as it will be used as an example in the class
Discovery Activity: What is One Health?

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

Take 5-7 minutes to think about and legibly write down on separate post it notes the answers to the following questions:
- Define what One Health approach means
- Identify two examples of One Health in practice
- Identify two to three advantages to multiple disciplines working together to promote one health

Display these post-it notes on the wall in the three separate sections. Then in a plenary review the following:
- What are the common things identified?
- What are the differences?
- Is there anything that surprised anyone?

Come up with a group description of what One Health is

There are many similar definitions of One Health by health organizations, but for the 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 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.

Overview of One Health Concepts

This presentation introduces One Health, the interdependence between humans, animals and the environment and why disciplines need to work together and One Health Core competencies. It also answers the questions: why one health and why now?

Reflect on:
- What One Health is and any questions you may have related to the power point presentation.

Discovery Activity: What is Risk analysis

Introduction to Risk Analysis:

You have two post it notes. On one post it note, share different ideas of what you think risk and risk analysis is. On the second post it note, give an example of something you would consider a risk and how you would analyze this risk. Place these notes in two different piles. Afterwards all the post it notes should be read out loud.
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. Risk analysis is a tool 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
- Decision-aiding method which, according to the OIE, involves hazard identification risk assessment, risk management and risk communication.
- Evaluation of the likelihood of entry, establishment and spread of a disease and the associated potential biological and economic consequences and its impact on public health
- The potential, likelihood or probability for realization of unwanted, adverse consequences to human or animal life, health, property, or the environment
- 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).

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)

Group Activity on the Codified frameworks for risk analysis

Divide into three groups. Each group is assigned one of the above codified frameworks
- Codex Alimentarius (focuses on food safety)
- Invasive species (UN convention on Biological Diversity)
- OIE (related to animal movement)

You have 45 minutes to research your framework; define what it means, and identify the risk analysis principles behind that framework. Each group will get 10 minutes to present its framework in a plenary and the class will discuss these different frameworks. You should also identify at least one article or reading material related to the framework and share this with the participants.
Risk analysis and frameworks will be added to the resource folder and used throughout this training.

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.
- What is the specific hazard of concern?
- What are the vector/vehicle/of the hazard of concern?
- What specific risk do we want to assess?
- What particular time frame are we interested in?
- What is the available budget?
- Who should be involved?

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

Who/what/where is at risk?
- Individual
- General population
- Life stages such as Juveniles or adults
- Population sub group

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 natural resources to community, noise, "invasions "

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

Watch the video: deadly animals among us - Killer outbreak series

After watching this video, break into pairs and each group should come up with a risk analysis question based on the video. These questions shall be discussed in the plenary with a focus on the above points.

List who you consider to be the vulnerable populations in this video-
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.

**Case study**

**Mining in Lake Tshangalele**

Read the case study on mining in Lake Tshangalele

**Mining in Lake Tshangalele- case study**

In a plenary session review this case study - what are some possible risk analysis questions/ who/what/where is at risk and what are the hazards of concern -

Come up with a risk analysis question related to animals, one related to humans and one related to the environment.

**Divide into 4 main groups.**

Each group is assigned one of 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

The topic assigned to you will be your risk analysis topic throughout the week and you will take responsibility to research on that topic and know as much as possible about it.

In the next 15 minutes, think through a risk analysis question related to your topic and present that question to the rest of the groups for discussions. As a take home assignment, you will be required to do some preliminary research on your topic.

**Components of Risk analysis**

Introduction of the different component of risk analysis
In this section, we present the components of risk analysis. This 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 ID**
- what can go wrong?
- how can it go wrong?
  - pathogens introduced
  - Importation/reintro. Etc.

**Risk Assessment**
- how likely is it?
- What is the probability of something going wrong?
- What are the consequences
  - L,M,H – Prob, %

**Risk Management**
- How do we minimize risk?
- What can be done to reduce the likelihood or minimize the consequences?
  - Testing, vacc, health certification, regulation

**Risk Communication**
- Who are the people or stakeholders involved?
- do people understand?
  - Keeping all stakeholders involved

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

Session Debrief
Debriefing - Summary of Key points

Notes
### Session 2: Risk Assessment

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity/Topic</th>
<th>Participant Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 min</td>
<td>Introduction</td>
<td>This sub-module deals with One Health risk assessment. It has been designed to help trainees understand basic information about the definition, principles, purposes, steps, methods, approaches, tools, qualitative, semi-quantitative and quantitative risk assessment and how to report results of risk assessment. With this, the participants/trainees will be able to achieve the following learning objectives.</td>
</tr>
</tbody>
</table>
|         |                                 | **Learning Objectives:** Participants will be able to:  
- Define the different hazards and begin to construct a model for that  
- Define risk assessment and learn its purpose  
- Describe the principles, methods/approaches of OH risk assessment  
- Differentiate among qualitative, semi-quantitative and quantitative risk assessment techniques  
- List the steps of qualitative and quantitative OH risk assessment  
- Apply theoretical knowledge and practical skills to conduct qualitative, semi-quantitative and quantitative OH risk assessments  

| 30 min  | Group activity-review of the risk question | Take 20 minutes and work on your risk analysis question for your specific topic. Each group should then present their question to the plenary and the plenary group should help them to refine the question or make it better. After all groups are comfortable with their question, we can then move forward.                                                                 |
| 15 min  | Introduction to risk assessment      | 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**: It 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 included as seen below:

The main steps in risk assessment are presented in the picture below.
As we discussed previously, hazards can be in many forms. They can be:

- Environmental
- Physical (changes to a habitat)
- Chemical (single, multiple, cumulative risk, e.g. toxins)
- 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
- natural resources to community, noise, “invasions “, war

If a hazard is not identified, the risk due to that hazard cannot be assessed and risk management will be unable to put control 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:** What is the risk of zoonotic disease transmission from African rodents imported into the United States causing an outbreak in humans. With this question a hazard identification visual is proposed as below.
Identify the hazard related to your topic.

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

Please develop a hazard diagram for your hazard, based on your 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

This section introduces the conceptual model for hazard identification, exposure and release. This conceptual model illustrates the sources of hazards, how the hazard is released, is transported, and finally reaches the populations at risk.
The conceptual model presented below is for bovine TB transmitted through milk in Ethiopia developed by Emily Mitchard at Tufts University. This can be used as an example:

45 min

Power point presentation on exposure, release and consequence assessment

Power point presentation and examples on bovine TB that focus on 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
This pathway determines an orderly series of events which would ultimately lead to the acquisition of BTB by humans.


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 (pathogens) in each situation depending on the amounts and timing, various actions, events or measures.
Prepare a similar model outlining the Hazard and release assessment of your topic. 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 taking into account 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:

![Exposure mechanisms diagram](image)

Add the exposure section to your charts

**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
    - Loss of production and those related to infection or disease of animals
    - The consequences for public health.
    - The adverse effects on the environment.
  - Indirect consequences
- Costs related to monitoring and control
- Compensation costs

Potential trade losses

Consequence assessment in the case of bovine TB includes the probability of becoming:
   a) Infected
   b) Diseased
   c) Dying
   d) 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
  - Infected/diseased people and animals
  - Loss of production and those related to infection or disease of animals
  - Costs to public health.
  - The adverse effects on the environment.

- Indirect consequences
  - Costs related to prevention and monitoring and control
  - Compensation costs
  - Costs related to banning of importation of prairie dogs
  - Hospitalization costs
  - Emotional—costs of losing a pet
  - Panic in a community

A score table like the one below is very effective in presenting consequence information

<table>
<thead>
<tr>
<th>Consequence Assessment Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of impact</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td><strong>For human health</strong></td>
</tr>
<tr>
<td>A. Extent</td>
</tr>
<tr>
<td>B. Intensity</td>
</tr>
<tr>
<td>C. Duration</td>
</tr>
<tr>
<td>D. Effect</td>
</tr>
<tr>
<td>Total (A-D)</td>
</tr>
<tr>
<td><strong>Economic</strong></td>
</tr>
<tr>
<td>A. Extent</td>
</tr>
<tr>
<td>B. Intensity</td>
</tr>
<tr>
<td>C. Duration</td>
</tr>
<tr>
<td>D. Effect</td>
</tr>
<tr>
<td>Total (A-D)</td>
</tr>
<tr>
<td><strong>Environmental</strong></td>
</tr>
<tr>
<td>A. Extent</td>
</tr>
<tr>
<td>B. Intensity</td>
</tr>
<tr>
<td>C. Duration</td>
</tr>
<tr>
<td>D. Effect</td>
</tr>
<tr>
<td>Total (A-D)</td>
</tr>
</tbody>
</table>
Activity: You have 30 minutes to prepare a consequence assessment score for your topics and present these to the plenary. You 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, add the section on who/what/where is at risk - who are the vulnerable at-risk populations and display your full model on wall for plenary to review.

Conceptual model—Exposure to *Mycobacterium bovis* in livestock keepers in Addis Ababa, Ethiopia

The above Bovine Tb conceptual model was developed by Emily Mitchard from Tufts University.

You were requested to watch the movie contagion prior to attending the workshop. In this session, since you are now familiar with the different stages of risk assessment and developing a conceptual model, break 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*

Power point presentation on the methods of risk assessment: qualitative, semi-quantitative and quantitative

For the purpose of this training, the focus will be on using qualitative methods for your 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:

- it can be from direct observation
- Data collection in the field
- Key informant interviews
- Desk top review of literature

Debrief:

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 workshop, 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 table below:

<table>
<thead>
<tr>
<th>Probability category</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negligible</td>
<td>Events is so rare that it does not merit to be considered</td>
</tr>
<tr>
<td>Very low</td>
<td>Events is very rare but cannot be excluded</td>
</tr>
<tr>
<td>Low</td>
<td>Events is rare but does occur</td>
</tr>
<tr>
<td>Medium</td>
<td>Events occurs</td>
</tr>
<tr>
<td>High</td>
<td>Events occurs</td>
</tr>
<tr>
<td>Very high</td>
<td>Events occurs almost certainly</td>
</tr>
</tbody>
</table>

Using examples from the monkey pox video, show examples of the risk estimation (included in the power point), then in your groups prepare your risk estimation based on release, exposure and consequence.

Debrief:
Field visit

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

- an abattoir/slaughter house
- a livestock market
- A fishing village
- Waste disposal site

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

- Ensure you take notes on practices observed and all factors that may influence transmission of OH related diseases/toxins/agents that could impact human, animal and environmental health.

- Think through the following questions.
  - Did you observe any potential OH 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.
  - Who are the different vulnerable populations and the stakeholders?
  - What are the possible recommendations to manage the identified risks?
  - How would you communicate this information to different audiences?

complete your conceptual model, identifying, the risk analysis problem, and developing a conceptual model and begin to identify ways to manage the risks you have identified, and communication mechanisms.

Your reports will then be presented in the next session.
This sub-module on One Health Risk Management will deal with the definition, steps and principles of OH 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 trainees with knowledge and skills on One Health risk management and enable them to be good risk managers.

**Learning Objective** are to:
- Define OH risk management
- Identify the steps for OH risk management
- Identify relevant stakeholders and rationalize their roles in OH risk management
- to 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 OH risk management
- Apply effective prevention, control and mitigation measures to manage OH risks and / or hazards
- Evaluate the implementation of OH risk management measures

**Instructional activities:**
- Power point overviews,
- Case studies, projects, PBL,
- Simulations and case studies.

Working in pairs, search the internet for the definition of risk management. Write the definition on post it notes and put them up on the wall.

Through a plenary discussion,
- 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

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. (CAC). 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.
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

**Risk management in Contagion and Monkey pox**

Divide 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 above:

- What can be/was done to decrease the likelihood of that hazardous event?
- What can be/was be done to reduce the implications once a hazardous event has happened
- How will be/were the selected risk management options implemented?
- 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. Examine the different disciplines and stakeholders involved and see if there was need to involve other disciplines.

**Power point on risk Management**

Power point on risk management. This power point 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 on their own time about risk management.

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

- Define the problem and put it in context.
- Analyze the risks associated with the problem in context.
- Examine options for addressing the risks.
- Make decisions about which options to implement.
- Take actions to implement the decisions.
- Conduct an evaluation of the action results
Risk management of the different topics/cases

After the presentation on this, develop a risk management plan, answering the questions above

These will then be presented in a plenary session.

Gender, culture and high-risk diseases

In 2015, the World Health organization designated 11 diseases as high risk for severe outbreaks. 10 of these diseases are of zoonotic origin. This list includes the following: 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 into pairs. Assign each group one of these diseases. All participants should answer the following questions:

- 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,
- They should identify the risk in relation to gender and cultural issues i.e.; are there cultural habits that increase the risk of the disease
- Are gender roles likely to impact the risk of the disease- (differences) among men women
- How can they take gender issues into consideration in their management plan?

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

Case study 1

Read through the following case studies:

- As you read through these case studies, pay specific attention to gender based risks- at exposure level, release level.
- 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 these three case studies and the role that gender plays in risk analysis.
Intestinal parasitic infections in rural Communities 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 1 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 subcategory exhibited the highest prevalences of O. viverrini (Fig. 2). Fig. 3 shows a rather similar picture for S. stercoralis infection. 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 [5]. The gender difference may be due to male-specific behavioral factors [17] such as the eating raw meat, alcohol drinking with colleagues, and taking risks with their work in the farm.

Full article found here
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3916464/

Case study 2

Case study: 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 taken into account 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.

**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


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 AI. 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 AI prevention and control.

Women are exposed to AI infections due to their roles in poultry production, marketing and food preparation. Women are usually responsible for slaughter of poultry and 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 AI 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 AI campaign messages, which are usually in Lao language and not adapted to the local situation, and to interact and communicate with AI 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
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.

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 considered.
- **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 power point, discuss with participants how to determine the level of stakeholder engagement.

In relation to your cases/topics, create a stakeholder list, their roles and the level of engagement of each stakeholder. Remember to consider marginalized communities as well as gender based differences among the stakeholders.

**Brainstorm on the following questions:**

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

Stakeholder mapping

Stakeholder analysis and mapping: In your case study group:

a) You have been provided with a set of sticky notes.
1. 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.

2. Line the sticky notes on the plain piece of paper according to whether they are international, national, regional or local.

3. Draw a circle around those stakeholders with lots of power and authority using a red marker.

4. Draw a square around those players with the most interest in the activity or who are impacted the most/ or most vulnerable.

5. Using a red marker, draw arrows that show flow of decision making (power and authority) from one stakeholder to another.

6. Using a green marker draw arrows that show flow of resources (funding) from one stakeholder to another.

7. 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:

   - Who has power and authority?
   - Who do you think should have power and yet does not?
   - Who is being left out of the different arrows and yet considered important and how do you include them?
   - 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 3: Risk Communication

<table>
<thead>
<tr>
<th>Time</th>
<th>Activity/Topic</th>
<th>Participant Instructions</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 min</td>
<td>Introduction</td>
<td>Sub-module-IV focuses on defining One Health Risk Communication, description of methods and tools used in one health risk communication, how to develop key message for One Health risk communication, understand the barriers in One Health risk communication and how to develop a policy brief.</td>
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</tbody>
</table>
|        | Learning objectives:   | - Define OH risk communication  
- Describe methods and tools of OH risk communication  
- Develop key messages on OH risk communication  
- Be able to communicate the information to the stakeholder in a timely transparent, effective and adequate manner  
- Justify the issues on gender, socio-cultural norms, beliefs and values while communicating OH risks  
- Develop policy briefs  |
| 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. Social determinants of Health 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” WHO  |
|        | Instructional activities: | - Small group discussions,  
- Seminars  
- Case studies  |
| 120 min| (Image obtained from Whitehead and Dahlgren: Concepts and Principles for tackling Social iniquities in Health, WHO 2006) Briefly brainstorm on what some of these circumstances and shapers are and how they link up with a Systems Thinking approach in One Health  
Briefly discuss the picture: what are the key issues identified in the picture that determine 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 to, media communications, social media, mass awareness campaigns, health promotion, stakeholder engagement, social mobilization and community engagement.

Establishing trust and credibility are two of the cornerstones of effective risk communication.

**Power point presentation**

Introduction on risk communication using power point: this brief power point will introduce the idea of risk communication to the learners stressing the points mentioned above.

**Think pair and share**

Using think pair and share technique, obtain answers to the following scenarios. Think, then pair with a neighbor, share with each other and then have one of you share with the rest of the group the solutions you came up with.

**Scenario 1**

- You are spokesperson for the National Emergency Taskforce leading 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
- Following the initial press release about the outbreak you are misquoted in the international media - mis-information which may cause undue concern or alarm and massively affect the tourism industry (outrage!).
- As a spokesperson how should you address inconsistent messages about the outbreak?

**Scenario 2**

- You receive information that there seems to be a “strange disease” / hemorrhagic fever outbreak in remote town
- 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?)

- Identify one audience, one to two communication vehicles and develop 3 key points (messages)

Scenario 3

- 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.
- A traditional burial was done. He was a renowned business man 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 & symptoms too.
- 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.
- 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.

Developing a risk communication plan

This activity will be done based on your case/topic. In your groups, do the following:

- 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. The following key issues need to be addressed
- As part of the plan, identify key One Health spokes persons that can effectively communicate with the public and media to prepare for and respond to. Who did you select and why?
- 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.
- Establish mechanisms for tracking and monitoring message dissemination and exposure, media coverage, audience reaction and feedback, and changing communication issues and priorities.
- Consider how to communicate to multiple audiences based on their gender, culture age, literacy status

Participants need to appreciate how outrage during risk communication is managed

- Calm the audience down respectfully and reasonably
- Listen to their concerns
- Apologize for any mistake the organization has made if the ou
• Communicate facts and evidence after you have demonstrated listening respectfully acknowledge anger and fear
• Explain the actual danger
• Cite credible third parties (experts, scientific research etc.)
• Correct misinformation
• Resolve rumors

Tips during risk communication
• Community engagement is not an option.
• Communities must be at the heart of any health emergency response.
• Identify and involve stakeholder groups e.g. VHTs, LCs, Councillors, army, police, DISO, schools, teachers, Bodaboda, taxi operators, private clinics
• Respect for social and cultural values of the population
• Involve influential people in the community i.e. clan leaders, elders, chiefs, religious leaders
• Identify the most effective locally available protection advice and solutions during the outbreak response
• Communicate risk reduction behaviours that are realistic, effective and culturally appropriate
• Identify community information needs and use trusted sources of information

Notes
Debrief on message basics

- 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”)
- Prioritize messages: First and last, must do, should do, could do, use visuals (graphics, demos), use non-technical language, use common figures of speech, don’t overwhelm with numbers / probabilities
- Be gender sensitive and endeavor to keep trust among community members.

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 a 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 topic for brief

Session 1: A policy brief is

- A short document that presents the findings and recommendations of a research project to a nonspecialized audience
- A medium for exploring an issue and distilling lessons learned from the research
- A vehicle for providing policy advice.
- It is a stand-alone document focused on one topic and usually is between 2-4 pages, maximum 1500 words

You will develop a policy brief based on your field day assigned topic. You have 15 minutes to reflect on your case for the field day.

Know your audience

A policy brief has a specific target audience. The participants should think through who their audience is going to be. Are they community members or congressmen, are they women or men, are they knowledgeable about this topic and how open are they to the message

What questions need answers?
What are their interests, concerns?
What does it take to reach specific readers such as media, decision-makers?

Identify your target audience for your brief

Lead with a short statement. The brief statement should:

- Answer the question why
- Explain the significance/urgency of the issue
- Describe objective
- Give overview of findings, conclusions
- Create curiosity for rest of brief

For example: Analyze the following statement and see if it answers to 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

Power point presentation on how to prepare policy Briefs.

Work on their briefs for about one hour

Share the summary of your briefs in a plenary session. Other students should analyze and critique your brief.

Debrief, reflection and conclusion of work shop

Reflect on the training. What went well - what one thing did you learn? What else would you have liked to learn about? How will you apply what you’ve learnt? What challenges did you encounter or observe during the training? Suggest areas of improvement.

Fill out the post-test and OHCEA evaluation form.
**Definition of One Health:**
Regardless of which of the many definitions of One Health is used, the common theme is collaboration across sectors. Collaborating across sectors that have a direct or indirect impact on health 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 a need to establish a better sectoral balance among existing groups and networks, especially between veterinarians and physicians, and to increase the participation of environmental and wildlife health practitioners, as well as social scientists and development partners. The American Veterinary Medical Association (AVMA) definition for the One Health Approach: The One Health Approach is 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.

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.

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 (UNSIC), 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 a 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:

• 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

• Meeting new global challenges head-on through collaboration among multiple professionals in veterinary medicine, human medicine, environmental, wildlife and public health

• 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

• Increasing interactive opportunities for multiple professionals as well as adding to our scientific knowledge to create innovative programs to improve health

Rationale for OH 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. 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 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-emergency of disease include illegal trade in wildlife globally, continuous evolution of pathogens, there is increasing food insecurity and a limited access to safe food products has resulted in the consumption of bush meat and invading the space of wildlife. There is increasing habitat with different species seeking new habitats. Therefore, the collaboration between sectors is imperative to combat the threat of disease emergence and re-emergency. The objective of OH 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, environmental science. The 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, ethics, entomology, food safety and security, global food and water systems, global trade and commerce, health of the environment and environmental conservation, implications of climate change, infectious disease ecology and integrated systems for disease detection, land use production systems and practice, mental and occupational health, public health, awareness and communication, support of biodiversity, wildlife promotion and conservation.

Case study: Mining in Lake Tshangalele: Environmental and health impact assessment in the Democratic Republic of Congo
To provide incentives and attract investors to the mining sector a new mining code was enacted in the DRC in July of 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 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, 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 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 a poor understanding of these exposures and their specific effects and they did not have adequate capacities to study and mitigate these problems. Evidence suggests 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 World Health Organization (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).

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. It should be flexible, based on the best available information that is in accord with current scientific thinking. Consistent and transparent to ensure fairness and rationality in decision making. 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.

It is 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.

Definition by the WTO

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 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.

Description by the OIE (World Organization for Animal Health)

Risk assessment is the component of the analysis which estimates the risks associated with a hazard. Risk assessments 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 modelling skills to carry 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?

- 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. Where the hazards and risks are obvious they can be addressed directly, and no complicated process or skills will be required.
- Routine noncontroversial tasks.
- When theory, data, time or expertise is limited.
- When other methods are going to be cost prohibitive and have a low probability of successful analysis.
- 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?**

Where the hazards presented by the undertaking are numerous and complex, and may involve novel processes, detailed and sophisticated risk assessments will be needed, and it is appropriate to carry out a detailed quantitative risk assessment in addition to the simple qualitative assessment.

authority – according to Andrews (2008) and Andrews et al. (2010) as cited in Andrews et al. (2015), the support needed to exert change and reforms of whatever kind including policy change or building state capability (political, legal, organizational, and personal), is what is referred to as authority. The authors further state that since some change needs more authority than others, the assessment of the extent of authority that one has and, the subsequent requirements, is of utmost importance.

**OHCEA EVENT EVALUATION – ONE HEALTH RISK ANALYSIS SHORT COURSE**

**Facilitators:** __________________________________________________________________________

**Dates:** ________________________________

OHCEA supported you to attend the OH Risk Analysis event. 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

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
   d) Strongly agree
e) 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 as a result of what I 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
16a. If yes, what was the topic of your presentation?
______________________________________________________________________________________
______________________________________________________________________________________
______________________________________________________________________________________

17. 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): __________________________________________________________

18. Which sector do you represent?
   a) Government
   b) Private sector
   c) Education
   d) Non-governmental organization (NGO)
   e) Research
   f) Other (please specify): __________________________________________________________

19. What is your sex?
   a) Male
   b) Female

20. Nationality: ________________________________
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