Animal Health

Level – IV

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Module Title: Identifying and Handling Diseases of Wild Animals

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Introduction to the Module

This module covers the knowledge and skills required to implement the identification, classification and handling of major diseases of wild animals in the country. This competence requires the application of knowledge and skills to capture and restrain wild animals humanly, to be able to identify and monitor major wild animal diseases, and apply the proper treatment, disease prevention and control measures.

LG #40	LO #1- Acquire basic information on wild animals and parks

Instruction sheet 1

This learning guide is developed to provide trainees the necessary information regarding the following content coverage and topics:

- Behaviour of wild animals
- Common species of wild animals and their eco-tourism importance in Ethiopia
- National parks and respective species of endemic wild animals
- Hazards in handling wild animals to self, bystanders, the public and animals

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Understand Behaviour of wild animals.
- Mention Common species of wild animals and their eco-tourism importance in Ethiopia.
- Mention National parks and respective species of endemic wild animals it hosts in Ethiopia.
- Recognize and take action on Hazards in handling wild animals to self, bystanders, the public and animals according to the enterprise guide lines.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks

Information Sheet 1:

1.1. Behaviour of wild animals

Wild animals exhibit a fascinating array of behaviours that have evolved over millions of years to help them survive and thrive in their natural habitats. This diversity of behaviours is driven by a combination of genetic predispositions and learned responses to their environment. Understanding these behaviours is crucial for researchers, conservationists, and wildlife enthusiasts to gain insights into the lives of these animals and develop effective strategies for their conservation.

In this discussion, we will explore the behaviors of certain species of wild animals, highlighting their unique adaptations and social dynamics. From the charismatic African elephants to the elusive snow leopards of the Himalayas, we will delve into the fascinating world of these remarkable creatures. By comprehending their behaviors, we aim to gain a deeper appreciation for the complexity and interconnectedness of the natural world.

Through this exploration, we will discover how various factors, such as mating rituals, parental care, foraging strategies, territoriality, and communication, contribute to the survival and reproductive success of wild animals. We will also examine the impact of environmental changes and human activities on these behaviors, shedding light on the challenges faced by these species in an ever-changing world. By studying the behaviors of wild animals, we can enhance our understanding of their ecological roles and the intricate web of interactions within their ecosystems. This knowledge can inform conservation efforts, enabling us to develop sustainable management plans and mitigate threats to their populations.

Wild animals display a wide range of behaviors that have evolved to help them survive in their natural habitats. Here is some notable behaviour exhibited by certain species of wild animals:

- **Migration:** Many species engage in long-distance seasonal migrations to find food, suitable breeding grounds, or better climates. Examples include the wildebeest migration in Africa, where millions of wildebeest and other herbivores travel in search of fresh grazing lands, and the Arctic tern, which migrates from the Arctic to the Antarctic and back each year, covering thousands of miles.
- **Territoriality:** Some animals are highly territorial and defend their territories against intruders of the same species. This behavior aims to protect limited resources, such as food, mates, or shelter. For instance, wolves mark and defend their territories to maintain access to prey and protect their pack.
- **Courtship and Mating Rituals:** Many species have elaborate courtship displays and rituals to attract mates. These behaviors can involve intricate dances, vocalizations, displays of colorful plumage, or other visual or auditory signals. Examples include the complex courtship dances of birds like the sage grouse and the vibrant displays of male peacocks.



1.1. **Fig 1.1.** Dances of male peacock

- **Social Hierarchies:** Numerous species, especially social mammals, establish hierarchical structures within their groups. Dominant individuals hold higher social status and receive preferential access to resources, such as food or mates. Examples include the alpha male in a wolf pack or the dominant female in a group of elephants.
- **Cooperative Hunting:** Certain predator species engage in cooperative hunting, where individuals work together to capture prey more effectively. This behavior can be observed in

animals like African lions, who coordinate their hunting strategies to increase their chances of success.

- **Tool Use:** While once thought to be unique to humans, tool use has been observed in several animal species. For instance, chimpanzees use sticks to extract termites from mounds, and sea otters use rocks to crack open shells.
- **Parental Care:** Many species exhibit various forms of parental care to ensure the survival of their offspring. This can include building nests, incubating eggs, nursing, and teaching essential skills. Examples include the care provided by lionesses to their cubs or the elaborate nests built by weaver birds.
- **Social Bonding:** Social animals often form strong bonds within their groups. These bonds can serve various purposes, such as maintaining group cohesion, cooperation, and protection against predators. Elephants, for instance, display strong social bonding, with individuals showing empathy and assistance towards one another.
- **Foraging Strategies:** Animals have developed various foraging strategies based on their dietary needs and habitats. Some animals, like lions, employ group hunting techniques to capture prey, while others, like squirrels, store food during times of plenty to sustain them through periods of scarcity.

These are just a few examples of the diverse behaviors exhibited by different species of wild animals. Behaviours can vary widely across species and are influenced by ecological factors, social dynamics, and evolutionary adaptations.

1.2. **Common species of wild animals and their eco-tourism importance in Ethiopia**

Ethiopia is also endowed with diverse wild animal species, some of which are endemic to the political boundary of the country. There are about 284 species of mammals, 861 species of birds, 201 species of reptiles (over 87 snakes, 101 lizards and 13 species of tortoises and turtles), 188 species of fish, 324 butterflies and 63 species of amphibians.

There are various literatures with records of the total number of wild animals. Especially the literatures on birds vary from one to another. The most commonly cited number is that there are 861 species of birds in the country. However, recently published book on the birds of Ethiopia and Eritrea brings the number of birds of Ethiopia down to 837 species. The number of endemic and near-endemic (shared with Eritrea) is reported to be 18 and 14, respectively.

The discrepancy is mainly the result of the recent taxonomic revision using molecular genetics and a number of subspecies of birds have come out as species. There is a huge knowledge gap on other components of the mammalian fauna owing to the absence of systematic survey especially on the arthropods (other insects in general) where high diversity and endemism is expected from the arrays of diverse ecosystems in the country.



Fig 1.2. Mountain Nyala: Bale Mountains National Park

Ethiopia is a country known for its rich biodiversity and diverse ecosystems, making it a prime destination for eco-tourism. Here are some common species of wild animals found in Ethiopia and their eco-tourism importance:

Bale mountain national park available at:

https://www.youtube.com/watch?v=dIXaqQ_PgG0(Accessed at 23.09.2023)

- **Ethiopian Wolf (Canis simensis):** The Ethiopian wolf (Canis simensis), also known as the Simien fox or Simien jackal, is a unique and endangered canid species found only in the Ethiopian highlands. Here are some details about the behavior and location of the Ethiopian wolf:

  ✓ **Location:**

  - Ethiopian wolves are endemic to the Ethiopian highlands, specifically the Afroalpine regions. They are primarily found in the isolated mountain ranges of the Ethiopian plateau, including the Bale Mountains and Simien Mountains. Their range extends across several national parks and protected areas in Ethiopia.

  ✓ **Behavior:**

  - **Social Structure**: Ethiopian wolves are highly social animals and live in packs consisting of a dominant breeding pair and their offspring. The pack size can range from two to around twenty individuals, but six to eight members is more typical.
  - **Diet**: They are primarily carnivorous and specialize in hunting small mammals, particularly rodents called giant mole-rats. Ethiopian wolves also prey on other small mammals like grass rats and hares. They are considered the world's most specialized wolf species in terms of diet.
  - **Hunting**: Ethiopian wolves are diurnal hunters, meaning they are active during the day. They use a combination of stalking, chasing, and pouncing techniques to catch their prey. They have been observed engaging in cooperative hunting, where pack members work together to capture elusive prey.
  - **Vocalizations:** Ethiopian wolves communicate through a variety of vocalizations, including barks, growls, and whines. They use these vocalizations to maintain contact within the pack, warn of potential threats, and coordinate during hunting.
  - **Reproduction**: Breeding typically occurs between October and December. The dominant breeding pair in the pack is usually the only one to reproduce. The female gives birth to a litter of usually two to six pups after a gestation period of around two months.

- **Threats:** The Ethiopian wolf is listed as endangered by the International Union for Conservation of Nature (IUCN). The main threats to their survival are habitat loss, fragmentation, and degradation due to agriculture and livestock grazing. They are also vulnerable to diseases, such as rabies and canine distemper, which can be transmitted by domestic dogs.

Conservation efforts are underway to protect the Ethiopian wolf and its habitat, including the establishment of protected areas and community-based conservation initiatives. These efforts aim to ensure the long-term survival of this unique and ecologically important species.



Fig 1.3. *Canis simensis*

- **Chelada Baboon (*Theropithecus chelada*):** The baboon species known as the Gelada baboon (Theropithecus gelada, formerly known as Theropithecus chelada) is a primate found in the highlands of Ethiopia. Here's information about the behavior and location of the Gelada baboon:

✓ **Location:**

- Gelada baboons are native to the Ethiopian Highlands, inhabiting the grasslands and alpine meadows of the central and northern parts of the country. They have a limited distribution and are primarily found in the Simien Mountains and other mountain ranges within the region.

✓ Behavior:

- Social Structure: Gelada baboons live in large social groups known as troops. Troops can consist of several hundred individuals, although they are typically smaller, with around 20 to 200 members. Each troop is organized into smaller units called bands, which are led by a dominant male known as the "leader of the band."

- Diet: Gelada baboons are primarily herbivorous. Their diet consists mainly of grasses, roots, and other plant parts. They are skilled grazers and spend a significant amount of time feeding on grasslands. They also supplement their diet with herbs, flowers, fruits, and occasionally insects.

- Unique Adaptations: Gelada baboons have unique physical and behavioral adaptations. They have long, sharp incisor teeth that they use to crop grass effectively. They also have a unique "hourglass" patch of bare skin on their chest that turns bright red when they are sexually receptive, which is a key visual signal for mating.

- Social Behavior: Gelada baboons engage in complex social behaviors. They have a hierarchical social structure, with dominant males maintaining control over females and subordinate males. They communicate through various vocalizations, facial expressions, and body postures.

- Reproduction: Breeding in Gelada baboons is seasonal, typically occurring during a specific period of the year. Females reach sexual maturity at around four to five years of age, while males become sexually mature at around six years. The dominant males in a troop have primary access to mating with females.

- Conservation Status: Gelada baboons are listed as a species of "Least Concern" by the IUCN, which means they are not currently at high risk of extinction. However, they face threats such as habitat loss, human encroachment, and competition with livestock for grazing areas. Conservation efforts focus on protecting their habitat, raising awareness, and promoting sustainable land use practices.

The Gelada baboon is an interesting primate species known for its unique adaptations, social structure, and its specialized grazing behavior. It plays an important ecological role in the Ethiopian Highlands and contributes to the biodiversity of the region.



Fig 1.4. chelada Baboon

- **Walia Ibex (Capra walie):** The Walia ibex (Capra walie) is a species of wild goat endemic to the Ethiopian Highlands. Here's information about the behavior and location of the Walia ibex:

  ✓ **Location:**

  - The Walia ibex is found exclusively in the high-altitude mountainous regions of northern Ethiopia, particularly in the Simien Mountains National Park. It inhabits rugged, rocky terrain at elevations between 2,500 and 4,500 meters (8,200 to 14,800 feet). The Simien Mountains are a UNESCO World Heritage site and provide a protected habitat for the Walia ibex.

  ✓ **Behavior:**

  - Social Structure: Walia ibex are typically found in small herds composed of females, young males, and juveniles. Adult males are often solitary or form smaller bachelor groups outside of the breeding season. The females and juveniles tend to stay in cohesive groups, while adult males have more individualistic behavior.

  - Adaptations: The Walia ibex has several adaptations that enable it to survive in its mountainous environment. It has strong, curved horns that both males and females possess. These horns are used for defense, territorial disputes, and mating rituals. Additionally, their specialized hooves provide them with excellent traction on steep and rocky terrain.

- Diet: The diet of Walia ibex consists mainly of grasses, herbs, and leaves. They are highly adapted to browsing on vegetation growing in rocky areas, using their agility to access food in challenging environments.

- Mating and Reproduction: Breeding in Walia ibex occurs during a specific mating season, which typically takes place in late autumn. During this time, males compete for dominance and access to females. The dominant males establish territories and engage in displays of strength and agility to attract mates. After a gestation period of around 5 to 6 months, a single offspring (rarely twins) is born.

- Conservation Status: The Walia ibex is listed as an endangered species by the IUCN. Its population has been severely impacted by habitat loss, hunting, and competition with domestic livestock. Conservation efforts, including the establishment of protected areas like the Simien Mountains National Park, have been crucial in preserving this species. Anti-poaching measures and community-based conservation initiatives are also in place to protect the Walia ibex and its habitat.

The Walia ibex is an iconic and endangered species of wild goat, known for its remarkable adaptation to the rugged mountains of the Ethiopian Highlands. Efforts to safeguard its habitat and ensure its survival are important for the conservation of this unique species.



Fig 1.5. The herd of Walia Ibex gathering at Semien Mountains

- **Giant mole-rat**

  The Giant mole-rat, also known as Ayitemogt (Tachyoryctes macrocephalus), is a species of mole-rat that is endemic to Ethiopia. Here's information about the behavior and location of the Giant mole-rat in Ethiopia:



Fig 1.6. Giant mole-rat (Ayitemogt)

✓ **Location:**

- The Giant mole-rat is found in the Ethiopian Highlands, primarily in the central and northern parts of the country. It inhabits high-altitude grasslands and meadows, often in close proximity to wetlands or marshy areas.

✓ **Behavior:**

- **Social Structure**: Giant mole-rats are highly social animals that live in large underground colonies. Each colony can consist of several hundred individuals. The colonies are organized into family groups, with a dominant breeding pair and their offspring.

- **Burrowing:** Giant mole-rats are exceptional burrowers and construct complex tunnel systems underground. These tunnels serve as their homes, providing protection from predators and the elements. The burrows consist of different chambers for nesting, food storage, and waste disposal.
- **Feeding Habits**: The diet of Giant mole-rats primarily consists of grasses, roots, bulbs, and other plant materials. They are herbivorous and use their powerful teeth and jaws to dig for

underground vegetation. They are considered important ecosystem engineers as their burrowing activities influence soil composition and vegetation patterns.

- **Reproduction:** Breeding in Giant mole-rats can occur throughout the year. The dominant pair within the colony is responsible for reproduction, and the female gives birth to a litter of one to four pups after a gestation period of around 70 days. The pups are cared for by the breeding pair and other members of the colony.
- **Conservation Status:** The conservation status of the Giant mole-rat is currently unknown. However, habitat loss and degradation due to agricultural activities, human encroachment, and climate change pose potential threats to their populations.

The Giant mole-rat, or Ayitemogt, is an interesting species that plays a role in the ecology of the Ethiopian Highlands. Their burrowing behavior and feeding habits contribute to the structure and functioning of the grassland ecosystems where they reside.

- **Wild Ass (Yedur Ahiya):** The Wild Ass, known as Yedur Ahiya in Amharic (Equus africanus), is found in the northeastern region of Ethiopia, particularly in the Danakil Depression and surrounding areas. Here's information about the behavior and location of the Wild Ass in Ethiopia:

✓ **Location:**

- In Ethiopia, the Wild Ass is primarily found in the Danakil Depression, which is a desert and semi-desert region located in the northeastern part of the country. This area spans across the Afar Region and parts of the Tigray Region. The arid and rugged landscapes of the Danakil Depression provide a suitable habitat for the Wild Ass.

✓ **Behavior:**

- **Social Structure**: Wild Asses in Ethiopia typically live in small herds or groups. These groups are composed of a dominant male, several females, and their offspring. The dominant male defends his territory and has primary access to mating opportunities.
- **Adaptations:** The Wild Ass has evolved various adaptations to survive in arid environments. They have elongated legs and large, tough hooves that enable them to navigate through dry and rocky terrain. Their bodies are well-suited to conserve water, allowing them to withstand prolonged periods without drinking.

- **Diet:** The Wild Ass in Ethiopia primarily feeds on grasses, herbs, leaves, and other vegetation available in their arid habitat. They are selective feeders, capable of extracting nutrients from low-quality forage.

- **Mating and Reproduction:** Breeding in Wild Asses can occur throughout the year, although there may be seasonal peaks in mating activity. Males compete for access to females through displays and physical confrontations. After a gestation period of around 11 months, a single foal is born. The foal becomes independent within a year.

- **Conservation Status:** The Wild Ass population in Ethiopia, known as the Ethiopian subspecies (Equus africanus somaliensis), is listed as critically endangered by the IUCN. Habitat loss, hunting, and competition with domestic livestock have contributed to their decline. Conservation efforts, including protected areas and captive breeding programs, are in place to help safeguard the population.

Preserving the Wild Ass population in Ethiopia is of great importance to maintain the biodiversity and ecological balance of the region. Efforts to protect their habitats and mitigate threats are crucial for the survival of this endangered species.

- **Swayne's Hartebeest:** Swayne's Hartebeest, commonly known as "Korkay" in Ethiopia, is a large antelope species found in the country. Here's information about the behavior and location of Swayne's Hartebeest in Ethiopia:

✓ **Location:**

Swayne's Hartebeest is endemic to Ethiopia and is primarily found in the southeastern part of the country. They inhabit the highlands and grasslands of the Bale Mountains, including the Bale Mountain National Park and the Harenna Forest.

✓ **Behavior:**

- **Social Structure:** Swayne's Hartebeest are primarily gregarious and form small herds consisting of females, their offspring, and a dominant male. The dominant male defends his territory, which typically encompasses a group of females.

- **Diurnal Activity:** Swayne's Hartebeest is primarily diurnal, meaning they are active during the daytime. They are well-adapted to the open grassland habitats and can often be observed grazing in the early morning or late afternoon.

- **Grazing and Diet**: These antelopes are herbivorous, feeding predominantly on grasses and other herbaceous vegetation. They have specially adapted elongated faces and high-crowned teeth that allow them to efficiently graze on grasses found in their habitat.

- **Vocalizations:** Swayne's Hartebeest communicate through a variety of vocalizations, including low grunts, snorts, and whistles. These vocalizations serve to maintain contact within the herd and establish dominance among males.

- **Threat Response:** When sensing danger, Swayne's Hartebeest exhibit an alert and cautious behavior. They are known to stand tall, raise their heads, and perform a "pronking" behavior, which involves leaping into the air with all four legs extended. This behavior may serve as a means of communication or as a warning signal to other members of the herd.

- **Conservation Status:** Swayne's Hartebeest is critically endangered and is one of the most threatened antelope species in Africa. The population has significantly declined due to habitat loss, hunting, and competition with domestic livestock. Efforts are being made to protect their remaining habitats, such as the establishment of protected areas like Bale Mountain National Park, and to implement conservation measures to safeguard the species.

Preserving the habitats and populations of Swayne's Hartebeest is vital to maintain the biodiversity and ecological balance of the Bale Mountains region in Ethiopia.

Birdlife: Ethiopia is renowned for its rich avian diversity, with a significant number of bird species being endemic to the country. Here are some notable endemic birds of Ethiopia:

- **Abyssinian Catbird (Parophasma galinieri):** The Abyssinian catbird is a striking and elusive bird endemic to Ethiopia. It inhabits the dense undergrowth of highland forests and is known for its melodious song.

- **Blue-winged Goose (Cyanochen cyanopterus):** Endemic to Ethiopia, the blue-winged goose is a striking waterbird with distinctive blue wing patches. It is found in high-altitude wetlands and is considered vulnerable due to habitat loss and hunting.



Fig 1.6. Goose

- **Prince Ruspoli's Turaco (Tauraco ruspolii):** This beautiful and rare turaco is endemic to the southwestern highlands of Ethiopia. It has vibrant plumage and is often sought after by birdwatchers visiting the region.



Fig 1.7. **Prince Ruspoli's Turaco**

- **Spot-breasted Lapwing (Vanellus melanocephalus):** The spot-breasted lapwing is a unique and localized bird endemic to Ethiopia. Its preferred habitat includes grasslands and marshes, particularly in the Rift Valley region.



Fig 1.8. Spot-breasted Lapwing

- **Ethiopian Cisticola (Cisticola lugubris):** This small passerine bird is endemic to Ethiopia and is commonly found in grasslands and agricultural areas. It is known for its distinctive song and acrobatic flight displays.

- **Yellow-fronted Parrot (Poicephalus flavifrons):** Endemic to the southwestern forests of Ethiopia, the yellow-fronted parrot is a medium-sized parrot with a vibrant yellow forehead. It is highly prized by bird enthusiasts and is considered vulnerable due to habitat loss and the pet trade.

- **Abyssinian Woodpecker (Dendropicos abyssinicus):** The Abyssinian woodpecker is an endemic bird found in Ethiopia's highland forests. It has a distinct black and white plumage with a red crown, and it forages for insects by tapping and drumming on tree trunks.

These are just a few examples of the endemic bird species found in Ethiopia. The country's diverse habitats, from highland forests to wetlands and grasslands, support a wide range of unique birdlife. Birdwatchers and nature enthusiasts visiting Ethiopia have the opportunity to observe and appreciate these remarkable endemic species in their natural habitats.



Fig 1.9. ***Dendropicos abyssinicus***

Wild animals play a crucial role in the field of eco-tourism and have significant importance. Here are some reasons why wild animals are essential in eco-tourism:

- **Biodiversity Conservation:** Wild animals are a fundamental component of ecosystems and contribute to the overall biodiversity of an area. They play a vital role in maintaining the delicate balance of nature. By attracting tourists to witness these animals in their natural habitats, eco-tourism raises awareness about the importance of conserving and protecting biodiversity.
- **Economic Benefits:** Wild animals, especially charismatic species like elephants, tigers, lions, and whales, attract visitors from around the world. These tourists spend money on accommodations, transportation, local guides, and other services, generating revenue for local communities. The income generated from eco-tourism can contribute to the conservation efforts and support local economies, helping to alleviate poverty and create employment opportunities.
- **Education and Awareness:** Eco-tourism provides an opportunity for people to observe and learn about wild animals up close. By experiencing the beauty and diversity of wildlife, visitors develop an appreciation for the natural world and gain a deeper understanding of the need for conservation. Education programs and guided tours during eco-tourism activities can promote environmental awareness, sustainable practices, and the importance of protecting wild animals and their habitats.
- **Scientific Research:** Eco-tourism activities often support scientific research initiatives focused on studying and monitoring wild animals. Researchers can gather valuable data on animal behavior, population dynamics, migration patterns, and habitat requirements. This information is crucial for developing effective conservation strategies and management plans to protect wild animal species.
- **Conservation Funding:** Revenue generated from eco-tourism can be directly invested in conservation initiatives. This funding can be used for anti-poaching efforts, habitat restoration,

wildlife monitoring, community development projects, and public awareness campaigns. By providing a financial incentive for conservation, eco-tourism helps to safeguard wild animal populations and their habitats.

However, it is important to note that eco-tourism should be conducted responsibly and in a manner that minimizes negative impacts on wild animals and their habitats. It should prioritize their welfare, respect their natural behavior, and adhere to ethical guidelines to ensure sustainable and responsible tourism practices.

1.3. National parks and respective species of endemic wild animals

Ethiopia is home to several national parks that protect its diverse wildlife and ecosystems. Here are some of the notable national parks in Ethiopia and the respective species of endemic wild animals found within them:

- **Simien Mountains National Park:** is one of Ethiopia's most famous and breathtaking national parks, located in the northern part of the country. It is a UNESCO World Heritage Site and renowned for its dramatic landscapes, including rugged mountain peaks, deep valleys, and stunning plateaus. Here are some notable endemic wild animals found in Simien Mountains National Park:
  - ✓ Ethiopian Wolf (Canis simensis)
  - ✓ Gelada Baboon (Theropithecus gelada)
  - ✓ Walia Ibex (Capra walie)
  - ✓ Ethiopian Wolf (Canis simensis)
  - ✓ Ethiopian Bush Crow (Zavattariornis stresemanni)



Fig 1.10. Simien Mountain National Park

- **Omo National Park:** is a vast protected area located in southwestern Ethiopia, near the border with South Sudan and Kenya. It encompasses an area of approximately **4,068 square kilometers** and is known for its diverse wildlife and unique cultural heritage. Here are some notable features and wildlife species associated with Omo National Park:
  - ✓ African Elephant (Loxodonta africana)
  - ✓ African Buffalo (Syncerus caffer)
  - ✓ Nile Crocodile (Crocodylus niloticus)
  - ✓ White-headed Buffalo-Weaver (Dinemellia dinemelli)
- **Awash National Park:** Awash National Park is a prominent national park located in the eastern part of Ethiopia, covering an area of approximately **756 square kilometers**. It is known for its diverse landscapes, wildlife, and cultural heritage. Here are some the wildlife species found in Awash National Park:
  - ✓ Beisa Oryx (Oryx beisa)
  - ✓ Salt's Dik-Dik (Madoqua saltiana)
  - ✓ Soemmerring's Gazelle (Nanger soemmerringii)
  - ✓ Grevy's Zebra (Equus grevyi)



Fig 1.11. Grevy's zebra: Awash National Park

- **Nechisar National Park:** Nechisar National Park is a national park located in the southern part of Ethiopia, near the town of Arba Minch. Covering an area of approximately **514 square kilometers**, the park is known for its stunning landscapes, diverse wildlife, and the presence of two lakes: Lake Abaya and Lake Chamo. Here are some of endemic species of wild animals found in Nechisar National Park:
  - ✓ Swayne's Hartebeest (Alcelaphus buselaphus swaynei)
  - ✓ Burchell's Zebra (Equus quagga)
  - ✓ Lesser Kudu (Tragelaphus imberbis)

- ✓ Nechisar Nightjar (Caprimulgus solala)

- **Mago National Park:** Mago National Park is a national park located in southwestern Ethiopia, near the border with South Sudan and Kenya. It covers an area of approximately **2,162 square kilometers** and is known for its diverse wildlife, scenic landscapes, and cultural significance. Here are some of endemic wildlife found in Mago National Park:
  - ✓ African Elephant (Loxodonta africana)
  - ✓ Nile Crocodile (Crocodylus niloticus)
  - ✓ African Lion (Panthera leo)
  - ✓ African Buffalo (Syncerus caffer)

- **Abijatta-Shalla Lakes National Park:** Abijatta-Shalla Lakes National Park is a national park located in the Ethiopian Rift Valley, approximately **200 kilometers south of Addis Ababa**. It is named after its two main lakes, Lake Abijatta and Lake Shalla, and covers an area of about 887 square kilometers. Here are some endemic species found in Abijatta-Shalla Lakes National Park:
  - ✓ Lesser Flamingo (Phoeniconaias minor)
  - ✓ Great White Pelican (Pelecanus onocrotalus)
  - ✓ African Fish Eagle (Haliaeetus vocifer)
  - ✓ Greater Kudu (Tragelaphus strepsiceros)

These are just a few examples of national parks in Ethiopia and the endemic wild animal species associated with them. Each park supports a unique array of wildlife, including endemic and non-endemic species. Exploring these national parks provides opportunities to observe and appreciate Ethiopia's diverse flora and fauna while contributing to conservation efforts and eco-tourism initiatives.

- **Bale Mountains National Park:** Bale Mountains National Park is a large national park located in the Oromia Region of Ethiopia. It covers an area of approximately 2,200 square kilometers and is known for its diverse and unique ecosystems, high-altitude landscapes, and rich biodiversity. Here are some key features and notable aspects of Bale Mountains National Park:
  - ✓ **Mountain Range and Peaks:** The park is named after the Bale Mountains, which are part of the Ethiopian Highlands. The Bale Mountains comprise a series of rugged peaks, with Tullu Demtu being the highest at 4,377 meters. The mountain range offers breathtaking scenery and is a popular destination for hiking and trekking enthusiasts.
  - ✓ **Afroalpine Moorlands:** Bale Mountains National Park is renowned for its extensive Afroalpine moorlands, which are unique to the region. These high-altitude grasslands are

characterized by tussock grasses, heather, and giant lobelias. The moorlands provide habitat for several endemic plant species and are a critical ecosystem for wildlife.

- ✓ **Wildlife and Endangered Species:** The park is home to a remarkable array of wildlife, including several endemic and endangered species. Some of the notable wildlife found in Bale Mountains National Park includes:
  - Ethiopian Wolf (Canis simensis)
  - Mountain Nyala (Tragelaphus buxtoni)
  - Bale Monkey (Chlorocebus djamdjamensis)
  - Giant Mole Rat (Tachyoryctes macrocephalus)
- ✓ **Birdlife:** The park is a paradise for birdwatchers, with over 300 bird species recorded. It is particularly renowned for its bird of prey population, including the rare and endangered Lammergeier (bearded vulture). Other notable bird species in the park include wattled ibises, blue-winged geese, and thick-billed ravens.
- ✓ **Hiking and Trekking:** Bale Mountains National Park offers excellent opportunities for hiking and trekking, allowing visitors to explore its diverse landscapes and experience the natural beauty of the Ethiopian Highlands. The park has various trails of varying difficulty, leading to stunning viewpoints, waterfalls, and remote areas.

Bale Mountains National Park is a haven for nature enthusiasts, offering a unique combination of high-altitude landscapes, endemic wildlife, and diverse ecosystems. Visitors can engage in activities such as wildlife viewing, bird watching, hiking, and exploring the park's remarkable natural heritage.



Fig 1.12. Mountain Nyala

1.4. Hazards in handling wild animals to self, bystanders, the public and animals

Handling wild animals can be hazardous and can pose risks to various parties involved, including the handlers themselves, bystanders, the general public, and the animals. Here are some potential hazards associated with handling wild animals:

- **Physical injury:** Wild animals can be unpredictable and may exhibit defensive behaviors when they feel threatened or cornered. This can result in bites, scratches, kicks, or other physical injuries to handlers or anyone in close proximity.
- **Zoonotic diseases:** Wild animals can carry various zoonotic diseases, which are infectious diseases that can be transmitted between animals and humans. Examples include rabies, hantavirus, Lyme disease, and avian influenza. Handlers and others who come into contact with wild animals can be at risk of contracting these diseases.
- **Allergic reactions:** Some individuals may be allergic to certain animals or their dander, fur, or excretions. Exposure to these allergens during handling can trigger allergic reactions ranging from mild discomfort to severe anaphylaxis.
- **Escape or release:** Handling wild animals increases the risk of escape or accidental release. Escape can pose danger to handlers, bystanders, and the public, especially if the animal is large, aggressive, or venomous. Released animals may also become invasive species, disrupting local ecosystems.
- **Aggressive behavior:** Wild animals may exhibit aggression due to stress, fear, or territorial instincts. This aggression can result in injury to handlers or others nearby, as well as increased stress for the animal itself.
- **Psychological stress:** Capturing and handling wild animals can cause severe stress and anxiety for the animals, which may affect their well-being and potentially lead to adverse health effects or behavioral issues.
- **Legal implications:** Laws and regulations govern the handling of wild animals, including permits, licensing, and ethical considerations. Mishandling or illegal possession of wild animals can result in legal repercussions.
- **Chemical spillage**: Chemical spillage hazards can arise when handling wild animals in certain situations, particularly in environments where hazardous substances are present. Here are some potential chemical spillage hazards when handling wild animals:

- ✓ **Contaminated Environments:** Wild animals may inhabit areas contaminated with industrial chemicals, pollutants, or agricultural residues. When handling these animals, there is a risk of coming into contact with or releasing these hazardous substances, which can be harmful to human health.
- ✓ **Veterinary Medications:** In certain cases, wild animals may require veterinary treatment, including the use of medications. Improper handling or administration of veterinary drugs can result in spills or leaks, leading to potential exposure to hazardous chemicals.
- ✓ **Chemical Restraint:** Chemical immobilization or sedation is sometimes necessary when handling certain wild animals for research, veterinary procedures, or relocation purposes. The use of tranquilizers or anesthetic drugs carries the risk of spillage or accidental release, which can pose hazards to both handlers and animals.
- ✓ **Chemical Cleaning Agents:** Cleaning and disinfection of equipment, enclosures, or facilities used in the handling of wild animals often involve the use of chemical cleaning agents. Accidental spills or improper handling of these substances can result in chemical exposure and potential health risks.
- ✓ **Hazardous Waste Management:** The proper disposal of hazardous waste generated during the handling of wild animals, such as chemical containers, contaminated materials, or used protective gear, is crucial. Failure to handle and dispose of hazardous waste appropriately can lead to environmental contamination and pose risks to both human and wildlife populations.

To minimize chemical spillage hazards when handling wild animals, it is important to follow best practices and safety guidelines:

- Conduct thorough risk assessments and implement appropriate safety protocols.
- Ensure proper training and education on the safe handling of hazardous substances.
- Use appropriate personal protective equipment (PPE) when working with chemicals.
- Have spill response plans in place, including containment measures and procedures for cleanup and decontamination.
- Store and handle chemicals securely, following relevant regulations and guidelines.
- Properly dispose of hazardous waste through authorized channels.

It is crucial to consult with experts, such as wildlife biologists, veterinarians, or environmental health and safety professionals, to ensure that chemical handling procedures are conducted safely and in compliance with applicable regulations.

- **Biological hazardous wastes**

  Handling wild animals can involve the management and disposal of biological hazardous wastes. Here are some examples of biological hazardous wastes that may be encountered when handling wild animals:

  - ✓ **Animal Carcasses:** In situations where wild animals have died or been euthanized, their carcasses become biological hazardous waste. Carcasses can harbor infectious agents, bacteria, viruses, or parasites that can pose health risks if not properly handled and disposed of.
  - ✓ **Animal Tissues and Fluids:** During veterinary procedures, research activities, or sample collection, various tissues and fluids may be obtained from wild animals. These biological materials, such as blood, saliva, urine, or tissue samples, can contain pathogens or infectious agents that require appropriate handling and disposal.
  - ✓ **Contaminated Animal Bedding or Waste:** Animal bedding, feces, urine, or other waste materials from wild animals can contain pathogens, parasites, or infectious agents. These materials should be treated as biological hazardous waste to prevent the spread of diseases or contamination.
  - ✓ **Used Personal Protective Equipment (PPE):** Personal protective equipment, such as gloves, masks, or gowns, used during the handling of wild animals, can become contaminated with biological hazards. Proper disposal of used PPE is necessary to minimize the risk of exposure to infectious agents.

  To manage and dispose of biological hazardous wastes generated from handling wild animals, the following practices should be followed:

  - **Segregation and Containment:** Separate and properly contain biological hazardous waste from other waste streams to prevent cross-contamination. Use leak-proof and puncture-resistant containers labeled as "biological hazardous waste."
  - **Disinfection:** Treat or disinfect animal carcasses, tissues, or contaminated materials using appropriate disinfection methods recommended for the specific pathogens or infectious agents present. Follow established protocols to ensure effective disinfection.
  - **Secure Storage:** Store biological hazardous waste in dedicated, secure areas that are inaccessible to unauthorized individuals or animals. Ensure appropriate storage

conditions, such as temperature control, to maintain the integrity of the waste until disposal.

- **Transportation:** Follow local regulations and guidelines when transporting biological hazardous waste. Use proper containers and ensure that waste is secured and labeled correctly during transportation.
- **Proper Disposal:** Dispose of biological hazardous waste through approved methods, such as incineration, autoclaving, or burial in designated areas. Adhere to local regulations and guidelines for the disposal of such waste.

It is important to consult with relevant authorities, such as environmental health agencies or waste management professionals, to ensure compliance with local regulations and best practices for the handling and disposal of biological hazardous waste generated from handling wild animals.

- **Gas leakage:** Gas leakage hazards can be a concern when handling wild animals, particularly in situations where gases or chemicals are used for various purposes. Here are some examples of gas leakage hazards that may be encountered:
  - ✓ **Anesthetic Gases:** In veterinary procedures or research settings, anesthetic gases may be used to immobilize or sedate wild animals. These gases, such as isoflurane or sevoflurane, can pose a risk if there is a leakage from the delivery system or improper ventilation. Inhalation of anesthetic gases by handlers or animals in high concentrations can lead to health issues.
  - ✓ **Industrial Gases:** In certain situations, industrial gases, such as oxygen or nitrogen, may be used for wildlife management or research purposes. Improper handling or storage of compressed gas cylinders can result in leaks or ruptures, leading to potential hazards, including asphyxiation or fire/explosion risks.
  - ✓ **Chemical Fumigants:** Chemical fumigants, like methyl bromide or phosphine, may be used for pest control or disinfection purposes in enclosures or storage areas where wild animals are kept. Leaks or improper use of fumigants can result in the release of toxic gases, which can pose health risks to handlers, animals, and the environment.
  - ✓ **Environmental Gases:** Wild animals may inhabit areas with naturally occurring gases, such as carbon dioxide, methane, or hydrogen sulfide, which can be emitted from geothermal activity, volcanic regions, or wetlands. In poorly ventilated or confined spaces, exposure to high concentrations of these gases can lead to health issues or asphyxiation.

To mitigate gas leakage hazards when handling wild animals, it is important to follow best practices and safety guidelines:

- **Proper Ventilation:** Ensure that handling areas, enclosures, or research facilities have adequate ventilation systems in place to prevent the buildup of gases and promote air exchange.
- **Regular Inspection and Maintenance:** Regularly inspect and maintain gas delivery systems, equipment, and storage areas to detect and address any leaks or malfunctions promptly. Follow manufacturer guidelines for maintenance and testing.
- **Training and Education:** Provide appropriate training and education to handlers on the safe use, handling, and storage of gases. Emphasize the importance of leak detection, proper ventilation, and emergency response procedures.
- **Personal Protective Equipment (PPE):** Use appropriate PPE, such as gas masks or respirators, when working with gases or in environments where gas leakage hazards are present. Ensure that PPE is properly fitted, maintained, and used according to manufacturer instructions.
- **Emergency Preparedness:** Establish and communicate emergency response procedures in the event of a gas leakage incident. This includes evacuation plans, emergency shutdown procedures, and access to emergency medical assistance.
- **Compliance with Regulations:** Adhere to local regulations, codes, and guidelines related to the handling, storage, and use of gases. Follow any specific safety protocols or permits required for working with potentially hazardous gases.

It is essential to consult with experts, safety professionals, or relevant authorities to ensure compliance with safety regulations and best practices when handling wild animals in environments where gas leakage hazards may be present.

- **Inhalation of aerosol particles:** Inhalation of aerosol particles can present hazards when handling wild animals, particularly in situations where there is a potential for the release of airborne particles. Here are some examples of hazards associated with inhalation of aerosol particles:
  - ✓ **Allergens:** Wild animals may carry allergens such as dander, fur, or feathers, which can become airborne and cause allergic reactions in susceptible individuals. Inhalation of these allergens can lead to symptoms such as nasal congestion, sneezing, coughing, or respiratory distress.
  - ✓ **Zoonotic Diseases:** Aerosolized particles from wild animals can carry zoonotic pathogens, including bacteria, viruses, or fungi, which can be transmitted to humans through inhalation.

Examples of zoonotic diseases that can be transmitted through aerosols include hantavirus, avian influenza, or certain types of bacterial infections.

- ✓ **Respiratory Irritants:** In certain environments, wild animals may produce or be exposed to respiratory irritants such as dust, pollutants, or chemicals. Inhalation of these irritants can lead to respiratory symptoms such as coughing, wheezing, or shortness of breath.
- ✓ **Airborne Contaminants:** Handling wild animals in areas with industrial activities, pollutants, or environmental contaminants can result in the release of airborne particles. Inhalation of these particles can lead to respiratory issues and potential long-term health effects, depending on the nature and concentration of the contaminants.

To minimize the hazards associated with inhalation of aerosol particles when handling wild animals, it is important to take appropriate precautions:

- **Personal Protective Equipment (PPE):** Wear appropriate respiratory protection, such as masks or respirators, when handling wild animals in situations where aerosol particles may be present. Ensure that the PPE is properly fitted, maintained, and used according to manufacturer instructions.
- **Ventilation:** If working in enclosed spaces or areas with poor ventilation, ensure proper airflow to minimize the accumulation of airborne particles. Use local exhaust ventilation or natural ventilation methods to improve air quality.
- **Hygiene Practices:** Practice good hygiene, such as regular handwashing and avoiding touching the face, to minimize the risk of transferring aerosol particles from wild animals to mucous membranes.
- **Environmental Controls:** Implement measures to control dust, allergens, or other airborne particles in the handling environment. This can include using appropriate cleaning methods, air filtration systems, or containment measures to reduce the release of aerosol particles.
- **Regular Cleaning and Maintenance:** Maintain clean and well-maintained animal enclosures, equipment, and facilities to reduce the accumulation of dust, allergens, or other airborne contaminants.
- **Training and Education:** Provide appropriate training and education to handlers on the potential hazards associated with inhalation of aerosol particles. Emphasize the importance of using proper respiratory protection and following established safety protocols.

It is essential to consult with safety professionals, occupational health experts, or relevant authorities to ensure compliance with safety regulations and best practices when handling wild animals in environments where inhalation of aerosol particles may be a concern.

- **Intraocular contamination:** Intraocular contamination hazards can arise when handling wild animals, particularly if there is a risk of contact with infectious agents or foreign substances that can enter the eye. Here are some examples of hazards associated with intraocular contamination:
  - ✓ **Zoonotic Diseases:** Wild animals can carry zoonotic pathogens, including bacteria, viruses, or parasites, which can be transmitted through direct contact with ocular tissues. Contact with ocular fluids or contaminated surfaces can pose a risk of infection, leading to eye-related diseases or systemic illnesses.
  - ✓ **Irritants and Chemicals:** Handling wild animals in environments where irritants, chemicals, or toxins are present can increase the risk of intraocular contamination. Accidental splashes or contact with these substances can cause eye irritation, chemical burns, or other adverse effects.
  - ✓ **Foreign Bodies:** Wild animals may carry foreign bodies, such as plant material, dirt, or debris, which can accidentally enter the eye during handling. These foreign bodies can cause mechanical damage, corneal abrasions, or introduce infectious agents if they carry microorganisms.

To minimize the hazards associated with intraocular contamination when handling wild animals, it is important to take appropriate precautions:

- **Personal Protective Equipment (PPE):** Wear appropriate eye protection, such as safety goggles or face shields, when handling wild animals. Ensure that the eye protection is properly fitted, maintained, and used according to manufacturer instructions.
- **Hand Hygiene:** Practice thorough hand hygiene before and after handling wild animals to reduce the risk of transferring infectious agents to the eyes or other mucous membranes.
- **Animal Restraint:** Use proper techniques and tools for animal restraint to minimize the risk of accidental injury or contact with ocular fluids. This can include the use of specialized devices or trained personnel to ensure safe handling.
- **Environmental Controls:** Minimize exposure to irritants, chemicals, or foreign bodies by working in well-maintained and clean environments. Remove any potential sources of contamination from the handling area.

- **Prompt First Aid and Medical Attention:** In the event of ocular contamination or injury, seek prompt first aid and medical attention. Rinse the eye thoroughly with clean water or saline solution, and consult a healthcare professional for appropriate evaluation and treatment.
- **Training and Education:** Provide appropriate training and education to handlers on the potential hazards of intraocular contamination. Emphasize the importance of using proper eye protection, following safe handling practices, and seeking medical attention when necessary.

It is important to consult with safety professionals, occupational health experts, or relevant authorities to ensure compliance with safety regulations and best practices when handling wild animals to minimize the risk of intraocular contamination hazards.

- **Slippery or uneven work surfaces:** Slippery or uneven work surfaces can pose hazards when handling wild animals, increasing the risk of accidents, falls, and injuries. Here are some considerations regarding these hazards:
  - ✓ **Slip and Fall Accidents:** Wet or slippery surfaces, such as those caused by water, mud, or animal waste, can lead to slip and fall accidents. Uneven or unstable surfaces, such as rough terrain or irregular flooring, can also increase the risk of losing balance and falling.
  - ✓ **Animal Behaviour:** Wild animals may exhibit unpredictable behavior, sudden movements, or attempts to escape, which can be challenging to manage on slippery or uneven surfaces. Handlers may have difficulty maintaining their footing or maintaining control over the animal, increasing the risk of injuries.
  - ✓ **Equipment Handling:** Handling equipment, such as cages, nets, or capture devices, can become more challenging on slippery or uneven surfaces. It can be harder to maneuver equipment properly, increasing the risk of accidents or unintended contact with the animals.

To minimize the hazards associated with slippery or uneven work surfaces when handling wild animals, it is important to take appropriate precautions:

- **Proper Footwear:** Wear appropriate footwear with slip-resistant soles that provide good traction on various surfaces. Choose shoes or boots that are comfortable, supportive, and designed for the specific handling conditions and terrain.
- **Clear Pathways**: Keep work areas clear of debris, obstacles, or clutter that can contribute to slips or falls. Remove any water, mud, or animal waste promptly to maintain dry and safe surfaces.

- **Lighting Conditions:** Ensure adequate lighting in work areas to enhance visibility and help identify potential hazards, such as uneven surfaces or obstacles. Use additional lighting sources if necessary, especially in dimly lit or outdoor environments.
- **Animal Handling Equipment:** Use appropriate animal handling equipment designed for the specific tasks and environmental conditions. Ensure that equipment is well-maintained, in good working condition, and suitable for use on slippery or uneven surfaces.
- **Training and Education:** Provide proper training to handlers on safe techniques for working on slippery or uneven surfaces. This includes teaching them how to maintain balance, use appropriate body mechanics, and anticipate the behavior of wild animals in different conditions.
- **Risk Assessment:** Conduct regular risk assessments of the work environment and identify potential hazards related to slippery or uneven surfaces. Take proactive measures to address these hazards, such as implementing non-slip coatings, providing additional support structures, or creating stable footing.

It is important to consult with safety professionals, occupational health experts, or relevant authorities to ensure compliance with safety regulations and best practices when handling wild animals on slippery or uneven work surfaces.

To mitigate these hazards, it is essential to prioritize safety and follow proper protocols when handling wild animals. This includes obtaining the necessary permits, receiving appropriate training, using personal protective equipment, and working with experienced professionals in the field. It is also crucial to consider the welfare and conservation implications of handling wild animals and to prioritize their well-being throughout the process.

1.4.1. Hand-washing

Hand-washing is considered the most important practice in preventing the spread of disease for visitors to animal contact areas. Infectious diseases may be spread from either animals or their environment to people via contaminated hands. Good hygiene practices, such as the correct hand-washing technique and washing hands at appropriate times in the animal contact area, will decrease the risk of disease. Always wash hands with soap and running water:

- After touching animals, their enclosures or food containers.
- Any part of the animal or its surrounds can be contaminated
- After being licked or bitten by animals

- After having contact with soil, urine or faeces in an animal contact area.
- Always wash hands before eating, drinking or smoking.
- Always alert about the behavoir of animal

1.4.2. Avoiding activities with a higher risk

- While visiting animals do not:
  - ✓ Touch mouth with hands, or lick fingers
  - ✓ Eat food intended for animals eat inside the animal contact area (although there can be exceptions to this where the operator implements control measures to mitigate zoonotic disease risk in a visitor eating area)
  - ✓ Leave open wounds uncovered
  - ✓ Wipe hands on clothing, if avoidable
  - ✓ Use dummies, spill-proof cups or baby bottles in the animal contact areas
  - ✓ Return dummies or toys that have fallen on the ground or been in contact with animals to children until they have been washed with soap and water.

Generally, avoiding activities with a higher risks like deforestation, hunting, marshy area, drought, transmitting vectors, contaminated feeds and water, exposure of the animal to pathogens, species and breeds of the animal is very important for wild life management in Ethiopia.

Self-check 1

Name…… ID…… Date……..

Directions:

Part I. Answer all the questions listed below (1pt each).

1. What are some potential hazards for individuals handling wild animals?
2. How can handling wild animals pose risks to bystanders?
3. What are the potential dangers to the general public when wild animals are mishandled?
4. In what ways can mishandling of wild animals pose threats to the animals themselves?
5. What are some common safety measures that should be followed when handling wild animals?

Part II. Multiple choice

Direction

Choose the correct answer from the given choices and incircle to your answer(1pt each).

1. Which of the following is NOT a common type of wild animal found in parks?
   a) Birds
   b) Reptiles
   c) Dinosaurs
   d) Mammals
2. What is the primary purpose of wildlife conservation in parks?
   a) To provide a safe haven for endangered species
   b) To create recreational spaces for visitors
   c) To harvest natural resources sustainably
   d) To build amusement parks for entertainment
3. Which of the following is a national park in the United States?
   a) Yosemite National Park
   b) Central Park

c) Disneyland

d) Hyde Park

4. What is the term used to describe an animal that primarily eats plants?

a) Carnivore

b) Herbivore

c) Omnivore

d) Insectivore

5. What is the role of a park ranger?

a) To entertain visitors with shows and performances

b) To enforce park rules and regulations

c) To capture and relocate wild animals

d) To sell tickets and souvenirs at the entrance

Note: Satisfactory rating – ≥ 10 points Unsatisfactory - below 10 points You can ask you teacher for the copy of the correct answers.

LG #41	LO #2- Identify and handle major infectious disease of wild animals

Instruction sheet 2

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identify Diseases, predators and natural disasters of wild animals
- Perform Personal hygiene and cleanliness standards
- Capture and restraining of wild animals
- Identify Sign, symptoms, transmission, diagnosis, treatment and prevention of major infectious diseases
  - ✓ Parasitic diseases
  - ✓ Bacterial diseases
  - ✓ Viral diseases
  - ✓ Fungal diseases
  - ✓ Zoonotic diseases
- Conduct Community awareness creation on signs of stress in wild animals
- Understand Public and economic importance of the diseases and advice

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Explain Threats to wild animals including diseases, predators and natural disasters are.
- Perform Personal hygiene and cleanliness standards are maintained in accordance with OHS procedures and organizational guidelines and procedures.
- Identify Major Infectious diseases of wild animals caused by micro-organisms based on their occurrence, clinical sign and symptoms, mode of transmission, laboratory and post mortem findings according to the national organizational guideline.
- Capture, restrain and handle Wild animals for diagnosis and treatment, according to the enterprise regulation.
- Creat awareness on signs of stress in wild animals when assessing the comfort of the

animal being restrained.

- Undertake diagnosis of animal disease according to the enterprise guide lines.
- Identify diseases causing microorganisms by their clinical manifestations, pathological changes and through laboratory diagnosis; by collecting appropriate spacemen from clinically sick and dead animals for specific suspected diseases according the laboratory requirements.
- Carry out prescribed animal treatments as required, under supervision, according to manufacturer's instruction and enterprise protocol.
- Identify and outlined prevention and control methods for each of the diseases according to the enterprise guideline.
- Identify and give advice on public and economic importance of the diseases and implement appropriate prevention and control programs as required under supervision of a veterinarian.

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks

Information sheet 2

2.1. Diseases, predators and natural disasters of wild animals

Threats to wild animals can come in various forms, including diseases, predators, and natural disasters. Here's an explanation of each:

- **Diseases:** Wild animals can be affected by both infectious and non-infectious diseases. Infectious diseases can be caused by viruses, bacteria, fungi, and parasites. These diseases can spread within and between species, impacting populations and sometimes leading to significant declines. Non-infectious diseases include nutritional deficiencies, dental issues, neoplastic diseases (tumors), and autoimmune disorders, which can affect individual animals' health and survival.
- **Predators:** Predation is a natural ecological process in which predators hunt and feed on prey animals. Predators play a crucial role in maintaining the balance of ecosystems by controlling prey populations. Predators can range from large carnivores to smaller predators like birds of prey, snakes, and even parasites. Predation can exert selective pressure on prey populations, driving adaptations and influencing behavior.
- **Natural Disasters:** Wild animals are susceptible to the impacts of natural disasters, such as wildfires, floods, hurricanes, earthquakes, and droughts. These events can result in habitat destruction, food scarcity, displacement, and direct mortality. Animals may face challenges in finding shelter, escaping danger, and securing food and water sources during and after natural disasters.

It's important to note that the impact of diseases, predators, and natural disasters on wild animals can vary depending on species, habitat, and other factors. Some species have developed adaptations and strategies to cope with these challenges, while others may be more vulnerable. Conservation efforts, habitat restoration, and wildlife management practices aim to mitigate these challenges and support the long-term survival of wild animal populations.

2.2. Personal hygiene and cleanliness standards

2.2.1. Introduction

Hygiene generally refers to the set of practices associated with the preservation of health and healthy living. Personal hygiene is practices performed by an individual to care for one's bodily health and wellbeing through cleanliness. Many people equate hygiene with 'cleanliness' but hygiene is a broad term including personal habits choices as how frequently to bath, wash hands, trim fingernails and change clothing. Also includes keeping the environment clean and pathogen free.

Personal hygiene is a concept that is commonly used in medical and public health practices. It is also widely practiced at the individual level and at home. Personal hygiene is personal, as its name implies. In this regard, personal hygiene is defined as a condition promoting sanitary practices to the self. Generally, the practice of personal hygiene is employed to prevent or minimize the incidence and spread of communicable diseases. Difference between cleanliness and hygiene is: the term cleanliness should not be used in place of hygiene. Cleaning in many cases is removing dirt, wastes or unwanted things from the surface of objects using detergents and necessary equipment.

Hygiene practice focuses on the prevention of diseases through the use of cleaning as one of several inputs. Sanitation addresses the cleaning and disinfection when necessary of people, equipment, animals and material. Some form of cleaning and disinfection should be done before people and their clothing, equipment, supplies, and larger items such as vehicles and heavy equipment cross from dirty or low risk (the farm perimeter) to clean or higher risk areas. Entry and exit routes from buildings and a property have the potential to bring and take away disease causing organisms. Proper Personal Hygiene includes the following:

- Wash hands before and after animal handling
- Do not eat or drink in the animal housing areas
- Wear coveralls, farm specific clothing or laboratory coats when handling animals.
- Avoid handling sick animals or

- animals with lesions unless gloved
- Wear a mask if you are allergic to animal hair or dander or if feed or bedding dust is present
- Routinely wear gloves when cleaning animal area

2.2.2. OHS Procedures

Occupational Health and Safety (OHS) procedures and organizational guidelines and procedures are important for maintaining a safe and healthy work environment. Here's an overview of these concepts:

- Risk Assessment: OHS procedures typically involve conducting risk assessments to identify potential hazards and evaluate the associated risks in the workplace. This helps in implementing appropriate control measures to minimize or eliminate those risks.
- Hazard Identification and Reporting: OHS procedures outline processes for identifying hazards and reporting them to the appropriate authority. This can be done through regular inspections, incident reporting systems, or employee reporting mechanisms.
- Emergency Preparedness: OHS procedures include guidelines on emergency preparedness and response. This may involve developing evacuation plans, establishing emergency communication systems, and providing first aid training to employees.
- Personal Protective Equipment (PPE): OHS procedures often address the use of personal protective equipment. They specify when and how PPE should be used to protect employees from workplace hazards. This includes providing training on proper usage, maintenance, and disposal of PPE.
- Training and Education: OHS procedures may require employers to provide training and education to employees on workplace safety and health. This ensures that employees are aware of hazards, understand safety protocols, and know how to perform their jobs safely.

2.2.3. Organizational Guidelines and Procedures:

- Safety Policies: Organizational guidelines and procedures establish safety policies that outline the organization's commitment to providing a safe and healthy work environment. These policies may include statements on hazard prevention, safety responsibilities, and reporting mechanisms.
- Roles and Responsibilities: Guidelines and procedures define the roles and responsibilities of various individuals within the organization regarding OHS. This includes management

responsibilities, supervisor responsibilities, and employee responsibilities for maintaining a safe workplace.

- Incident Reporting and Investigation: Organizational guidelines and procedures establish protocols for reporting and investigating workplace incidents, accidents, near misses, or hazards. This helps in identifying the root causes of incidents and implementing corrective actions to prevent future occurrences.
- OHS Committees or Representatives: Some organizations may establish OHS committees or designate OHS representatives to facilitate communication, collaboration, and continuous improvement in OHS practices. These guidelines define the structure, roles, and responsibilities of such committees or representatives.
- Compliance with Regulations: Organizational guidelines and procedures ensure compliance with applicable OHS laws, regulations, and industry standards. They provide guidance on meeting legal requirements and maintaining OHS records and documentation.

It's important to note that specific OHS procedures and organizational guidelines and procedures can vary based on the nature of the organization, industry, and jurisdiction in which it operates. Organizations should develop and tailor their procedures to address the unique OHS requirements of their work environment.

Generally the OHS procedures that should be followed while dealing with wildlife includes

- Appropriate handling reprocessing of reusable equipmentUsing aseptic technique
- Cover cuts and abrasions with waterproof dressing and change as necessary
- Maintain personal immunisation/vaccination requirements for working with animals where required
- Personal hygiene practices especially washing and drying hands before and after animal contact and/or any activity likely to cause cross-contamination
- Safe handling and disposal of sharps and other clinical, related and general waste
- Use of PPE clothing and equipment and change as appropriate for the intended use.

2.3. Capturing and restraining of wild animals

Capturing and restraining wild animals should only be done by trained professionals, such as wildlife biologists, veterinarians, or wildlife management authorities. It is essential to prioritize the safety and well-being of both the captured animal and the individuals involved in the capture process. The specific methods used for capturing and restraining wild animals can vary depending on the species, size, behavior, and the purpose of capture (e.g., research, relocation, veterinary examination). Here are some general considerations:

- **Proper training:** Individuals involved in capturing and restraining wild animals should have appropriate training and experience in handling and working with the specific species they are targeting. This helps ensure the safety of both the animal and the handlers.
- **Permits and regulations:** It is important to comply with local laws, regulations, and permit requirements for capturing and handling wild animals. Obtain the necessary permits and permissions before initiating any capture activities.
- **Ethical considerations**: Capturing and restraining should be carried out with minimal stress and harm to the animal. It is important to consider the potential impact on the animal's welfare and ensure that capture methods are as humane as possible.
- **Equipment:** Depending on the species and situation, various equipment may be used, such as nets, traps, catch poles, tranquilizer darts, or specialized handling tools. The selection of equipment should be appropriate for the species and minimize the risk of injury to both the animal and the handlers.
- **Safe handling and restraint:** When capturing or restraining an animal, it is crucial to prioritize the safety of all individuals involved. Careful techniques should be employed to minimize stress and prevent injury to both the animal and the handlers. This may involve using appropriate physical restraints or sedation when necessary.
- **Health considerations:** When capturing and handling wild animals, it is important to consider zoonotic diseases and take appropriate precautions to protect both the animal handlers and the captured animals. This may involve the use of personal protective equipment (PPE), vaccination protocols, and following proper hygiene practices.
- **Release or transfer:** Once the capture and handling objectives have been achieved, the animal should be released back into its natural habitat or transferred to an appropriate location, such as a rehabilitation center or a new suitable habitat, if necessary.

Remember, capturing and restraining wild animals should be done with the utmost care, expertise, and respect for the animal's welfare. It is crucial to consult with professionals and adhere to local regulations and ethical guidelines when carrying out these activities.

- **Hand restraining:** Hand restraining of wild animals can be a challenging and potentially dangerous task. It should only be performed by trained and experienced professionals who have the necessary knowledge and skills to handle wild animals safely. Here are some important considerations when it comes to hand restraining wild animals:
  - ✓ **Personal Safety:** The safety of the handler should always be the top priority. Wild animals can be unpredictable and may exhibit aggressive behavior when feeling threatened or cornered. Handlers should wear appropriate personal protective equipment (PPE) to minimize the risk of injury, including gloves, long-sleeved clothing, and possibly helmets or face shields for additional protection.
  - ✓ **Animal Welfare:** It is crucial to prioritize the welfare of the animal during restraint. Excessive force or improper handling can cause stress, injury, or even death to the animal. Handlers should be knowledgeable about the specific species they are dealing with, including their behavior, anatomy, and any special considerations for their welfare.
  - ✓ **Proper Technique:** Each species may require different handling techniques based on their size, strength, and natural behaviors. Handlers should receive specific training and guidance on the appropriate methods for safely restraining each type of animal. This may involve techniques such as using nets, catch poles, or specialized equipment designed for animal restraint.
  - ✓ **Environmental Considerations:** The handling environment should be carefully assessed to ensure the safety of both the handler and the animal. It should be free from any hazards or escape routes that could endanger either party during the restraining process. Facilities with appropriate enclosures or containment areas can provide a controlled environment for safe handling.
  - ✓ **Sedation or Anesthesia:** In some cases, hand restraining may not be feasible or safe without the use of sedatives or anesthesia. These methods should only be administered by trained professionals, such as veterinarians, and in accordance with appropriate guidelines and regulations. The administration of sedatives or anesthesia should be carefully monitored to ensure the well-being of the animal.

- ✓ **Legal and Ethical Considerations:** It is important to comply with local laws, regulations, and permits when handling wild animals. Additionally, ethical considerations should be taken into account, including the necessity of the restraining procedure, the potential impact on the animal's well-being, and the availability of alternative, less invasive methods of handling or restraint.

- **Chemical restraining:** Chemical restraining, also known as chemical immobilization or chemical capture, is a method used to temporarily immobilize or sedate wild animals for various purposes, such as research, veterinary procedures, or relocation. It involves the administration of drugs or chemicals to induce a state of sedation or unconsciousness. Here are some important considerations regarding chemical restraining of wild animals:
  - ✓ **Professional Training:** Chemical restraining should only be performed by trained and qualified professionals, such as wildlife veterinarians or experienced wildlife biologists. They should have a deep understanding of the target species, appropriate drug dosages, potential risks, and the necessary equipment for safe administration.
  - ✓ **Species-Specific Considerations:** Different animal species may have varied sensitivities and responses to chemical immobilization drugs. The selection and dosage of drugs should be tailored to the specific species being targeted. Factors such as body size, metabolism, and physiological characteristics should be taken into account to minimize the risk of adverse effects.
  - ✓ **Drug Selection:** The choice of immobilizing drugs depends on various factors, such as the desired level of sedation, duration of immobilization required, and the specific needs of the animal. Commonly used drugs include tranquilizers, sedatives, dissociative anesthetics, and opioid analgesics. The selection should be based on the professional's knowledge and consideration of the animal's health, stress levels, and the procedure being performed.
  - ✓ **Monitoring and Support:** During chemical restraining, continuous monitoring of the animal's vital signs, such as heart rate, respiratory rate, and body temperature, is essential. Proper monitoring equipment, such as pulse oximeters or ECGs, should be used to assess the animal's physiological status. Trained personnel should be present to provide necessary support, including airway management, temperature regulation, and emergency intervention if any complications arise.
  - ✓ **Safety Precautions:** Chemical restraining should be performed in a controlled and secure environment to ensure the safety of both the animal and the personnel involved. Procedures should be in place to prevent accidental escape or injury during the immobilization process. Adequate personal protective equipment (PPE) should be worn by handlers to minimize the risk of exposure to drugs and potential zoonotic diseases.

- ✓ **Ethical Considerations:** The use of chemical restraining should be guided by ethical considerations, prioritizing the welfare and well-being of the animals. The procedure should be performed with the minimum necessary stress and risk, and the animal should be monitored closely to ensure a smooth recovery from immobilization.

- **Traps :** Trapping is a method used to restrain or capture wild animals for various purposes, such as research, population control, or relocation. Different types of traps are used depending on the target species and the specific objectives. Here are some important considerations regarding traps restraining of wild animals:
  - ✓ **Legal and Ethical Considerations:** It is essential to comply with local laws, regulations, and permits related to trapping wild animals. Trapping methods should align with ethical guidelines, prioritizing animal welfare and minimizing unnecessary harm or distress.
  - ✓ **Species-Specific Traps:** Traps should be selected based on the target species and their behavior. Different animals may require specific types of traps to ensure effective capture and minimize the risk of injury. Traps should be properly designed, tested, and approved for use on the target species.
  - ✓ **Trap Placement and Monitoring:** Traps should be strategically placed in areas where the target species are likely to be present. Traps should be checked regularly to minimize the time animals spend in the trap and to promptly release any non-target or unintended captures. Timely monitoring also helps reduce stress and potential harm to trapped animals.
  - ✓ **Animal Welfare:** Trapped animals may experience stress, fear, and physical discomfort. Therefore, it is important to prioritize their welfare during the trapping process. Traps should be designed to minimize injury and provide appropriate ventilation, food, and water if required. Trapped animals should be handled with care and released promptly or provided with necessary veterinary attention.
  - ✓ **Training and Expertise:** Trapping should be performed by trained individuals with expertise in wildlife management and trapping techniques. They should have a thorough understanding of the target species' behavior, trap operation, and animal handling to ensure the safe and effective use of traps.
  - ✓ **Non-Target Species:** Traps may inadvertently capture non-target or unintended species. Steps should be taken to minimize the likelihood of capturing non-target animals, such as using trap modifications or bait selection specific to the target species. Prompt release of non-target captures is crucial to prevent unnecessary harm or mortality.

- ✓ **Public Safety:** Trapping activities should be conducted with consideration for public safety. Traps should be placed away from public areas to minimize the risk of accidental encounters or conflicts between trapped animals and humans. Clear signage and communication should be provided to inform the public about trapping activities in the area.



Fig 2.1. Different methods of restraining in wild animals

2.4. Sign, symptoms, transmission, diagnosis, treatment and prevention of major infectious diseases

2.4.1. Parasitic diseases

Wildlife parasitic diseases are diseases caused by parasites that infect various species of wild animals. These parasites can be protozoa, helminths (worms), ectoparasites (such as ticks and fleas), or other organisms that rely on a host organism for their survival and reproduction. These diseases can have significant impacts on the health and populations of wild animals, as well as pose risks to humans and Here are a few examples of wildlife parasitic diseases:

A. Babesiosis

Babesiosis is a tick-borne disease caused by protozoan parasites of the genus Babesia. It affects a wide range of wild animals, including deer, rodents, and birds. The parasites invade red blood cells, causing anemia and other symptoms. In some cases, babesiosis can also infect humans and domestic animals. The signs and symptoms of babesiosis in wildlife can vary depending on the species affected and the severity of the infection.

- Here are some **common signs and symptoms** observed in wildlife with babesiosis:
  - ✓ **Anemia**: Babesiosis parasites invade red blood cells, leading to the destruction of these cells. This can result in anemia, characterized by pale mucous membranes, weakness, lethargy, and reduced activity levels.
  - ✓ **Fever:** Infected animals may exhibit an elevated body temperature or fever. This can be detected by monitoring the animal's body temperature, which may be higher than the normal range.
  - ✓ **Loss of appetite**: Babesiosis can cause a decrease in appetite in affected wildlife. Animals may show reduced interest in food, leading to weight loss and poor body condition.
  - ✓ **Jaundice**: In severe cases of babesiosis, the breakdown of red blood cells can lead to the accumulation of bilirubin, causing a yellow discoloration of the skin, eyes, and mucous membranes. This condition, known as jaundice, is more commonly observed in advanced stages of the disease.
  - ✓ **Neurological symptoms**: In some cases, babesiosis can affect the nervous system, leading to neurological signs such as disorientation, lack of coordination, and abnormal behavior.
  - ✓ **Respiratory distress**: Babesiosis can also affect the respiratory system, causing difficulty in breathing, coughing, or rapid and shallow breathing.

It's important to note that the signs and symptoms of babesiosis can overlap with those of other diseases, making it challenging to diagnose based solely on clinical signs. Laboratory tests such as blood smears or molecular techniques are often necessary to confirm the presence of Babesia parasites in the blood.

The **transmission of babesiosis** to wildlife primarily occurs through the bite of infected ticks. Ticks serve as vectors for the Babesia parasites, which they acquire when feeding on infected hosts, such as other infected wildlife or domestic animals. When an infected tick feeds on a susceptible wildlife host, it can transmit Babesia parasites, leading to the development of babesiosis in the wildlife.

The life cycle of Babesia parasites typically involves two hosts: a vertebrate host (such as a mammal) and an invertebrate host (such as a tick). The parasites undergo various stages of development within these hosts.

- Here's a simplified overview of the transmission cycle:
  - **Infected wildlife:** Wildlife, such as deer, rodents, birds, or other mammals, act as reservoir hosts for Babesia parasites. They harbor the parasites within their blood.
  - **Tick bites infected wildlife**: Ticks, particularly species of Ixodes ticks, feed on infected wildlife and acquire the Babesia parasites.
  - **Infected tick feeds on susceptible wildlife**: The infected tick then seeks a new host, which could be another wildlife host. When it bites the susceptible wildlife, it can transmit the Babesia parasites into the bloodstream of the new host.
  - **Parasite multiplication and transmission**: Once inside the susceptible wildlife host, the Babesia parasites invade red blood cells, multiply, and continue their life cycle. When a new tick feeds on the infected wildlife, it can acquire the parasites and continue the transmission cycle by biting additional wildlife hosts.

It's important to note that while ticks are the primary mode of transmission for babesiosis in wildlife, other modes of transmission are possible but less common. For example, vertical transmission from an infected mother to her offspring or transmission through blood transfusion between animals can occur.
Preventing tick bites and implementing tick control measures are crucial for reducing the transmission of babesiosis and other tick-borne diseases to wildlife. Proper habitat management, tick surveillance, and targeted interventions can help mitigate the risk of babesiosis transmission among wildlife populations.

- **Treatment:** The treatment of babesiosis in wild animals can be challenging due to several factors, including limited access to affected individuals and the potential impact on wildlife populations and ecosystems. It's important to note that the management and treatment of wildlife diseases should be carried out by trained wildlife veterinarians or professionals in collaboration with wildlife management authorities. Here are some general considerations for the treatment of babesiosis in wild animals:
  - ✓ **Diagnosis:** Accurate diagnosis is essential before initiating treatment. This typically involves collecting blood samples from the affected animal and examining them for the presence of Babesia parasites using laboratory techniques such as blood smears or molecular tests.
  - ✓ **Supportive care:** In some cases, providing supportive care to the affected animal may be necessary. This can include measures such as fluid therapy to correct dehydration and anemia, maintaining body temperature, and ensuring proper nutrition.

- ✓ **Antiprotozoal medication:** For severe cases of babesiosis, antiprotozoal medications may be administered to target and eliminate the Babesia parasites. The choice of medication and dosage will depend on factors such as the species of the Babesia parasite, the severity of the infection, and the specific considerations for the wildlife species being treated. The use of medication in wildlife should be carefully evaluated to minimize potential adverse effects on the individual and the surrounding ecosystem.
- ✓ **Tick control:** Managing the tick population in the environment can help reduce the transmission of babesiosis and other tick-borne diseases. This can include habitat management practices, such as reducing tick habitat and implementing targeted tick control measures.
- ✓ **Monitoring and follow-up:** Regular monitoring of the affected individuals is important to assess their response to treatment and overall health. In some cases, multiple treatment sessions or long-term management may be necessary.

It's crucial to consider the potential impact of treatment on wildlife populations and ecosystems. Interventions should be carried out with careful consideration of conservation and ethical concerns, and decisions regarding treatment should be made in consultation with wildlife management authorities and wildlife health experts.

Each case of babesiosis in wild animals may present unique challenges, and the treatment approach should be tailored to the specific circumstances, species, and available resources.

If you suspect babesiosis or any other disease in wildlife, it is crucial to contact local wildlife authorities, veterinarians, or wildlife experts for proper diagnosis, treatment, and management.

- **Prevention and control of babesiosis**

Babesiosis is a tick-borne disease that affects both domestic and wild animals. While the prevention and control of babesiosis in wild animals can be challenging, here are some general strategies that can help mitigate the spread and impact of the disease:

- ✓ **Tick Control:** Babesiosis is transmitted by ticks, so effective tick control measures are crucial. Implementing tick control strategies, such as habitat modification, reducing tick populations, and using acaricides (tick-killing substances), can help minimize the exposure of wild animals to infected ticks. This may involve targeted tick control efforts in areas with high tick density or implementing landscape management practices that make habitats less suitable for ticks.

- ✓ **Wildlife Surveillance:** Conducting regular surveillance of wild animal populations can help identify the presence and prevalence of babesiosis. This information is valuable for understanding the disease dynamics, assessing the risk to both wildlife and domestic animals, and implementing appropriate control measures. Surveillance can involve capturing and testing wild animals for the presence of the Babesia parasite or monitoring tick populations in specific habitats.
- ✓ **Habitat Management:** Managing the habitat can indirectly reduce the risk of babesiosis in wild animals. Creating buffer zones between tick-infested areas and animal resting or grazing areas can minimize tick exposure. Habitat modifications, such as reducing tall grasses, brush, or leaf litter, can make the environment less suitable for ticks, leading to a decrease in tick populations.
- ✓ **Public Awareness and Education:** Raising awareness among the general public, wildlife managers, and stakeholders about babesiosis and its transmission can promote responsible behavior and preventive measures. This includes educating individuals about the importance of tick control on pets and livestock, as well as promoting practices that reduce contact between domestic and wild animal populations.
- ✓ **Collaboration and Integrated Approach:** Collaboration between wildlife management agencies, veterinary professionals, researchers, and other stakeholders is vital for effective prevention and control of babesiosis in wild animals. By integrating efforts, sharing information, and implementing coordinated strategies, the spread of the disease can be better managed and controlled.

It is important to note that specific control strategies may vary depending on the geographic location, wildlife species involved, and the specific Babesia parasite strains present. Local wildlife management authorities and veterinary professionals should be consulted for guidance on the most appropriate and effective prevention and control measures for babesiosis in wild animals in a given area.

B. Lyme Disease

Lyme disease is caused by the bacterium Borrelia burgdorferi and is transmitted to humans and animals through the bite of infected black-legged ticks. While it primarily affects humans, wildlife, particularly mammals like deer and rodents, serve as reservoir hosts for the bacteria. Lyme disease can lead to various symptoms, including

- ✓ fever
- ✓ fatigue
- ✓ joint pain, and

- ✓ neurological problems.

The treatment and prevention of Lyme disease in wildlife involve a combination of strategies aimed at reducing the prevalence of the disease in both wildlife populations and the tick vectors that transmit the disease. It's important to note that managing and treating Lyme disease in wildlife should be carried out by trained wildlife professionals or in collaboration with wildlife management authorities. Here are some general considerations for the treatment and prevention of Lyme disease in wildlife:

- **Tick control**: Reducing the tick population is crucial for preventing the transmission of Lyme disease. This can be done through habitat management practices that create unfavorable conditions for ticks, such as maintaining tall grasses and shrubs, reducing leaf litter, and creating barriers to prevent tick movement. In some cases, targeted application of acaricides (tick-killing chemicals) may be considered, but this should be done with caution to minimize potential impacts on non-target species and the environment.
- **Wildlife management**: Managing wildlife populations, particularly those that serve as reservoir hosts for the Lyme disease bacterium (such as white-tailed deer and rodents), can help reduce the prevalence of the disease. This can involve population control measures, such as regulated hunting or culling programs, to reduce the density of reservoir hosts.
- **Vaccination (for wildlife):** Although there is currently no widely available Lyme disease vaccine specifically designed for wildlife, research is ongoing in this area. Developing vaccines that can be used to immunize reservoir hosts could potentially help reduce the transmission of the disease.
- **Surveillance and monitoring:** Regular surveillance of wildlife populations for the presence of Lyme disease is important for understanding the disease dynamics and assessing the effectiveness of management strategies. This can involve collecting and testing blood or tissue samples from wildlife to detect the presence of the Lyme disease bacterium or antibodies.
- **Public education:** Raising awareness among the public about Lyme disease, its prevention, and the role of wildlife in the transmission cycle can help promote responsible behavior, such as tick bite prevention measures and reporting of sick or dead wildlife.
- **Veterinary care:** While there is no specific treatment for Lyme disease in wildlife, providing veterinary care and supportive measures to wildlife that may be affected by the disease can help improve their overall health and resilience.

It's important to consult with wildlife management authorities, wildlife health experts, and local regulations when implementing strategies for the treatment and prevention of Lyme disease in wildlife. These measures should be integrated into a comprehensive approach that considers the ecology of the disease, the needs of wildlife populations, and the potential impacts on ecosystems.



Fig. 2.2. Lyme

C. Sarcoptic Mange

It affects a wide range of mammals, including foxes, coyotes, and bears. The mites burrow into the skin, causing intense itching, hair loss, and skin lesions. Severe infestations can be fatal.

Sarcoptic mange, also known as scabies, is a highly contagious skin disease caused by the Sarcoptes scabiei mite. It affects a wide range of wild animals, including mammals like foxes, coyotes, wolves, bears, and raccoons. The signs and symptoms of sarcoptic mange in wild animals can vary depending on the species affected and the stage of the infestation.

- Here are some **common signs and symptoms**:
  - ✓ **Intense itching**: Infected animals typically experience severe itching, which leads to constant scratching, biting, and rubbing against objects in an attempt to alleviate the discomfort. This can result in hair loss and self-inflicted wounds.
  - ✓ **Hair loss and skin lesions**: As the infestation progresses, hair loss occurs, usually starting around the ears, face, elbows, and legs. The skin may become dry, scaly, crusty, thickened, or ulcerated. Secondary bacterial infections can also develop in the affected areas, leading to additional skin lesions or sores.
  - ✓ **Thickened and wrinkled skin**: In chronic cases of sarcoptic mange, the skin may become thickened, wrinkled, and hyperpigmented.

- ✓ **Weight loss and emaciation**: Severe and prolonged infestations can lead to weight loss and emaciation due to the animal's constant itching, reduced appetite, and compromised ability to forage or hunt.
- ✓ **Behavioral changes**: Infected animals may exhibit behavioral changes, such as increased restlessness, agitation, irritability, or aggression. They may also show signs of social withdrawal or reduced activity levels.
- ✓ **Eye and ear involvement**: In some cases, sarcoptic mange can affect the eyes and ears, leading to conjunctivitis, discharge from the eyes, crusting around the eyes, and ear infections.

It's important to note that the signs and symptoms of sarcoptic mange can resemble those of other skin diseases, so a proper diagnosis is essential. Wildlife professionals, such as wildlife veterinarians or wildlife biologists, can conduct appropriate examinations, skin scrapings, or other diagnostic tests to confirm the presence of Sarcoptes scabiei mites.

Sarcoptic mange can have significant impacts on affected wildlife populations, and appropriate management strategies, including treatment and control measures, should be implemented in consultation with wildlife experts and authorities.

- **Treatment of sarcoptic mange**

Sarcoptic mange, also known as scabies, is a highly contagious skin disease caused by the Sarcoptes scabiei mite. It affects a wide range of animals, including domestic and wild species. The treatment of sarcoptic mange typically involves a combination of approaches, including:

- ✓ **Veterinary Diagnosis:** Proper diagnosis is crucial to confirm the presence of sarcoptic mange and rule out other skin conditions. A veterinarian will examine the animal, conduct skin scrapings to identify mites or their eggs under a microscope, and may perform additional tests if necessary.
- ✓ **Medications:** Medications are the primary treatment for sarcoptic mange. The specific medications prescribed may vary depending on the severity of the infestation, the species of the affected animal, and other factors. Commonly used medications include:
- ✓ **Topical Acaricides:** These are applied directly to the affected areas of the skin and are effective in killing the mites. They may include products containing ingredients like selamectin, fipronil, or amitraz. Follow the veterinarian's instructions for proper application.
- ✓ **Systemic Medications:** In more severe cases or when topical treatments are insufficient, oral or injectable medications may be prescribed. These medications, such as ivermectin or milbemycin, are effective in killing mites throughout the body. Dosage and duration of treatment will be determined by the veterinarian.

- ✓ **Symptomatic Treatment:** In addition to killing the mites, symptomatic treatment may be necessary to address secondary infections, relieve itching, and promote healing. This may involve the use of antibiotics for bacterial infections, anti-inflammatory medications to reduce itching and inflammation, and specialized shampoos or ointments to soothe the skin.
- ✓ **Environmental Management:** Sarcoptic mange mites can survive off the host for a short period, so environmental management is essential to prevent reinfestation. This may include thorough cleaning of bedding, kennels, and living areas, as well as washing or discarding infested items.
- ✓ **Follow-up and Monitoring:** Sarcoptic mange treatment often requires multiple rounds of medication and ongoing monitoring to ensure complete eradication of the mites. Follow-up visits with the veterinarian are important to assess treatment progress, adjust medications if needed, and address any complications or concerns that may arise.

It is important to note that sarcoptic mange is highly contagious, and infected animals can transmit the mites to other animals or humans. Therefore, it is crucial to isolate and treat affected animals promptly and take appropriate precautions to prevent the spread of the disease.

- **Prevention and control**

Preventing and controlling sarcoptic mange in wild animals can be challenging due to the nature of their habitats and the difficulty of individual treatment. However, here are some general strategies that can help mitigate the spread and impact of sarcoptic mange in wild animal populations:

- ✓ **Surveillance and Monitoring:** Regular surveillance of wild animal populations can help detect the presence of sarcoptic mange and monitor its prevalence and spread. Wildlife professionals, researchers, and conservation organizations can conduct surveys or studies to identify affected individuals or groups, assess the severity of infestation, and monitor changes over time.
- ✓ **Habitat Management:** Managing the habitat can indirectly help reduce the risk of sarcoptic mange in wild animals. Maintaining healthy and diverse ecosystems can support the overall well-being of wildlife populations. Practices such as habitat restoration, minimizing stressors, and promoting biodiversity can contribute to stronger immune systems and reduce the susceptibility of animals to mange infestations.
- ✓ **Tick Control:** Sarcoptic mange is often exacerbated by high tick populations, as ticks can spread the mites that cause the disease. Implementing tick control measures, such as habitat modification, reducing tick populations, and using acaricides, can help minimize the exposure of wild animals to infected ticks and potentially reduce the incidence of mange.

- ✓ **Wildlife Population Management:** In cases where sarcoptic mange is severely impacting a specific population or species, wildlife population management strategies may be considered. This could involve interventions such as culling infected individuals to prevent the further spread of the disease or implementing targeted treatment programs (e.g., using oral or injectable medications) to reduce infestation levels.
- ✓ **Research and Collaboration:** Continued research on sarcoptic mange in wild animal populations is important for understanding the disease dynamics, identifying effective control measures, and developing strategies specific to different species and habitats. Collaboration among wildlife managers, veterinarians, researchers, and conservation organizations is essential to share knowledge, exchange best practices, and implement coordinated efforts for prevention and control.
- ✓ **Public Awareness and Education:** Raising public awareness about sarcoptic mange and its impact on wild animals can foster responsible behavior and support conservation efforts. Informing the public about the disease, its transmission, and the importance of avoiding direct contact with wildlife can help prevent the spread of mange and protect both animals and humans.



Fig. 2.3. Infestation of sarcoptic mange

D. Toxoplasmosis

Toxoplasmosis is caused by the protozoan parasite Toxoplasma gondii. It can infect a variety of warm-blooded animals, including wild mammals and birds, as well as humans. Cats are the primary host and shed the parasite through their feces. Ingesting contaminated food or water or coming into contact with contaminated soil can lead to infection. In most healthy individuals, toxoplasmosis causes mild flu-like symptoms, but it can be severe or even fatal in individuals with weakened immune systems and can cause birth defects in unborn babies.

The **signs and symptoms** of toxoplasmosis in wild animals can vary depending on the species affected, the stage of the infection, and the immune response of the host.

- Here are some common **signs and symptoms**:
  - ✓ **Neurological symptoms**: Toxoplasmosis can affect the central nervous system of animals, leading to neurological signs. These may include unsteady gait, lack of coordination, tremors, seizures, weakness or paralysis of limbs, abnormal behavior, or altered consciousness.
  - ✓ **Respiratory symptoms**: In some cases, toxoplasmosis can cause respiratory symptoms, such as coughing, sneezing, difficulty breathing, or pneumonia.
  - ✓ **Ocular symptoms**: Toxoplasma gondii can also affect the eyes of infected animals, leading to ocular symptoms. These may include inflammation of the eye (uveitis), conjunctivitis, cloudy or opaque appearance of the eyes, or even blindness.
  - ✓ **Generalized illness**: Infected animals may exhibit general signs of illness, including lethargy, loss of appetite, weight loss, fever, and dehydration.
  - ✓ **Reproductive complications**: Toxoplasmosis can cause reproductive issues in animals, leading to abortions, stillbirths, or the birth of weak or deformed offspring.
  - ✓ **Asymptomatic infection**: It's important to note that many wild animals can be infected with Toxoplasma gondii without showing any obvious signs of illness. They can act as carriers of the parasite and shed its oocysts in their feces, contributing to the environmental contamination.
- **Diagnosing**

Toxoplasmosis in wild animals often requires laboratory tests, including serological testing, molecular techniques, or histopathological examination. It's important to consult with wildlife experts, wildlife veterinarians, or wildlife health authorities for proper diagnosis and management of toxoplasmosis in wild animal populations.

- **Preventing**

The transmission of toxoplasmosis in wild animals involves various measures, such as promoting good hygiene practices, minimizing exposure to contaminated food or water sources, and reducing the risk of environmental contamination by managing domestic and feral cat populations, which are the primary hosts for *Toxoplasma gondii*.

E. Echinococcosis

Echinococcosis is a parasitic disease caused by tapeworms of the Echinococcus genus. It primarily affects canids, such as wolves and foxes, but can also infect other mammals, including humans. The parasite forms cysts in the organs, particularly the liver and lungs, leading to serious health issues. Humans can become infected by accidental ingestion of tapeworm eggs through contact with contaminated soil or animal feces.

The signs and symptoms of echinococcosis in wild animals can vary depending on the species affected, the location of the cysts, and the severity of the infection.

- Here are some common signs and symptoms:
  - ✓ **Abdominal swelling or masses**: In animals with abdominal echinococcosis, the presence of fluid-filled cysts or hydatid cysts in the liver, lungs, or other organs can lead to abdominal distension or the formation of palpable masses.
  - ✓ **Respiratory symptoms**: Echinococcosis can affect the lungs of infected animals, causing respiratory signs such as coughing, difficulty breathing, or pneumonia. This is more commonly seen in species like ungulates.
  - ✓ **Intestinal obstruction or digestive disturbances**: In rare cases, echinococcosis can result in the formation of cysts in the intestines, leading to intestinal obstruction, vomiting, diarrhea, or other digestive disturbances.
  - ✓ **General signs of illness**: Infected animals may display general signs of illness, including lethargy, loss of appetite, weight loss, weakness, or a decline in overall condition.
  - ✓ **Neurological symptoms**: Echinococcosis can occasionally affect the central nervous system of animals, resulting in neurological signs such as seizures, coordination problems, or behavioral changes.
  - ✓ **Asymptomatic infection**: In some cases, wild animals may be infected with Echinococcus tapeworms without showing any obvious signs of illness. They can act as reservoirs for the parasite, shedding eggs in their feces and contributing to the environmental contamination.

- **Diagnosing:** Echinococcosis in wild animals often requires specialized laboratory tests, such as imaging techniques like ultrasound or radiography, and examination of cyst contents or tissue samples. It's important to consult with wildlife experts, wildlife veterinarians, or wildlife health authorities for proper diagnosis and management of echinococcosis in wild animal populations.
- **Treatment:** Echinococcosis, also known as hydatid disease, is a parasitic infection caused by the tapeworms of the Echinococcus genus. The treatment of echinococcosis in wild animals is

challenging, and there are limited options available. Here are some general considerations regarding the treatment of echinococcosis in wild animals:

- ✓ **Veterinary Diagnosis:** Proper diagnosis is essential to confirm the presence of echinococcosis in wild animals. A veterinarian or wildlife biologist will typically conduct a thorough physical examination, including imaging techniques such as X-rays or ultrasounds, to detect the characteristic cysts caused by Echinococcus tapeworms. Blood tests or fecal examinations may also be performed to detect specific antibodies or tapeworm eggs.
- ✓ **Wildlife Management:** In cases where echinococcosis is detected in wild animal populations, wildlife management strategies may be implemented to prevent the spread of the disease. This can include population monitoring, habitat management, and implementing measures to reduce contact between infected animals and susceptible hosts, such as livestock or humans.
- ✓ **Control of Intermediate Hosts**: Echinococcus tapeworms require intermediate hosts, such as rodents or ungulates, to complete their life cycle. Implementing measures to control or reduce the population of intermediate hosts can indirectly help in reducing the transmission of the disease. This can include habitat management practices, predator-prey dynamics, or targeted control strategies in specific areas.
- ✓ **Public Awareness and Education:** Raising public awareness about echinococcosis and its transmission can promote responsible behavior and prevent human exposure to the disease. Educating individuals about the importance of proper hygiene, avoiding contact with wild animals, and the potential risks associated with handling or consuming infected wildlife can help reduce the spread of echinococcosis.

- **Prevention and control:** Preventing and controlling echinococcosis in wild animals involves implementing strategies to reduce the transmission of the disease and minimize the risk to both wildlife and humans. Here are some general measures that can help in the prevention and control of echinococcosis in wild animal populations:
  - ✓ **Wildlife Surveillance:** Regular surveillance of wild animal populations is crucial for monitoring the presence and prevalence of echinococcosis. Surveillance can involve conducting surveys, collecting and analyzing samples (such as feces or tissue samples) from wild animals, and monitoring changes in infection rates over time. This information is valuable for understanding the disease dynamics and implementing appropriate control measures.
  - ✓ **Public Awareness and Education**: Raising awareness among the general public, hunters, wildlife managers, and stakeholders about echinococcosis is essential. Education programs can inform individuals about the risks associated with handling or consuming infected wildlife,

proper hygiene practices, and the importance of reporting and avoiding contact with animals displaying signs of the disease. Public awareness campaigns can also emphasize responsible hunting practices and the importance of proper disposal of carcasses to prevent disease transmission.

- ✓ **Control of Intermediate Hosts**: Echinococcus tapeworms require intermediate hosts, such as rodents, ungulates, or other small mammals, to complete their life cycle. Implementing measures to control or reduce the population of intermediate hosts can help limit the transmission of the disease. This can include habitat management practices, rodent control programs, and measures to reduce interactions between wild and domestic animals.
- ✓ **Wildlife Management:** Managing wildlife populations can indirectly contribute to the prevention and control of echinococcosis. This can involve practices such as habitat restoration, reducing population densities in areas where transmission is high, and implementing measures to prevent the concentration of infected animals in specific locations. Wildlife population management strategies should be based on scientific research and conducted in collaboration with wildlife management authorities.
- ✓ **Hygiene Measures**: Practicing good hygiene is important to minimize the risk of echinococcosis transmission. This includes washing hands thoroughly with soap and water after any contact with wildlife, avoiding direct contact with wild animal feces, and proper handling and disposal of carcasses to prevent contamination.
- ✓ **Collaboration and Integrated Approach**: Collaboration between wildlife management agencies, public health authorities, veterinary professionals, researchers, and other stakeholders is crucial for effective prevention and control of echinococcosis in wild animals. By integrating efforts, sharing information, and implementing coordinated strategies, the spread of the disease can be better managed and controlled.

2.4.2. Bacterial diseases

There are several major infectious bacterial diseases that affect wild animals. Here is an overview of some of these diseases, including their signs and symptoms, modes of transmission, diagnosis, treatment, and prevention:

A. Tuberculosis (Mycobacterium bovis)

- **Signs and Symptoms:** Chronic weight loss, coughing, decreased physical condition, and generalized weakness.

- **Transmission:** Direct contact with infected animals, ingestion of contaminated food or water, or inhalation of infectious aerosols from respiratory secretions.
- **Diagnosis:** Tuberculin skin tests, serological tests, and culture of bacteria from clinical samples.
- **Treatment:** Long-term antibiotic treatment under veterinary supervision.
- **Prevention:** Regular surveillance, culling of infected animals, and minimizing contact between wildlife and domestic animals.

B. Brucellosis (Brucella spp.)

- **Signs and Symptoms**: Abortion, infertility, arthritis, and general weakness.
- **Transmission:** Direct contact with infected animals, ingestion of contaminated food or water, or through contact with aborted fetuses or reproductive tissues.
- **Diagnosis:** Serological tests, culture of bacteria from clinical samples, and molecular diagnostic techniques.
- **Treatment:** Antibiotic treatment, but it may not completely eliminate the infection.
- **Prevention:**Vaccination of domestic animals, control of wildlife-domestic animal interaction, and proper disposal of infected tissues.

C. Anthrax (Bacillus anthracis)

- **Signs and Symptoms**: Sudden death, fever, respiratory distress, and bleeding.
- **Transmission:** Ingestion of spores from contaminated soil or vegetation, inhalation of spores, or direct contact with infected animals.
- **Diagnosis:** Culture of bacteria from blood or tissue samples, and detection of bacterial DNA or toxins.
- **Treatment:** Antibiotics, but early intervention is critical.
- **Prevention:** Vaccination of livestock, proper carcass disposal, and surveillance in areas with known outbreaks.

D. Salmonellosis (Salmonella spp.)

- **Signs and Symptoms**: Diarrhea, fever, loss of appetite, and dehydration.
- **Transmission:** Ingestion of contaminated food, water, or surfaces, or through direct contact with infected animals or their feces.
- **Diagnosis:** Isolation and identification of bacteria from feces or other clinical samples.
- **Treatment:** Supportive care and antibiotics in severe cases.

- **Prevention:** Good hygiene practices, proper waste management, and minimizing contact between wildlife and livestock.



Fig 2.4. Sign of salmonellosis in wild birds

E. Leptospirosis (Leptospira spp.)

- **Signs and Symptoms**: Fever, muscle pain, jaundice, kidney failure, and reproductive problems.
- **Transmission:** Contact with contaminated urine or water, or exposure to infected tissues.
- **Diagnosis:** Serological tests, PCR-based tests, and culture of bacteria from clinical samples.
- **Treatment:** Antibiotics and supportive care.
- **Prevention:** Vaccination of domestic animals, rodent control, and minimizing exposure to contaminated environments.

It's important to note that specific signs, symptoms, and treatments may vary for different species and bacterial strains. Proper diagnosis and management should be carried out by trained veterinarians or wildlife health professionals. Prevention strategies often involve a combination of surveillance, vaccination, hygiene practices, and minimizing contact between wildlife and domestic animals to reduce the risk of transmission.

2.4.3. Viral diseases

There are several major infectious viral diseases that affect wild animals. Here is an overview of some of these diseases, including their signs and symptoms, modes of transmission, diagnosis, treatment, and prevention:

A. Rabies

- **Signs and Symptoms:** Changes in behavior, aggression, paralysis, excessive salivation, and difficulty swallowing.
- **Transmission:** Bite or scratch from an infected animal, typically through the saliva containing the virus.
- **Diagnosis:** Clinical signs, direct fluorescent antibody (DFA) test on brain tissue, or detection of viral RNA.

- **Treatment:** No cure once symptoms appear; prevention through pre- or post-exposure vaccination.
- **Prevention:** Vaccination of domestic animals, wildlife management programs, and public education on avoiding contact with wild animals.



Fig 2.5. Sign and symptom of Rabid animal

sign and symptom of Rabies virus available at:
https://www.youtube.com/watch?v=_tMORbU5c3Y(Accessed at 22/09/2023)

B. Canine Distemper:

- **Signs and Symptoms:** Respiratory signs, fever, eye and nose discharge, neurological signs, and gastrointestinal symptoms.
- **Transmission:** Inhalation or direct contact with respiratory secretions or contaminated surfaces.
- **Diagnosis:** Clinical signs, serological tests, PCR-based tests, and histopathology.
- **Treatment:** Supportive care, including fluid therapy and antibiotics to prevent secondary infections.
- **Prevention:** Vaccination of domestic dogs and maintaining a barrier between domestic and wild animals.

C. Avian Influenza

- **Signs and Symptoms:** Respiratory signs, decreased egg production, neurological signs, and high mortality rates.
- **Transmission:** Direct contact with infected birds, contaminated surfaces, or through respiratory secretions.

- **Diagnosis:** Viral isolation, PCR-based tests, serological tests, and histopathology.
- **Treatment:** No specific treatment; supportive care and control measures to prevent further spread.
- **Prevention:** Surveillance in wild bird populations, biosecurity measures in poultry farms, and vaccination of domestic poultry.

D. Bovine Viral Diarrhea (BVD)

- **Signs and Symptoms**: Respiratory signs, diarrhea, decreased fertility, and immunosuppression.
- **Transmission:** Contact with infected animals, including nasal secretions, feces, urine, or contaminated objects.
- **Diagnosis:** Serological tests, viral isolation, PCR-based tests, and antigen detection.
- **Treatment:** Supportive care, control of secondary infections, and vaccination.
- **Prevention:** Biosecurity measures, testing and culling of persistently infected animals, and vaccination of cattle.

E. Feline Immunodeficiency Virus (FIV)

- **Signs and Symptoms:** Immunodeficiency, chronic infections, weight loss, oral diseases, and neurological signs.
- **Transmission:** Bite wounds, typically through aggressive fights between infected and uninfected cats.
- **Diagnosis:** Serological tests, PCR-based tests, and Western blot analysis.
- **Treatment:** No cure; management of secondary infections and supportive care.
- **Prevention:** Vaccination, minimizing outdoor exposure for cats, and preventing fights between cats.

F. **Foot and Mouth Disease (FMD):**

Primarily affects cloven-hoofed animals, including domestic livestock, but it can also infect certain wild animal species. Here is an overview of the signs and symptoms, transmission, diagnosis, treatment, and prevention of FMD in wild animals:

- **Signs and Symptoms:**
  - ✓ Fever
  - ✓ Development of vesicles (blisters) on the tongue, lips, gums, muzzle, and feet
  - ✓ Lameness and reluctance to move
  - ✓ Drooling and excessive salivation
  - ✓ Reduced appetite and weight loss

- ✓ Excessive nasal discharge

- **Transmission:** FMD is highly contagious and spreads through direct contact with infected animals, their secretions (saliva, nasal discharge, milk), and contaminated environments. It can also be transmitted via indirect contact through contaminated objects or through the air over short distances. Wild animals can contract FMD through contact with infected domestic livestock or by coming into contact with contaminated areas.
- **Diagnosis:** Diagnosing FMD involves a combination of clinical signs, laboratory testing, and epidemiological investigation. Veterinary professionals may perform tests such as virus isolation, polymerase chain reaction (PCR), and serological tests to detect the presence of the FMD virus or antibodies. Samples may be collected from vesicles, saliva, nasal swabs, or blood.
- **Treatment:** There is no specific treatment for FMD. Supportive care and management of symptoms are typically provided to affected animals. This includes providing appropriate nutrition, maintaining hydration, and minimizing stress. Veterinary professionals may administer medications to control secondary bacterial infections and alleviate pain or discomfort.
- **Prevention:** Vaccination is an essential component of FMD prevention in livestock. Vaccination programs can help reduce the severity and spread of the disease. However, there are multiple strains (serotypes) of the FMD virus, and vaccines may vary in efficacy depending on the specific strain involved.

  - ✓ **Biosecurity Measures**: Implementing strict biosecurity measures is crucial to prevent the introduction and spread of FMD. This includes controlling animal movement, limiting access to infected areas, practicing good hygiene, and disinfecting equipment, vehicles, and footwear.
  - ✓ **Surveillance and Early Detection**: Surveillance programs should be in place to monitor for the presence of FMD in domestic and wild animal populations. Early detection enables quick response and containment measures to limit the spread of the disease.
  - ✓ **Wildlife Management**: In areas where wild animals may act as reservoirs or carriers of FMD, wildlife management strategies may include monitoring wild populations, managing wildlife-livestock interactions, and implementing measures to reduce contact between wild and domestic animals.

- ✓ **Control Measures during Outbreaks:** During FMD outbreaks, control measures may involve quarantine, culling of infected and susceptible animals, movement restrictions, and disinfection of infected premises.

Generally, diagnosis and management of viral diseases in wild animals require expertise from veterinarians and wildlife health professionals. Prevention strategies often include vaccination programs, surveillance, proper hygiene practices, and minimizing contact between domestic and wild animal populations. It's important to note that specific signs, symptoms, and treatments may vary for different viral strains and animal species.

2.4.4. Fungal diseases

Fungal diseases can also affect wild animals, although they are less common compared to bacterial and viral infections. Here is an overview of some major infectious fungal diseases in wild animals, including their signs and symptoms, modes of transmission, diagnosis, treatment, and prevention:

A. White-nose Syndrome

- **Signs and Symptoms:** White fungal growth on the muzzle, wings, and other body parts, abnormal behavior, increased arousal during hibernation, and weight loss in bats.
- **Transmission:** Direct contact with spores of the fungus (Pseudogymnoascus destructans) in caves or other roosting areas.
- **Diagnosis:** Visual inspection of characteristic fungal growth, histopathology, and genetic analysis.
- **Treatment:** No cure currently available; management focuses on minimizing disturbance and providing suitable hibernation conditions.
- **Prevention:** Strict cave visitation protocols, limiting human access to bat habitats, and decontamination procedures to prevent the spread of fungal spores.

B. Chytridiomycosis

- **Signs and Symptoms:** Thickened or ulcerated skin, excessive shedding of skin, lethargy, loss of appetite, and death in amphibians.
- **Transmission:** Contact with the aquatic stages of the chytrid fungus (Batrachochytrium dendrobatidis or Batrachochytrium salamandrivorans).
- **Diagnosis:** Skin swabs, histopathology, and PCR-based tests.
- **Treatment:** Antifungal drugs, such as itraconazole or terbinafine, although success rates can vary.

- **Prevention:** Quarantine and strict biosecurity measures for captive amphibians, monitoring and managing disease in wild populations, and protecting amphibian habitats.

C. Aspergillosis

- **Signs and Symptoms:** Respiratory distress, coughing, nasal discharge, weight loss, and lethargy in birds and mammals.
- **Transmission:** Inhalation or ingestion of fungal spores (Aspergillus spp.) present in the environment or contaminated food.
- **Diagnosis:** Fungal culture, serological tests, radiography, and histopathology.
- **Treatment:** Antifungal medications, surgical removal of fungal masses if applicable, and supportive care.
- **Prevention:** Proper hygiene and sanitation practices in captive settings, minimizing exposure to moldy environments, and providing appropriate diet and husbandry conditions.

D. Dermatophytosis (Ringworm)

- **Signs and Symptoms**: Circular patches of hair loss, scaling, and crusting on the skin in mammals.
- **Transmission:** Direct contact with fungal spores (various dermatophyte species) in the environment or infected individuals.
- **Diagnosis:** Fungal culture, microscopic examination of hair or skin samples, and PCR-based tests.
- **Treatment:** Topical or systemic antifungal medications, along with environmental decontamination.
- **Prevention:** Good hygiene practices, regular monitoring of animals, segregation of infected individuals, and disinfection of contaminated areas.

Diagnosis and treatment of fungal diseases in wild animals require specialized knowledge and veterinary expertise. Prevention strategies often involve a combination of surveillance, management of environmental conditions, minimizing stress, and implementing biosecurity measures. It's important to note that specific signs, symptoms, and treatments may vary depending on the fungal species and the affected animal species.

2.4.5. Zoonotic diseases

Zoonotic diseases are those that can be transmitted between animals and humans. Wild animals can serve as reservoirs or carriers of various zoonotic diseases. Here are some examples of zoonotic diseases associated with wild animals:

- **Rabies:** Rabies is a viral disease that affects the nervous system, leading to inflammation of the brain. It is transmitted through the bite or scratch of an infected animal, with wild animals such as bats, raccoons, skunks, and foxes being common reservoirs.
- **Lyme Disease:** Lyme disease is caused by the bacterium Borrelia burgdorferi and is primarily transmitted through the bite of infected ticks. Wild animals, particularly small mammals like mice and deer, can act as hosts for infected ticks, contributing to the spread of the disease.
- **Hantavirus Pulmonary Syndrome:** Hantavirus is a group of viruses that can cause severe respiratory illness in humans. Transmission occurs through contact with the urine, saliva, or feces of infected rodents such as deer mice or cotton rats.
- **Ebola Virus Disease:** Ebola is a severe viral disease that can be transmitted to humans from wild animals, particularly non-human primates and fruit bats. Handling or consuming infected animals can lead to transmission.
- **Avian Influenza:** Avian influenza, or bird flu, is caused by influenza viruses that primarily infect birds. Certain strains of avian influenza have the potential to infect humans who come into close contact with infected wild birds or their contaminated environments.
- **Monkeypox:** Monkeypox is a viral disease similar to smallpox. It is primarily found in rodents and non-human primates, and transmission to humans can occur through contact with infected animals or their bodily fluids.
- **Plague:** Plague is a bacterial disease caused by Yersinia pestis. Wild rodents, such as rats, squirrels, and prairie dogs, serve as reservoirs. Flea bites, handling infected animals, or exposure to their tissues can result in human infection.

Preventing zoonotic diseases from wild animals involves practicing good hygiene, avoiding contact with wild animals and their bodily fluids, using appropriate protective measures when handling wildlife, and taking precautions to minimize exposure to disease vectors such as ticks and mosquitoes. Public health organizations and wildlife management agencies work to monitor, control, and prevent the spread of zoonotic diseases through surveillance, research, and public awar

2.5. Community awareness creation on signs of stress in wild animals



Fig 2.6. Community awareness creation activity

Creating community awareness about the signs of stress in wild animals is an important step in promoting their well-being and conservation. Here are some key points to include in an awareness campaign:

- **Behavioral Changes**: Educate the community about the behavioral changes that may indicate stress in wild animals. These can include increased aggression or agitation, excessive vocalization, repetitive behaviors, changes in feeding or foraging patterns, or withdrawal and hiding.
- **Physical Signs:** Highlight the physical signs that may indicate stress in wild animals. These can include rapid breathing, increased heart rate, dilated pupils, excessive grooming or self-mutilation, weight loss, or changes in posture or movement.
- **Disturbance and Fleeing**: Help the community understand that if wild animals are constantly disturbed or fleeing from human presence, it may be a sign of stress. Explain the importance of giving animals adequate space and not approaching or chasing them.
- **Disruption of Natural Behavior**: Stress can manifest when wild animals are unable to perform their natural behaviors due to human interference. For example, if an animal is pacing, circling, or displaying abnormal repetitive behaviors, it could be a sign of stress caused by captivity or habitat disturbance.
- **Loss of Appetite or Abnormal Eating Patterns**: Inform the community that changes in eating habits, such as loss of appetite or abnormal eating patterns, can be indicators of stress in wild animals. This could be due to factors like habitat degradation, food scarcity, or disturbance.

- **Social Interaction Changes:** Explain that changes in social behavior, such as increased aggression or avoidance of social interactions, can be signs of stress in wild animals. This may occur when their social structure is disrupted or when they are exposed to unfamiliar or threatening situations.
- **Environmental Cues:** Encourage the community to be aware of the environmental cues that may cause stress in wild animals. These can include loud noises, bright lights, excessive human activity, encroachment into their natural habitat, or destruction of their nesting or denning sites.
- **Reporting and Responsible Behavior**: Provide guidelines for community members to report any observations of stressed wild animals to the appropriate authorities, such as local wildlife agencies or conservation organizations. Emphasize the importance of responsible behavior, such as keeping a safe distance, not feeding or touching wild animals, and respecting their natural behaviors and habitats.
- **Collaboration with Experts**: Encourage community members to seek guidance from wildlife experts, conservationists, or local authorities when encountering or witnessing signs of stress in wild animals. Provide contact information and resources for reporting and seeking assistance.

By raising community awareness about the signs of stress in wild animals, individuals can become more informed and take appropriate actions to minimize disturbance and promote the well-being of wildlife populations in their area.

Generally, stress signs like Vocalisation , Excessive struggling ,Defecation , Increase in heart rate ,Panting/heat stress, Clenching of teeth , Self biting, Attempts to escape , Panting/heat stress , Animal is limp or closes its eyes (mammals) , Aggression , Urination ,Excessive struggling , Cyanosis (bluing) of the nose and/or lip can be seen in most of wild animals(birds and mammals).

2.6. Public and economic importance of the diseases and advice

2.6.1. Public and Economic Importance of Wild Animal Diseases:

- **Zoonotic Disease Transmission:** Wild animal diseases can have significant public health implications. Many zoonotic diseases, which are transmitted between animals and humans, originate in wildlife. Examples include Ebola, avian influenza, rabies, and Lyme disease. Understanding and managing these diseases are crucial for protecting public health.
- **Wildlife Conservation:** Wild animal diseases can have a profound impact on wildlife populations. Outbreaks of diseases among endangered species or in key habitats can lead to population declines,

ecosystem imbalances, and even extinction risks. Managing and preventing diseases in wild animals contribute to the conservation of biodiversity and ecosystem health.

- **Livestock and Agricultural Impact:** Some wild animal diseases can affect domestic animals and agricultural production. Diseases like foot-and-mouth disease, bovine tuberculosis, and African swine fever can cause significant economic losses in the livestock industry, disrupt trade, and impact food security.
- **Tourism and Recreation**: Wildlife-based tourism and recreational activities, such as wildlife safaris and ecotourism, contribute to local economies. Diseases affecting iconic or economically valuable wildlife species can have negative impacts on tourism revenues and livelihoods dependent on wildlife-related activities.
- **Treatment cost:** The treatment costs associated with wild animal diseases can have economic implications at various levels. Here are some considerations regarding the economic importance of wild animal diseases and their treatment costs:
    - ✓ Wildlife Rehabilitation and Conservation Costs: Treating wild animal diseases often involves wildlife rehabilitation efforts, where affected animals are captured, treated, and cared for until they can be released back into the wild. These rehabilitation programs require financial resources for personnel, veterinary care, medications, specialized facilities, and rehabilitation equipment. The costs associated with wildlife rehabilitation contribute to the overall economic burden of managing wild animal diseases and ensuring the conservation of affected species.
    - ✓ Research and Monitoring Expenses: Understanding and effectively managing wild animal diseases require ongoing research and monitoring efforts. This includes studying disease dynamics, investigating transmission patterns, developing diagnostic tests, and assessing treatment effectiveness. The economic importance lies in the funding required to support research projects, maintain monitoring programs, and employ researchers and field staff to collect data and analyze findings.
    - ✓ Disease Outbreak Response Costs: When disease outbreaks occur in wild animal populations, there are often significant costs associated with the response efforts. These may include emergency response teams, field investigations, laboratory testing, disease surveillance, and implementing control measures such as quarantine, culling, or vaccination campaigns. The economic importance of disease outbreak response lies in the resources needed to contain and mitigate the spread of diseases, protecting both wildlife populations and potentially affected human interests.

- ✓ Economic Impact on Ecotourism and Recreational Activities: Wild animal diseases can have indirect economic impacts on ecotourism and recreational activities. When disease outbreaks occur, there may be a decline in wildlife populations or restrictions on visitor access to affected areas, resulting in reduced tourism revenue. For example, if a popular wildlife destination experiences an outbreak of a highly contagious disease, visitor numbers may decline, leading to financial losses for local businesses and communities dependent on ecotourism.
- ✓ Agricultural and Livestock Industry Costs: Some wild animal diseases can spill over to domestic livestock or have implications for agricultural industries. In such cases, the economic importance of wild animal diseases extends to the costs associated with disease control and prevention measures, including vaccination campaigns, surveillance programs, testing, and biosecurity measures. These costs can impact the profitability and productivity of livestock industries, as well as trade restrictions and market losses.

2.6.2. Advice for Wild Animal Disease Prevention and Management:

- **Wildlife Disease Surveillance:** Establishing robust surveillance systems for wild animal diseases is essential for early detection, monitoring, and response. Close collaboration between wildlife agencies, veterinary services, and researchers can facilitate timely identification and management of diseases in wild animal populations.
- **Wildlife Trade Regulations:** Implement and enforce regulations on the wildlife trade to reduce the risk of disease transmission. Strict controls on the capture, transport, and sale of live animals can help prevent the spread of diseases from wild animals to humans or other species.
- **Habitat Conservation and Management:** Protecting and conserving natural habitats is crucial for maintaining healthy wildlife populations. Well-managed habitats with diverse ecosystems can support disease resilience and reduce the risk of disease emergence and transmission.
- **Biosecurity Measures:** Implementing biosecurity measures in captive wildlife facilities, zoos, and wildlife rehabilitation centers can help prevent disease outbreaks and protect both captive and wild populations. Measures may include quarantine protocols, hygiene practices, and disease testing.
- **Public Education and Awareness:** Public education campaigns to raise awareness about the risks associated with wildlife diseases, zoonotic disease transmission, and responsible interactions with wildlife are essential. Educating communities about proper hygiene practices, wildlife handling guidelines, and the importance of reporting sick or dead animals can help prevent disease spread.

- **Research and Collaboration:** Encouraging research on wild animal diseases, their ecology, and transmission dynamics can enhance understanding and inform disease management strategies. Collaboration between scientists, veterinarians, wildlife managers, and policymakers is crucial for effective disease prevention and control.
- **One Health Approach:** Adopting a One Health approach that recognizes the interconnectedness of human, animal, and environmental health is vital. Collaborative efforts among human health, animal health, and environmental sectors can lead to more comprehensive and effective disease prevention and management strategies.

By implementing these measures, society can mitigate the public health risks associated with wild animal diseases, protect wildlife populations, and safeguard the economic and ecological values they provide.

Self check 2 .

Name…… ID…… Date……...

Directions:

Part I. Answer all the questions listed below (1pt each).

1. What are the key signs and symptoms of major infectious diseases commonly found in wild animals?
2. What are the appropriate safety measures and personal protective equipment (PPE) required when handling potentially infected wild animals?
3. How can you identify potential sources or vectors of infectious diseases in wild animal populations?
4. What are the proper protocols for reporting and notifying relevant authorities about suspected or confirmed cases of infectious diseases in wild animals?

Part II. Multiple choice(1pt each)

Direction

Choose the correct answer from the given alternatives and encircle to your answer.

1. Which infectious disease primarily affects bats and can be transmitted to humans?
    a. Avian Influenza
    b. Canine Distemper
    c. White-Nose Syndrome
    d. Bovine Tuberculosis

2. Chronic Wasting Disease (CWD) primarily affects which group of wild animals?
    a. Birds
    b. Reptiles
    c. Rodents
    d. Cervids

3. Which disease is caused by a parasitic worm and can be transmitted to humans through contact with contaminated soil or water?

a. Rabies
b. Echinococcosis
c. Foot and Mouth Disease
d. West Nile Virus

4. Which viral disease affects both domestic and wild canids (e.g., foxes, wolves, coyotes)?
   a. Avian Influenza
   b. West Nile Virus
   c. Canine Distemper
   d. Bovine Tuberculosis

Note: Satisfactory rating – ≥ 8 points Unsatisfactory - below 8 points. You can ask your teacher for the copy of the correct answers.

LG #42	LO #3- Identify and handle non-infectious disease of wild animals

Instruction sheet 3

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identify Common non Infectious diseases of wild animals
- Conduct Treatments, prevention and control of non-infectious diseases
- Recognize Economic importance of the diseases and advice

This guide will also assist you to attain the learning outcomes stated in the cover page.

Specifically, upon completion of this learning guide, you will be able to:

- Identify Common non-infectious diseases of wild animals are identified based on their occurrence, clinical sign and symptoms, laboratory and post mortem findings; according to the national and organizational guideline.
- Prescribe treatments for the diseases are identified and their usage outlined as required, according to manufacturer's instruction, enterprise protocol and the national standard veterinary treatment guideline.
- Identify and outlined Prevention and control methods for each of the diseases according to the enterprise guideline.
- Identify and give advice on conomic importance of the diseases and implement appropriate prevention and control programs as required under supervision

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the information Sheets
4. Accomplish the Self-checks

Information sheet 3.

3.1. Common non Infectious diseases of wild animals

Wildlife disease interest, activity, and reporting have primarily concentrated on parasitology and infectious diseases; disease entities with specific and identifiable etiologies. In the relatively new field of wildlife diseases this is understandable, and is based upon modern trends in human and veterinary medicine. With the discovery of pathogenic agents in the 19th century, a narrowing of the definition of disease from the time of Hippocrates was embraced. Hippocrates defined disease as disharmony within the body, between the body and mind, and between man and animal and the environment. The 20th century redefinition espoused that disease resulted from a collision between a pathogenic agent and a susceptible individual.

Common non-infectious diseases in wild animals can arise due to various factors such as genetic predisposition, nutritional deficiencies, environmental toxins, trauma, and age-related changes. Here are some examples of non-infectious diseases commonly observed in wild animals:

- **Nutritional deficiencies:** Insufficient intake or imbalances of essential nutrients can lead to diseases such as metabolic bone disease, vitamin deficiencies, and malnutrition-related disorders.
- **Dental problems:** Dental issues like periodontal disease, tooth fractures, and abscesses can occur in wild animals, especially those with specialized diets or captive individuals fed inappropriate diets.
- **Trauma:** Injuries resulting from collisions with vehicles, entanglement in human-made structures, or predator-prey interactions can cause fractures, wounds, and internal organ damage.
- **Parasitic infestations:** While parasites themselves may be infectious, non-infectious complications can arise from severe infestations, such as anemia, malnutrition, and organ damage.
- **Neoplastic diseases:** Wild animals can develop various types of tumors, including benign or malignant growths, which can affect different organs and systems.
- **Autoimmune disorders:** Some wild animals may experience immune system dysregulation, leading to autoimmune conditions where the immune system attacks the body's own tissues.
- **Degenerative diseases:** Aging in wild animals can be accompanied by degenerative conditions, such as arthritis, cataracts, and neurodegenerative diseases.
- **Environmental toxins:** Exposure to pollutants, heavy metals, pesticides, and other environmental toxins can lead to organ damage, reproductive issues, and systemic health problems in wild animals.

- **Endocrine disorders:** Hormonal imbalances can occur in wild animals, resulting in conditions such as hypothyroidism, hyperadrenocorticism (Cushing's syndrome), or reproductive hormonal abnormalities.
- **Congenital abnormalities:** Some wild animals may be born with congenital defects or genetic disorders that can affect their overall health and survival.
- **Allergies:** Wild animals, like domestic animals, can develop allergies to various environmental factors such as pollen, certain foods, insect bites, or environmental contaminants. Allergic reactions in wild animals can manifest as skin irritations, respiratory distress, itching, or other symptoms.

Diagnosing and managing non-infectious diseases in wild animals often require specialized veterinary care, including physical examination, diagnostic imaging, laboratory tests, and sometimes interventions such as surgeries or supportive care. It is essential to consider the unique needs and circumstances of each species when addressing these diseases in the wild.

3.2. Treatments, prevention and control of non-infectious diseases

3.2.1. Identify and outline how to prescribe treatments for non-infectious diseases in wild animals

Prescribing treatments for non-infectious diseases in wild animals requires a careful and individualized approach. Here are some key steps to consider when prescribing treatments for non-infectious diseases in wild animals:

- **Accurate Diagnosis:** Proper diagnosis is crucial for identifying the specific non-infectious disease affecting the wild animal. This may involve conducting a thorough physical examination, collecting relevant samples for laboratory analysis, and considering the animal's clinical signs and history. Consult with a wildlife veterinarian or specialists experienced in wild animal medicine to ensure an accurate diagnosis.

- **Consultation and Collaboration:** Seek input and collaborate with wildlife veterinarians, researchers, or experts who have experience in treating non-infectious diseases in wild animals. Their knowledge and expertise can provide valuable insights into treatment options and considerations specific to the species and condition.

- **Individualized Treatment Plans:** Develop individualized treatment plans based on the diagnosed non-infectious disease and the specific needs and circumstances of the wild animal. Consider factors such as the animal's species, age, health status, behavior, and the feasibility of administering treatments in the wild.

- **Medication Considerations:** Select medications appropriate for the non-infectious disease and the wild animal species. Take into account the safety, efficacy, and appropriate dosage for the species being treated. Consider any potential side effects, contraindications, or special considerations for wildlife, such as the impact on reproduction or potential effects on other species in the ecosystem.

- **Route of Administration:** Determine the most suitable route of administration for the prescribed treatment. This may include oral medications, topical applications, injectable formulations, or other methods. Consider the practicality and feasibility of administering treatments in the wild and ensure that the chosen route of administration is safe and effective.

- **Treatment Administration:** Administer the prescribed treatment to the wild animal following appropriate techniques and methods. Ensure safety for both the animal and the personnel involved. If necessary, sedation or anesthesia protocols may be required to facilitate treatment administration safely.

- **Monitoring and Follow-up:** Monitor the response of the wild animal to the prescribed treatment and assess its effectiveness. Regularly evaluate the animal's condition, clinical signs, and any changes in behavior. Adjust the treatment plan as necessary based on the animal's response and consult with veterinary professionals for guidance.

- **Ethical Considerations:** Consider the ethical implications of treating non-infectious diseases in wild animals. Evaluate the potential benefits, risks, and long-term consequences of treatment on the individual animal, its population, and the ecosystem. Ensure that treatment aligns with conservation goals and does not compromise the welfare or natural behaviors of the wild animal.

- **Documentation and Reporting:** Maintain accurate and detailed records of the prescribed treatments, including the dosage, route of administration, response to treatment, and any observed

side effects or complications. Report treatments provided to appropriate wildlife management authorities, research institutions, or regulatory bodies as required.

It is crucial to note that treating non-infectious diseases in wild animals should be done with caution, considering the potential impacts on the individual animal and the broader ecosystem. Consultation with wildlife veterinarians, adherence to ethical guidelines, and collaboration with experts are essential to ensure the well-being of the treated animals and the conservation of wild populations.

3.2.2. Identifying and outlining prevention and control methods of the diseases

To identify and outline prevention and control methods for diseases, including both infectious and non-infectious diseases in wild animals, several strategies can be employed. Here are some general prevention and control methods:

- **Surveillance and Early Detection:** Implement a robust surveillance system to monitor wild animal populations for signs of disease. This may involve regular monitoring of animal health, conducting necropsies on deceased animals, and collecting samples for laboratory analysis. Early detection allows for prompt intervention and control measures.
- **Biosecurity Measures:** Establish and enforce strict biosecurity protocols to prevent the introduction and spread of diseases. This includes implementing measures to control the movement of animals, personnel, and equipment in and out of wildlife areas. Proper waste management and disinfection procedures should be followed to minimize disease transmission.
- **Habitat Management:** Maintain healthy and suitable habitats for wild animals. This involves managing vegetation, water sources, and other environmental factors to promote optimal animal health. Implement practices that reduce stress, such as providing adequate food and shelter, and minimizing human disturbance.

- **Vaccination Programs (if applicable):** For certain diseases, vaccination can be an effective prevention method. Consult with wildlife veterinarians and experts to determine if vaccination programs are appropriate for specific diseases affecting wild animal populations. Develop and implement vaccination strategies that consider the target species, logistics of vaccine delivery, and long-term effectiveness.

- **Education and Public Awareness:** Raise public awareness about the risks associated with diseases in wild animals and promote responsible behavior. Educate the public, wildlife enthusiasts, and stakeholders about the importance of avoiding direct contact with wild animals, reporting sick or dead animals, and following recommended practices in natural areas. Encourage collaboration and reporting of disease sightings to relevant authorities.

- **Research and Monitoring:** Support scientific research and monitoring efforts to better understand disease dynamics in wild animal populations. This includes studying disease prevalence, transmission pathways, and factors contributing to disease outbreaks. Research findings can inform targeted prevention and control strategies.

- **Collaboration and Partnerships:** Collaborate with relevant stakeholders, including wildlife management agencies, conservation organizations, research institutions, and veterinary professionals. Establish partnerships to share information, resources, and expertise in disease prevention and control. Collaborative efforts can help develop comprehensive strategies and implement effective measures.

- **Data Sharing and Reporting:** Promote data sharing and reporting of disease information among wildlife professionals and researchers. This facilitates the exchange of knowledge, early detection of emerging diseases, and the development of evidence-based prevention and control strategies. Timely reporting of disease outbreaks to appropriate authorities allows for prompt action.

- **Adaptive Management:** Continuously evaluate and adjust prevention and control methods based on new information, emerging threats, and changing disease patterns. Implement an adaptive management approach that incorporates ongoing monitoring, regular assessments, and the flexibility to modify strategies as needed.

Generally, treatment, prevention and control of non-infectious wild animal diseases can be done by Prophylactic (vaccines or other preventive drugs) or therapeutic treatment, isolation, quarantine, movement control, burying or incineration of dead body, Improve wild animal protection

It is important to note that prevention and control methods for specific diseases may vary based on the disease characteristics, species involved, and local ecological factors. Therefore, it is essential to consult with wildlife veterinarians, experts, and relevant authorities to develop tailored prevention and control strategies for specific diseases affecting wild animal populations.

3.3. Economic importance of the diseases and advice

Non-infectious diseases in wild animals can also have economic implications. Here are some aspects of their economic importance and advice for their management:

3.4.1. Economic importance of non-infectious wild animal diseases

Non-infectious wild animal diseases, also known as non-communicable or non-transmissible diseases, are health conditions that affect wild animals but do not spread between individuals or populations. While these diseases may not directly impact human health or have zoonotic implications, they can still have economic importance in various ways. Here are some key points regarding the economic importance of non-infectious wild animal diseases:

- **Conservation and Ecological Impact:** Non-infectious diseases can affect the health and survival of wild animal populations, which can have ecological consequences. The loss or decline of certain species due to these diseases can disrupt ecosystems and affect biodiversity. The economic value of biodiversity and intact ecosystems is significant, as they provide essential ecosystem services such as pollination, water regulation, and nutrient cycling, which are crucial for human well-being and economies.
- **Tourism and Recreation:** Wildlife tourism and recreational activities, such as wildlife viewing, safaris, and nature-based tourism, contribute significantly to local and national economies. Non-infectious diseases that impact wildlife populations can have negative effects on tourism and recreation industries. For example, if a disease affects iconic or charismatic species, it may reduce visitor numbers and revenue generated from wildlife-related activities.
- **Agriculture and Livestock:** Non-infectious diseases can also have indirect economic implications for agriculture and livestock industries. Some wild animal diseases can affect livestock health and productivity, leading to economic losses for farmers and agricultural sectors. For instance, if certain wildlife species serve as reservoirs for diseases that impact domestic animals, efforts may be required to manage or control the disease transmission, which can incur costs.
- **Research and Conservation Funding:** The study and management of non-infectious diseases in wildlife require research, monitoring, and conservation efforts. Funding is often required to conduct studies on disease prevalence, impacts, and mitigation strategies. Economic resources are necessary to support research initiatives, develop management plans, and implement conservation measures aimed at protecting wildlife populations from non-infectious diseases.

- **Ecosystem Services:** Healthy wildlife populations play a crucial role in providing ecosystem services that support human well-being and economies. These services include pest control, seed dispersal, and regulation of plant and animal populations. Non-infectious diseases that affect wildlife populations can disrupt these ecosystem services, with potential economic consequences in sectors such as agriculture, forestry, and water management.

While the economic impacts of non-infectious wild animal diseases may not be as direct or immediate as those of infectious diseases, they can still have significant implications for various sectors, including tourism, agriculture, research, and ecosystem services. Understanding and addressing these diseases are important for the long-term conservation and sustainable use of wildlife resources, as well as for maintaining the economic values associated with healthy ecosystems.

3.4.2. Implementing Advice for Non-Infectious Disease Management in Wild Animals:

Implementing effective management strategies for non-infectious diseases in wild animals requires a comprehensive approach that considers various factors. Here are some key steps and advice for managing non-infectious diseases in wild animal populations:

- **Research and Monitoring**: Conduct thorough research and monitoring to understand the prevalence, distribution, and impacts of non-infectious diseases in target species or populations. This includes studying disease ecology, identifying risk factors, and assessing the population-level effects on wildlife.
- **Disease Surveillance**: Establish disease surveillance programs to detect and track non-infectious diseases in wild animals. This may involve regular monitoring of populations, collecting and analyzing samples, and collaborating with researchers, veterinarians, and relevant stakeholders. Surveillance helps in early detection, understanding disease dynamics, and implementing appropriate management actions.
- **Habitat Management**: Focus on habitat management practices that promote the overall health and well-being of wild animal populations. This includes protecting and restoring critical habitats, ensuring access to adequate food and water resources, and mitigating factors that contribute to stress or disease susceptibility (e.g., pollution, habitat fragmentation, and climate change).
- **Wildlife Population Management**: Implement measures to manage wildlife populations in ways that reduce disease risks and maintain overall population health. This may involve population control strategies, such as regulated hunting or culling, to prevent overpopulation, which can lead to increased disease transmission and competition for resources.

- **Wildlife Health Assessments**: Conduct regular health assessments on target wildlife populations to identify individuals or groups that may be affected by non-infectious diseases. This can involve physical examinations, sample collection, and diagnostic tests to evaluate the overall health status of individuals and detect disease presence or progression.
- **Public Awareness and Education**: Raise public awareness about non-infectious diseases in wild animals and their potential impacts. Educate communities, stakeholders, and visitors about responsible behavior around wildlife, including minimizing stress and disturbance, preventing habitat destruction, and avoiding the spread of potential contaminants.
- **Collaboration and Partnerships**: Foster collaboration and partnerships among researchers, wildlife managers, conservation organizations, and local communities. Effective disease management requires a multidisciplinary approach, with input from various stakeholders, to ensure the best practices are implemented and resources are utilized effectively.
- **Conservation and Policy Measures**: Incorporate non-infectious disease management into conservation policies, management plans, and regulations. Develop guidelines and protocols for managing non-infectious diseases in wildlife populations, and integrate them into broader conservation strategies to ensure long-term sustainability.

It's important to note that specific management strategies will vary depending on the nature of the non-infectious disease, the target species, and the ecological context. Therefore, it is recommended to consult with experts in wildlife health and conservation to develop tailored management approaches for individual cases.

Self check3.

Name…… ID…… Date…….

Directions:

Part I. Answer all the questions listed below (1pt each).

1. What are some common signs and symptoms of non-infectious diseases observed in wild animals?

a) Fever and lethargy

b) Abnormal growths or tumors

c) Nutritional deficiencies

d) Dental issues or oral lesions

e) All of the above

2. Which of the following factors can contribute to the development of non-infectious diseases in wild animals?

a) Genetic predisposition

b) Environmental toxins

c) Nutritional imbalances

d) Trauma

e) All of the above

3. Non-infectious diseases in wild animals are not influenced by their environment or diet.

a) True

b) False

4. What are some management strategies to address non-infectious diseases in wild animals?

a) Providing appropriate veterinary care

b) Nutritional management and supplementation

c) Environmental modifications

d) Education and public awareness

e) All of the above

Part II. Short answer questions(1pt each)

Direction

Give a short and brief answer for the following questions.

1. Name a common non-infectious disease that affects the feathers or plumage of birds.
2. What is a non-infectious disease that results from the accumulation of toxins in an animal's body?
3. Which non-infectious disease is characterized by abnormal cell growth and can affect various organs in wild animals?
4. Name a non-infectious disease that can result from nutritional deficiencies in wild animal populations.

Note: Satisfactory rating – ≥ 8 points Unsatisfactory - below 8 points. You can ask your teacher for the copy of the correct answers.

References

Books and pdf

DeKuiper, J.L. and Coussens, P.M., **2019.** Inflammatory Th17 responses to infection with Mycobacterium avium subspecies paratuberculosis (MAP) in cattle and their potential role in development of Johne‘s disease. Veterinary immunology and immunopathology, 218, p.109954.

OIE (2018): Guidelines for Wildlife Disease Surveillance: An Overview, Pp 1 -12

Beineke, A., Baumgärtner, W. and Wohlsein, P., 2015. Cross-species transmission of canine distemper virus—an update. *One Health*, *1*, pp.49-59.

Tegwin T. and Danielle B. **(2020):** Safe Work Practices for Working with Wildlife, Techniques in Disease Surveillance and Investigation

Sadanand S., Govindhaswamy U., Devender K., and Singh D. (2017): A Manual on Chemical Immobilization of Wild Animals

Schemnitz, Sanford D., Batcheller, Gordon R., Lovallo, Matthew J., White, H. Bryant and Fall, Michael W.(2009): "Capturing and Handling Wild Animals". USDA National Wildlife Research Center - Staff Publications. 1191.

Milton F. and J. Christian Franson (2001): Field Manual of Wildlife Diseases General Field Procedures and Diseases of Birds.

OIE (2010): Training manual on wildlife diseases and surveillance. Training Manual on Wildlife Diseases and Surveillance

OIE(2017): Training manual on wildlife health risk assessment in support of decisions and policies

Trimmel and Walzer (2020): Infectious Wildlife Diseases in Austria—A Literature Review From 1980 Until 2017. *Front. Vet. Sci*. 7:3.

Elizabeth S. Williams and Ian K. Barker (2001): Infectious Diseases of Wild Mammals, 3rd Ed.

Richard J. Delahay, Graham C. Smith, and Michael R. Hutchings (2009): The Science of Wildlife Disease Management

Murray E. Fowler (2008): Restraint and Handling of Wild and Domestic Animals, 3rd Ed.

Web addresses

Proper use of PPE available at: https://www.health.state.mn.us/facilities/patientsafety/infectioncontrol/ppe/comp/index.html(Access Date 22.09.2023)

Infection control configuration available at: https://www.aaha.org/aaha-guidelines/infection-control-configuration/protocols/personal-protective-equipment/(Access Date 22.09.2023)

Principles of occupational health available at: https://animalcare.illinois.edu › about › occupational-health (access date: August 082022) (Access Date 22.09.2023).

Hazard identification available at https://www.ccohs.ca/oshanswers/hsprograms/hazard_risk.html (access Date: Date 22.09.2023)

sources of hazards available at: https://www.google.com/search?client=opera&q=Ergonomic+hazards&sourceid=opera&ie=UTF-8&oe=UTF-8 (Access Date 22.09.2023).

Environmental hazards available at: https://www.google.com/search?client=opera&q=drive+pdf+environmental+hazards.&sourceid=opera&ie=UTF-8&oe=UTF-8 (Access Date 22.09.2023).

None infectious diseases of wildlife available at : https://www.fsai.ie/legislation/food_legislation/food_information/14_allergens.html (Access Date 22.09.2023).

work place hazards available at https://www.totalika.org/understanding-the-six-major-types-of-workplace-hazards/ (Access Date 22.09.2023)

Causes, Sign and Symptoms, Diagnosis and Treatment of Rabies available at https://www.youtube.com/watch?v=_tMORbU5c3Y(Access Date 22.09.2023).

Bale mountain national park available at https://www.youtube.com/watch?v=dIXaqQ_PgG0(Access Date 23.09.2023).

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