# Wildlife Conservation
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Lecture -15
Some Terminologies

[FL]. Today we begin a new module management of wildlife diseases. In this module we will be having 3 lectures. The first lecture deals with some terminologies. So, these terminologies will become foundation blocks for the next 2 lectures. Then will have a lecture on some common wildlife diseases and third lecture on principles of disease management. So, let us begin with the terminologies.

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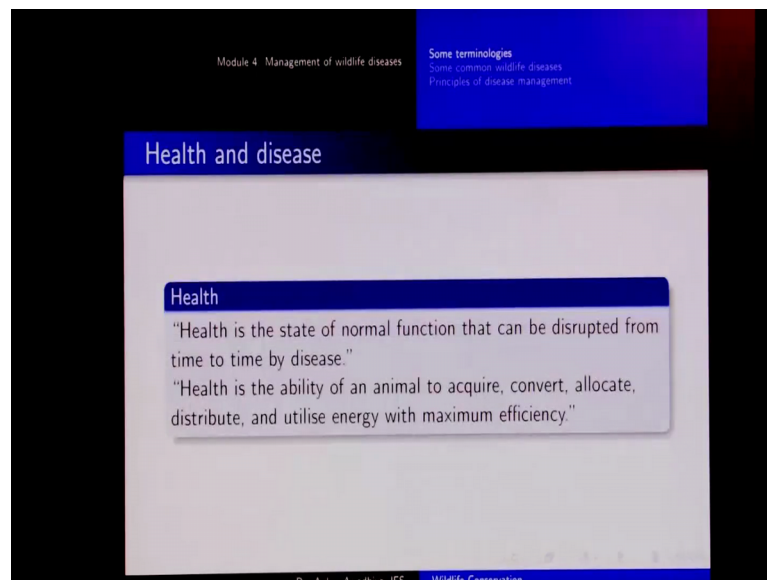
So, talking about health and disease; the first question is what do we mean by health and what do we mean by disease. So, health is defined as the state of normal function that can be disrupted from time to time by disease. So, essentially in this definition we are saying that if an animal does not have a disease, then we will say that it is healthy.

The second definition says that health is the ability of an animal to acquire, convert, allocate, distribute and utilize energy with maximum efficiency. So, in the second definition what we are saying, that if an animal is able to perform all it is functions all it is normal natural functions properly with the best of efficiencies, then we will call that the animal is healthy. So, basically the difference between both of these definitions is that

the first definition takes a negative outlook; it says that if there is if an animal does not have a disease. So, it has this focus or not if it is not diseased then it is healthy. In the case of the second definition, it says that that we do not have to deal with these diseases if the animal is able to perform all it is functions properly with the best of efficiencies then we will say that it is healthy.

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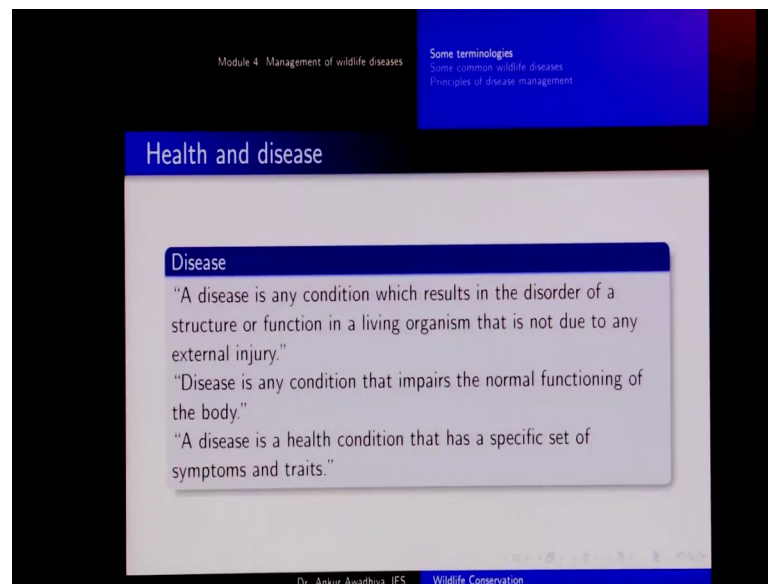
Now, disease on the other hand can be defined either as an absence of health. So, any condition which results in the disorder of a structure or function in a living organism, that is not due to any external injury will call it a disease. So, essentially this is an absence of health or the absence of the best way in which the organism should be able to function. The second definition is that, disease is any condition that impairs the normal functioning of the body. The third is a disease is a health condition that has a specific set of symptoms and traits. So, essentially what we are saying in these cases is that one if there is a disorder of any sort in the structure or function of the animal which is not because of an external injury.

So, essentially if this animal was injured and is not able to walk properly we would say that it is injured. But after some time also if it is not able to walk properly, then probably it is a diseased animal. So, any disorder that is, there is will be called as a disease. The second definition says that disease is any condition that impairs the normal functioning of the body. So, even if we do not have an overt symptom outside, if there is some

normal function of the body that is being disrupted we will say that this is a disease. And the third definition says that, it is a health condition that has a specific set of symptoms and traits. So, essentially what we are saying in this case is that whenever we talk about a disease, it will have a certain set of symptoms and traits. So, for instance, when you get influenza you have fever. So, if you have fever and if you have other traits of influenza like running nose cough headache and so on, then we would say that you have this disease called influenza.

Incidentally disease comes from 2 terms, dis plus ease. So, ease means comfort dis means absence of. So, it is the absence of a comfortable level that the animal is facing so, in which case we call it a disease.

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Now diseases are classified into acute diseases and chronic diseases. Now a disease of short duration or of recent onset is called an acute disease so, for instance my influenza or myocardial infarction. Myocardial infarction is the scientific term used for a heart attack. So, in the case of a heart attack, you would have observed in a number of movies as well. So, if you have a heart attack within a few minutes or a few hours you are dead. So, it is a disease of a very short duration. It does not take a very long time to propagate itself and it is often of a recent onset.

So, you in most cases you would say that a person who got a heart attack got a heart attack; say a few minutes back or a few hours back. But you would not say that this

person got a heart attack say 10 years back and he died now. So, there could be a different heart attack, but it is an acute disease because it is of a short duration, a few minutes or a few hours and of a recent onset.

Chronic disease on the other hand is a disease that is persistent or otherwise long lasting in it is effects or a disease that comes with time. So, acute is short duration chronic is long duration. Acute is recent, chronic is of a very long time back. So, for instance things like cancer or deficiency diseases. Now in the case of cancer a person might have a cancer, it would grow for say months together or years together even without being detected, and then later on it would manifest it is symptoms. So, it is a chronic disease because it takes a very long time to propagate.

So, when we say acute it is short, recent origin it is very sharply seen in the organism. So, it gets the this disease and it shows the symptoms, then maybe in a short while it is dead. In the case of a chronic disease, it will have this disease for a very long time, and then it would start showing symptoms and then maybe it would die.

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Other things are disease transmissibility. So, an infectious disease is a disease that is caused by disease causing agents or pathogens. So, infectious disease means bacterial diseases, viral diseases, fungal diseases, parasitic diseases. So, all these diseases can be spread from one animal to another animal. So, this is because which is why we call these as infectious diseases, they can infect another animal. Second is contagious diseases.

So, contagious diseases are a subset of the infectious diseases that are easily transmitted by contact with the ill animal or their secretions. So, basically if things like influenza and herpes. So, what we are saying here is, if a disease is an infectious disease, if it can spread from animal a to animal b. But if our disease that is an infectious disease, can spread just by contact between 2 bodies or their secretions, then we would call it a contagious disease. So, contagious will spread with touch infectious will spread by some other means.

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Next we look at a diseases geographic extent. So, what is the size of the land that has these diseases? So, the first thing is enzootic. So, if you remember the term endemic. So, when we said that a species is endemic in an area, it meant that it is only found in that area it is not found anywhere else, and it is generally found in that area.

So, similarly when we say enzootic, it is an animal disease that is peculiar to or constantly present in a locality. So, it will be always seen in that area. The disease is maintained in the population without the need for a external inputs. So, basically whenever you go there you will find that the animals are showing this disease. For example, enzootic abortion of ewes it is a late abortion in ewes called by caused by chlamydophila abortus; which is introduced to a flock by a carrier sheep. Another good example of an enzootic disease would be a deficiency disease that is seen in certain locations. So, for instance in the case of human beings in the case of hilly areas, because

they have low concentrations of iodine. So, we would have people that suffer from goiter. So, goiter is a disease because of iodine deficiency. So, this disease is generally found in those areas, and it is not found in most of the other areas, because most of the other areas have sufficient concentrations of iodine.

So, similarly in the case of animals if there is a deficiency disease; that is prevalent in say one particular national park, we would call it an enzootic disease. Next is an epizootic. Now epizootic can be compared with our human term of epidemic. So, a disease that suddenly and temporarily affects a large number of animals over a large area example sylvatic plague. So, this is a disease that comes up suddenly.

So, it is not always prevalent in that area it comes up in at certain times it is temporary in that area. So, basically it is not present at all times. And it affects a large number of animals over a large area. So, basically you are not having a situation in which a few animals are dying or a few animals are impacted, but a large number of animals that are impacted.

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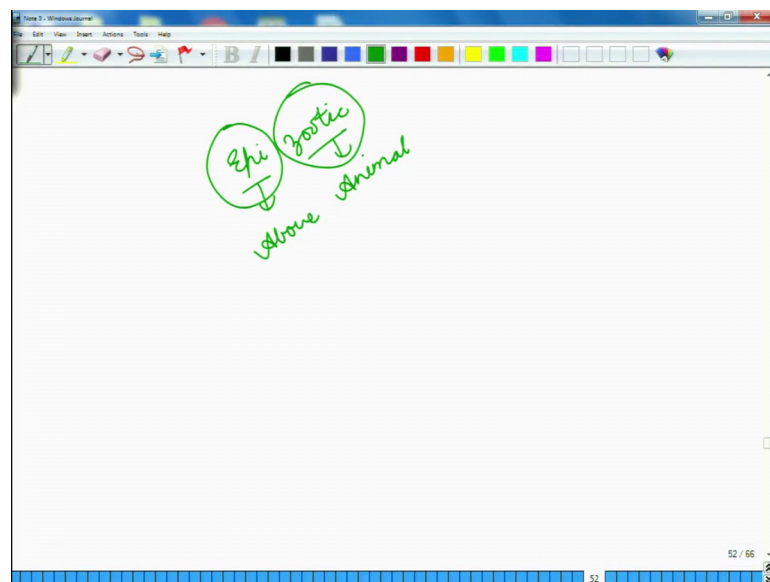
Now, epizootic if we look at it is word roots epizootic. So, epi means above and zootic means the animal. So, it is a disease that is coming from above. So, if we look at our older traditions, if there was an epidemic people would say that it is the gods wrath that is coming up. So, it is coming down to us from the god. So, which is why it is coming

from above. So, similarly epi here is above and zooty is the animal. So, it is coming from above. Next is panzootic.

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Now panzootic is an epizootic that spreads over a large region for example, a continent or even worldwide. So, in the case of an episodic disease, it has a large area, but if it becomes even larger, if it impacts a complete continent or maybe even the world then we would call it a panzootic disease; such as the avian influenza which recently became a panzootic disease.

Next we have a sporadic disease. A sporadic is a disease that occurs upon occasion or in a scattered isolated or seemingly random way. For instance, rabies in dogs so, sporadic disease would occur in a few animals, at some times and we would not very well know for instance, why this disease occurred in this area at this particular point of time. So, it is a sporadic disease.

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Next is an outbreak. An outbreak is a sudden increase in the occurrences of a disease in a particular time and place, for example, Ebola outbreak. So, when we say outbreak it used to be a sporadic disease, but suddenly it increased in its spread in its occurrence, at some particular time and place. So, in that case in place of a sporadic disease, we would call it an outbreak of a disease.

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Now, considering the nature of the agent, we have infectious agents and we have non infectious agents. So, as we saw before; an infectious agent is a disease causing agent

that is a pathogen. So, for example, we have bacterial, virus, fungi, helminths prions or protozoa. So, these are all examples of infectious agents. So, infectious agent it means that it can spread from one animal to another animal. Non infectious agent is a disease causing agent that is not a pathogen. For example, air pollution dietary deficiency or high levels of cholesterol. So, basically if I have a disease, that is caused by an infectious agent that is caused by a pathogen. So, for instance if I have common cold, I can spread it to you, if we come in close contact. But in the case of a non-infectious disease.

So, for instance, if I have a deficiency disease or if I have high levels of blood cholesterol, if you come in contact with me you will not get this disease. So, this is the basic difference between an infectious agent and a non-infectious agent or also between an infectious disease and a non-infectious disease.

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Now, why does an animal get a disease? The presence of a disease or a disorder can be explained by 4 factors. Predisposing factors, precipitating factors, perpetuating factors and the absence of protective factors. So, we will look each of these one by one.

Now a predisposing factor is a condition or situation that may make an animal or a person more at risk or susceptible to disease. For example, heredity age gender environment and lifestyle.

So, basically when we say that we have a predisposing factor. So, if you consider children in the schools. So, the school going children have more incidences of common cold. As compared to people who are adults, but then if you look at people who have an old age, they will also be having a greater incidence of common cold as compared to the adults in any population. So, age becomes a predisposing factor for diseases such as common cold. Because people who are adults or animals also who are adults have a better immunity a better resistance to the diseases as compared to either very young animals or very old animals. So, factors such as these are called predisposing factors.

Similarly, things like lifestyle; so, in the case of human beings if we have people who are say athletes, they run a very different lifestyle than people who have a sedentary job; who whose job is to sit and type on computers for instance. So, in the case of lifestyle, the people who are athletes might be more prone to injuries whereas, people who are leading a sedentary lifestyle might be more prone to diseases such as cholesterol or hypertension. So, similarly in the case of animals if we look at camp elephants or if we look at temple elephants, temple elephants are kept in the temples, they have to spend quite a lot of time just standing there to give blessings.

So, in those situations they would have very different sorts of diseases maybe diseases of the feet, because of constant standing on a concrete floor, as compared to animals that are living in the forest. So, the forest lifestyle would give the elephants of very different set of diseases such as infectious diseases. But the elephants that are residing in the temples would have say lifestyle diseases because of standing. So, all these factors go by the name of predisposing factor. So, predisposing factors make you more susceptible to get a disease. Next we have precipitating factors. So, factors that cause or trigger the onset of a disorder illness accident or a behavioral response. So, if there is a predisposing factor; so for instance, if you have a very young animal.

So, well this young animal get influenza or not. So, it has the predisposing factor, but then it also needs precipitate factor. So, precipitating factor would be exposure to a specific disease, amount or level of an infectious organism drug or noxious agent etc. So, for instance if you have this young animal, and if there is another animal that has influenza and it comes in very close contact with our young animal it will get influenza. But not if it is kept completely isolated. So, this contact becomes a precipitating factor when the predisposing factor is already presented.

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Next is a perpetuating factor factors or conditions that maintain the disabling symptoms in an individual.

So, for instance insufficient nutrition and unhealthy surroundings, basically our baby an animal that got influenza, if we do not feed it properly, if it is getting insufficient nutrition, then probably it will not be able to fight this disease. And so, this disease will continue in this animal for a longer period of time. So, insufficient nutrition in this case becomes a perpetuating factor, it is perpetuating the disease that is already present in the animal.

Next we have protective factors or the absence of protective factors that lead to the disease. So, these are factors or traits of an individual, that serve as strength or assets that can be accessed to promote a healthy adjustment to lessen the severity of the symptoms for example, immune response.

So, basically if there is an animal that was already well fed, it has sufficient stocks of energy in its body in the form of say glycogen or in the form of fats. So, it can access these resources to put up a stronger immune response against the disease. So, such factors would become protective factors and absence of protective factors would also increase the incidence of a disease in the animal.

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Next we have 2 terms morbidity and mortality. Morbidity is the state of being sick. Morbidities refers to the state of being diseased or unhealthy within a population. So, essentially if we have a population of say 1,000 animals and out of this1000 animal there

are 100 animals that got influenza and are still sick. So, we would say that these animals are morbid.

On the other hand, mortality is the term used for the number of animals who died within a population. Now out of these 100 animals, suppose 10 animals died because of influenza or because of side effects of influenza. So, we would say that we had a mortality in this population, because some animals actually died. So, morbidity is being sick mortality is being dead.

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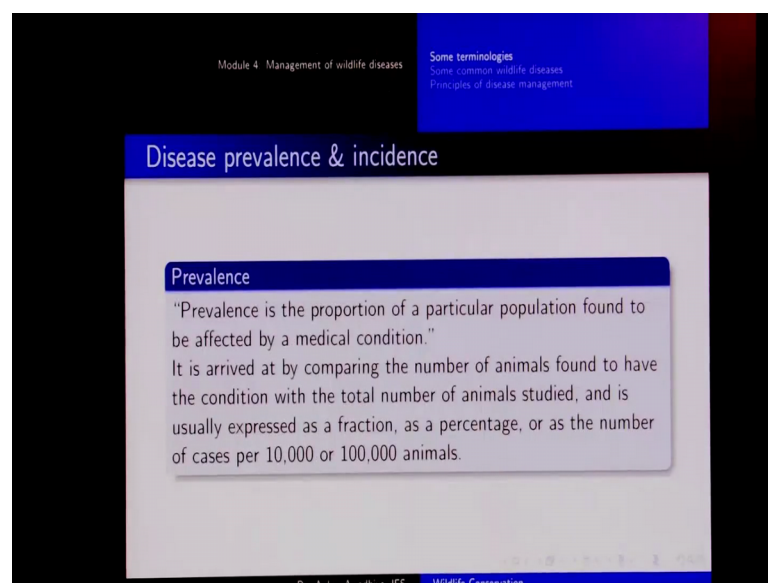
Next we have 2 terms disease prevalence and incidence. Now prevalence is the proportion of a particular population found to be affected by a medical condition. So, in our previous example if out of 1,000 animals, we had 100 animals that were sick we would say that the prevalence of the disease in this population is 100 out of 1,000 animals or we can also say that we have a prevalence of 10 percent.

Now, it is arrived at by comparing the number of animals found to have the condition with the total number of animals studied and is usually expressed as a fraction. So, we can say that the prevalence is 0.1 or as a percentage when we will say that it is 10 percent, or as the number of cases per 10,000 or 100,000 cases. So, it is 100 per 1,000 animals or 1,000 per 10,000 animals or 10,000 per 100,000 animals. So, basically we can express it in any of these fractions that is prevalence. Prevalence is how many animals in a population have that disease.

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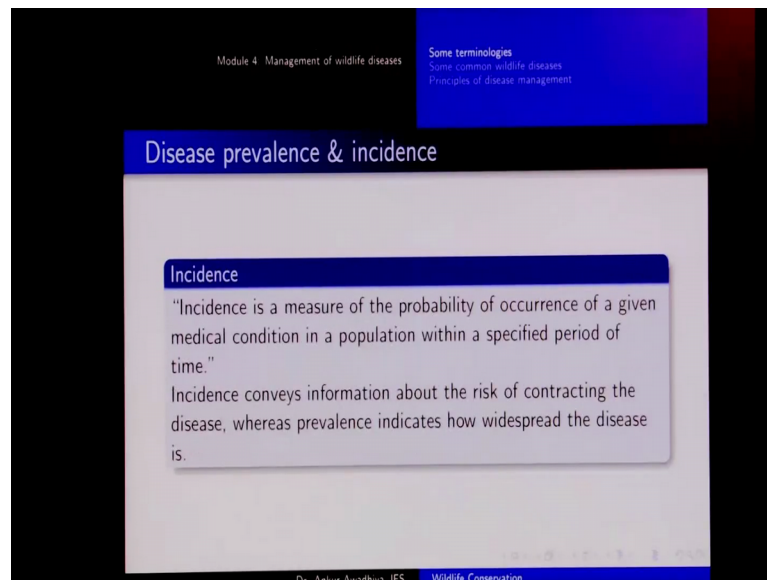
Next we have incidence. Now incidence ask the questions. In the next one year how many animals are going to have this disease?

So, incidence is a measure of the probability of occurrence of a given medical condition in a population within a specified period of time. So, for instance if we say that 100 animals out of these 1,000 animals are sick. So, that is the prevalence, but in the next one year or in the next 6 months, how many more animals are going to have this disease. So, in that case we are talking about incidence.

So, it conveys the information about the risk of contracting the disease whereas, prevalence indicates how widespread the diseases. So, prevalence is talking about the existing situation whereas, incidence is talking about what is going to happen in the near future. In a specified time period, how many more animals are going to become sick that is incidence.

Now, talking about transmission of diseases from one individual to another, we have horizontal and vertical transmission. So, in the case we can understand it more clearly if we look at this diagram.
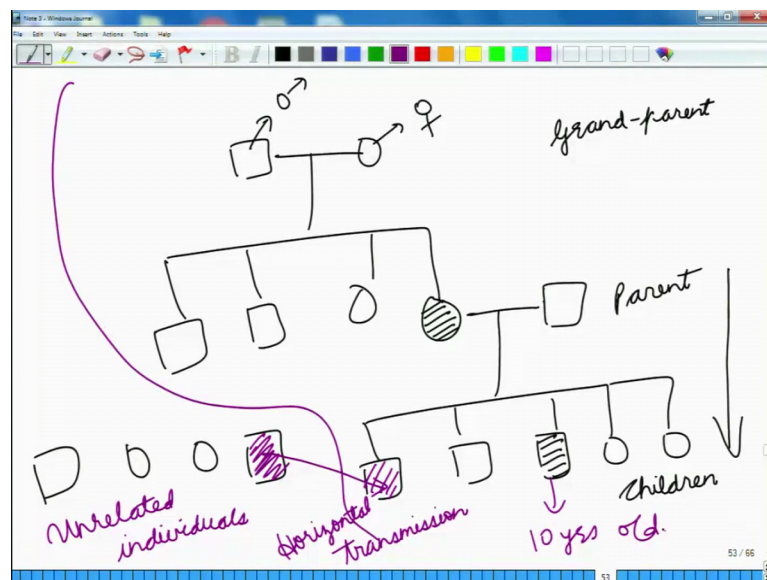
So, essentially we have a father and a mother, they have say 4 children. Then we have a meeting between this female with another male. And then it had say 5 children. So, in this case black refers to male and the circle refers to a female. Now when we see a

horizontal transmission so, this is a family tree in which this is the grandparent generation, this is the parent generation, and this is the children generation.

Now when we talk about horizontal and vertical transmission so, let us first come to the vertical transmission. Transmission of an infection from the parental generation to their offspring, this can occur in utero that is when the next generation is in the womb of the parent generation, or immediately after birth. For example, injection of injection means eating or drinking of breast milk or direct contact during or after birth example is Chlamydia.

So, coming back to our drawing board, if there is a disease that came from the mother to the child, in this case we say that it is a vertical transmission, because it is going from one generation to another generation. So, this is a vertical transmission however, in the same population we have some other individuals, that were unrelated to this family. So, we have this family and then we have some unrelated individuals.

Now, in this case suppose this animal had a disease, and it was able to pass it to this animal. So, in this case what is happening is a horizontal transmission. Horizontal because it is not occurring in a top down fashion it is moving from one individual to another in a horizontal fashion. Now consider the case that this parent and the offspring.

So, the offspring was born and now the offspring is say 10 years old. Now at 10 years this offspring caught another disease, and then it transmitted it to it is parent. Do we call it a horizontal transmission or a vertical transmission? Now in this case we would say that this transmission was a horizontal transmission. Because it was not just across the family line, but it happened just as it would have transmitted this disease from one animal to another in the horizontal fashion.

So, coming back to the definitions; a horizontal transmission is transmission of an infectious agent like bacterium virus fungus etcetera. Usually between members of the same species that are not parent and child example rabies. So, rabies spreads when a rabid animal bites another rabid animal and then transmits this disease into the body of the second animal. Vertical transmission of an infection from the parental generation to their offspring, this can occur in utero or immediately after birth.

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Now in the case of horizontal transmission we can have direct transmission or indirect transmission. So, remember that we are now talking about horizontal transmission.

Now, direct transmission happens when the disease causing microbe is passed from one animal to another when their bodies touch in some way for example, sexually transmitted diseases whereas, indirect transmission happens when microorganisms are carried to an animal in some way, instead of by actual body to body contact, such as through food water droplets in the air or sharp objects such as Cholera.

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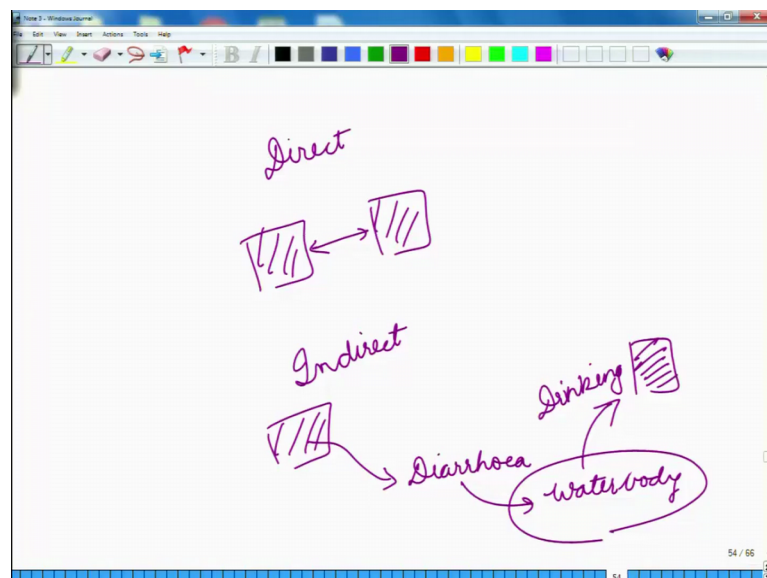
So, basically in the case of direct transmission we have an animal then there is another animal. Both of these animals get into touch with each other, and then this disease what passed into the second animal.

So, it is direct directly in contact. Now in the case of an indirect transmission, this animal for instance it had disease. Because of this disease it gave out diarrhea, it had diarrhea. Then this diarrhea infected a water body, then this water was taken up by another animal. So, this animal had it drunk the water from this water body, and then this animal became diseased.

So, essentially this transmission is not a direct transmission, it is an indirect transmission because we have this water body in between. So, for instance in cases in which you have kept an animal in a cage, and then this animal develops a disease, then you remove that animal you put another animal there, and the second animal also develops a disease we would call that it is an indirect transmission, because the cage acted as source and through which the disease was passed from one animal to another.

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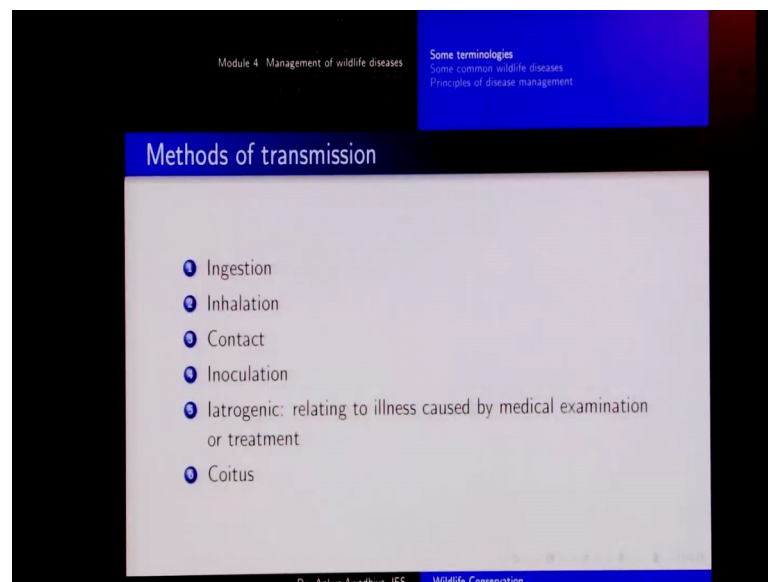
Now, talking about the methods of transmission, we have ingestion so, in the case of ingestion when animal has eaten or drunk the pathogens that were there in the environment or from another animal. So, ingestion is eating or drinking, inhalation is through breathing. So, this is how you catch cold or influenza. So, the sneeze or cough droplets that are there in the air also harbors the pathogens. So, the next animal inhales it

and gets the disease. Next is contact which is skin to skin contact. Next is inoculation now inoculation means that your body was pierced by something. So, basically for instance if there was grassland and this grassland suppose it had a nail.

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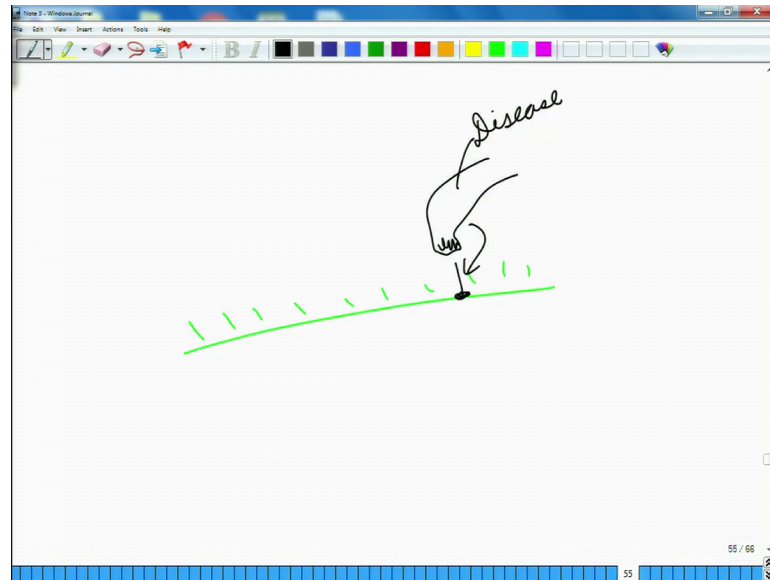
So, one animal put it is hoof on top of this nail, and this nail pierce this animal, and this animal was having some disease.

So now the pathogen has come into the nail on the surface of the nail. Now if there is another animal that also puts it is hoof on or it is skin on that nail, then it would be an inoculation of the disease into the second animal. Next is iatrogenic, iatrogenic is iatros means medical. So, it is disease that is transmitted because of some medical examination or treatment.

So, basically things like if an animal had say an injury in it is leg, and then during it is medical treatment we applied some sort of ointment on top of that injury. And that ointment had some substance which led to an allergic reaction in the skin or maybe that ointment itself was contaminated by something else. So, we will call such kinds of transmission as iatrogenic transmission, because they are being transmitted during a medical procedure or during treatment or during a medical observation.

Next we have transmission through coitus, coitus means, mating and things such as sexually transmitted diseases are transmitted through the process of coitus. Now coming

back to vertical transmission; so, till now we were talking about horizontal transmission. In the case of vertical transmission, we can have hereditary diseases. So, in the case of hereditary diseases, it is there in the genome of the animal. And so, the offspring gets it right at the time when there was a fertilization between the sperm and the ovum, next is congenital diseases, those diseases that are present at birth and acquired in utero or in ovo example congenital heart disease. So, a number of developmental diseases for example, our congenital diseases.

So, what do we mean by developmental diseases?

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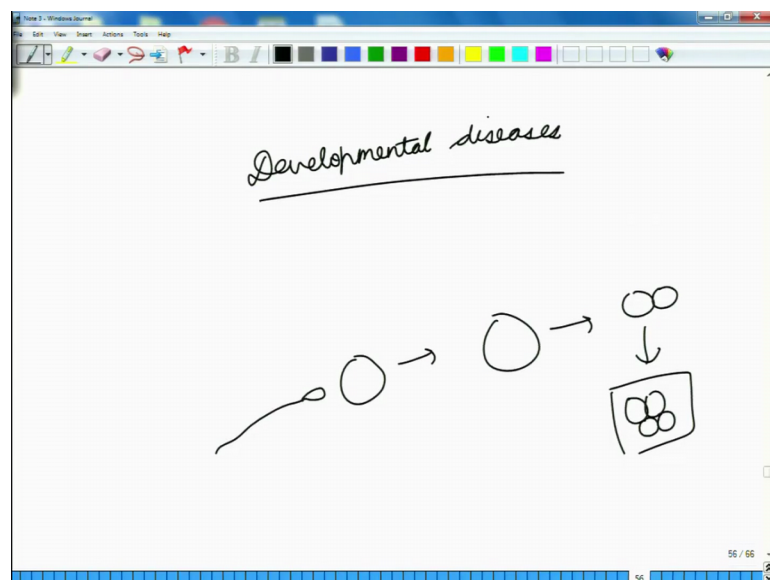
So, we had an ovum, and then it was fertilized by a sperm. So, we got a zygote, now this zygote then starts dividing from one cell it becomes 2 cells, then it becomes 4 cells and so on. But then the next question is, how does this mass of cell know which way is up which way is down; which way is right which way is left. So, essentially when we talk about development, we have a right hand we have a left hand, why do we have a right hand here, and not say on top of our head. So, conditions such as these are regulated by a set of factors that are known as developmental factors.

Now, if something goes wrong during that is in those signals, then we could have conditions in which some part of the body is not formed properly or it is overgrowth, or in a in the case of heart we could have a congenital heart disease, in which the septum does not does not completely fill up it is full and things like that. So, congenital diseases

are those diseases that are present at birth and acquired in utero when the organism was in the womb or in ovo. Now congenital diseases also include a number of infectious diseases. So, in which case we also call them transplacental diseases, these diseases can also be be present at birth, but we call them transplacental, because there was a transmission of pathogens from mother to the fetus through the the placenta.

So, essentially in this case, the mother got an infection during the pregnancy and that pathogen was able to move through the placenta from the mother into the fetus. So, it becomes a transplacental infection. So, a number of situations we may also confuse between congenital diseases and transplacental diseases.

But an easy way to remember is that in the case of transplacental diseases, it is mostly because the mother got this disease and the pathogen was transmitted. Whereas, in most of the congenital diseases they are developmental disorders; though they could also be caused because of some pathogens. Now ascending transmission is an infection that moves upwards from the urethra or vagina and often results in a preterm abortion.

Now, an example here would be that you had a mother organism. So, you had a mother, and in the womb a baby animal that was growing. And then this mother suppose it got a urinary tract infection. So, in this case this infection was able to move up the urethra, and then it was even able to enter into the womb. And it was able to infect the fetus there. So, this would be called an ascending infection, and in most of the cases it results in an abortion of the fetus. Now after transmission let us talk about hosts. Now a host is an organism that harbours a parasitic, a mutualistic or a commensal guest or a symbiont. The guest typically being provided with nourishment and shelter. For example, rat is a host for bubonic plague, since it harbors rat fleas that are vectors for the disease.

So, basically if we have one animal so, we have an animal, and then there is something else that is growing on this animal on or inside. Now these things could be mutual or mutualistic. So, mutualistic for instance would mean that I have or like all of us have bacteria in our intestines. Now in the case of those bacteria, we are providing those bacteria with food and we are we are providing them with shelter in the form of our intestines. Now those bacteria intern provide us with a number of vitamin b compounds. So, this situation would be called a mutualistic situation, in which we are helping the bacteria and the bacteria is helping us. In certain situations, it could be a parasitic.

Now, a parasitic situation would mean that we are providing food and shelter to the animal or to the organism, but this organism is intern harming us. So, most of the pathogens would come into this category or things like tapeworms. So, if somebody has a tapeworm in it is gut. So, this tapeworm is not doing any benefit to the host, but this tapeworm is actually doing harm to the host.

So, in those situations we would call it a parasitic organism. The third thing could be a commensal. Now a commensal means that we have this organism that is living on or inside us, we are providing it with food and shelter, but this organism intern does not do anything to us. So, it is neither benefiting us nor it is harming us. So, it is neither benefiting the host not harming the host. So, in those cases we will call it a commensal.

So, in the case of mutualism, it provides benefit to host, in the case of parasitism it provides harm to host. And in the case of commensal it provides or let us say it has neither benefit nor harm. So, a host is that organism that is supporting any of these 3 categories of organisms. Mutualistic organisms parasitic organisms or commensals. Now types of host so, we differentiate between definitive or primary host and a secondary or an intermediate host. So, a definitive or a primary host in which the parasite reaches maturity and reproduces sexual, sexually. In the case of an intermediate host, in which parasite does not reach maturity or reproduce sexually.

So, basically in the case of the primary host it has the parasite has completed it is life cycle, it has reached to maturity it has produced eggs or maybe spores or cysts; that are then passed on or to infect some other organism. In the case of secondary host, it is it has not reached it is maturity, it does not reach maturity in this host, but it has to go to some other host to complete it is life cycle.

Then we have incidental or dead end host. So, an incidental host is one it is an intermediate host. So, intermediate host meaning that the parasite has not been able to reach sexual maturity and it has not been able to produce more eggs or cysts or whatever. So, it is an intermediate host that generally does not allow transmission to the definitive host.

So, basically the parasite has to move from the intermediate host to the definitive host, but if this thing does not happen if this transmission does not happen, then we will call it a dead end host. So, basically this parasite was able to enter into the intermediate host it

was not able to complete it is life cycle and there it ended. So, basically in those situations we will call it a dead end host. So, for example, humans and horses are dead end host for west nile virus. So, they can become infected, but the level of virus in their blood does not become high enough to pass on the infection to mosquitoes.

Next we have reservoir host. So, a reservoir just like the normal meaning of the term reservoir. It is a host that can harbor a pathogen indefinitely with no ill effects with important implications for disease control. Because what is happening in this case is that we have an animal that is not showing us any of the symptoms of the disease, but it is harboring the pathogens in it is body.

So, it is just acting as a reservoir, it is just acting as a tank, in which you have the pathogen it is not showing any of the impacts, but as long as this reservoir is there would be other animals in the population or other animals in the community that will be following ill. So, this is known as a reservoir host. Similarly, we have an amplifier host.

An amplifier host or an amplifier is one in which the level of pathogen can become high enough that the vector such as a mosquito that feeds on and will probably become infectious. So, basically it permits the pathogen to breed it permits the pathogen to increase it is numbers to such an extent that it becomes possible for the pathogen to infect something else. So, it is just acting as a multiplication ground for the pathogen. So, it is called an amplifier host.

Next we differentiate between vectors and carriers. Vector is an organism or a mechanical agent that is capable of transmitting disease from one infected individual to a new individual without having the disease. For example, mosquito is a vector for malaria. So, what we are saying here is that a vector is an organism such as the mosquito or flies they are vectors.

It is or it could even be an inanimate object. So, for instance this pen could be a vector, if there was somebody who had a disease he or she touch this pen and then lift it here. Now I came and picked up this pen. So, these pathogens could be transmitted from that person to me via this pen. So, in that case this pen would be called a vector.

So, it is either an organism especially mosquitoes and flies or an inanimate object a nonliving object, that is capable of transmitting diseases from one organism to another

organism without having the disease. So, in this case mosquito does not have the disease the fly does not have the disease and this pen does not suffer from any diseases. So, which is why we call it a vector, Carrier on the other hand is an individual that has the disease, but not the symptoms, and it is capable of transmitting the disease to a new individual for example, a carrier of tuberculosis. So, in the case of carrier what we have is that there is an individual in the population.

So, suppose in the case of deer, there is one deer that has tuberculosis. But in the case of this deer the tuberculosis has not reached to such an extent there it would show the symptoms. So, it is a symptom free it looks healthy, but it has tuberculosis within it is body. And then it is able to transport this tuberculosis from itself to something else. Now why is it able to do it? Because remember that in the case of any disease we have 4 factors that are there.

So, probably this individual that has that is a carrier of tuberculosis probably it is immune system is strong. So, even though it has the bacterium inside it is not able this bacterium is not able to show the symptoms. But at the same time it is able to transmit these bacteria from itself to some other organisms who probably because of their young age, or because of their old age, or because of a weakened immune system will catch this disease very fast and will show the symptoms.

So, such organisms are called as carriers. Now remember that vector does not show the disease does not and is either say mosquitoes or flies or such animals which do not get this disease or they are inanimate objects. But in the case of carriers they are the same organisms that also get the disease; it is just a matter of time or just a matter of chance.

Now in the case of vectors we differentiate between mechanical vectors and biological vectors. So, a mechanical vector carries an infective organism to it is host through it is legs and other body parts; example flies. Where as a biological vector develops an infective organism in it is body and passes it along to it is host; example mosquito.

So, basically when we talk about flies; when flies set on any contaminated object they would get the pathogens on their feet, and then when they go and sit somewhere else which has food they would pass on this organism. So, this organism has not entered into the body of the flies. So, they are termed as mechanical vectors. In the case of mosquitoes, when they drink blood from an infected individual, then the parasites might

develop inside the body of mosquito, and then later on when it bites some other some other organism, these pathogens would be transmitted to the second organism. So, such vectors in which the pathogen develops inside the body are called as biological vectors. Then in the case of carriers we differentiate between incubatory convalescent and asymptomatic carriers.

So, what does it mean? In the case of incubation. So, whenever a person has gotten a disease so suppose there is a person who got exposed to common cold virus. So, he or she got this virus, but this virus has not yet grown to a stage in which it would start showing the symptoms. But at this stage as well, the person would be able to transmit the virus from person a to person b.

So, such individuals in which they are in the process of getting this disease, they have not yet shown the symptoms of the disease, but are able to transmit the pathogens from person one to person 2 are known as incubatory carriers. Convalescent carrier is an individual who is fully cured of a particular disease, but is still capable of transmitting the disease to others.

So, basically there was a person who supposed got diarrhea. And after getting diarrhea or this animal after getting diarrhea it was treated with medicines. And so, is now not showing any of the symptoms of diarrhea. But then it still has some amount of pathogens left in the body which it is still is treating out along with it is dung. So, such an individual would be called a convalescent individual. So, it is now not showing any of the symptoms of the disease, it is essentially a cured individual, but it is still transmitting the disease to other individuals. The third is asymptomatic, an individual who has the disease causing agent in the body, but show no signs or symptoms of the disease and are capable of transmitting the disease to others.

So, in this case probably the incubation phase is long gone, the individual still has the pathogens in the body, but the immune system is keeping the body safe. And so, the body is not showing any of the symptoms. But still the pathogens are being transmitted to other individuals. So, in these cases we would call them as asymptomatic carriers. Now in this lecture we had a number of terms. And it might look a bit heavy on the one hand, but then once we are through with these terms in the next 2 lectures we would will make

use of these terms to understand different diseases, and to understand how different diseases are managed. So, that is all for today.

Thank you for your attention [FL].