

# ASSIGNMENT MODULE 2

Daniele Cervellera

Student of WASH post-graduate diploma (Course Code: PGD002) in  
The Strategia Netherlands

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- 1. Consider a disease known as diabetes mellitus, which is characterized by an increase in the blood sugar level. Infectious agents may contribute to the development of the disease in early childhood, but are not the main cause of the disease. Can it be classified as communicable? Explain your reasons**

The diabetes mellitus cannot be classified as a communicable disease because it cannot be transmitted from a person to another, and that is the key element to define a disease as a communicable. And this classification follows this definition, and the fact that infectious agents may contribute to the development of the disease does not influence the scientific categorization of a communicable disease.

The diabetes mellitus describes a metabolic disorder of multiple aetiology characterized by chronic hyperglycaemia with disturbance of carbohydrate, fat and protein metabolism resulting in defect of insulin secretion, insulin action, or both (WHO, 1999).

## **2. How would you classify pulmonary tuberculosis using the epidemiologic method?**

### **What is the main importance of such classification?**

The communicable diseases have two main ways to be classified: the first is the clinical classification and the other one is the epidemiologic classification. If the first one is focusing on the visible signs and symptoms (clinical appearances) that the person is showing, the epidemiologic classification is considering the mode of transmission of the disease.

The main importance of this classification is related to the mode of interaction with the patient, because depending on the class of the disease the intervention will follow specific prevention and control measures. Within the same epidemiologic group there are similar procedures to interrupt the transmission. The advised therapeutic interventions are: standard and airborne precautions, avoid close contact with others (including isolation) and medication (different if it is latent or active) (Emergency Nurses Association, 2013).

In the case of pulmonary tuberculosis, it falls in the category of airborne diseases, since it is transmitted through the air. The infection is transmitted to the new host through air. The other categories are waterborne, foodborne and vector-borne diseases.

As it is reported by Centers of Diseases and Control (2013), “infectious droplet nuclei are generated when persons who have pulmonary or laryngeal TB disease cough, sneeze, shout, or sing. Depending on the environment, these tiny particles can remain suspended in the air for several hours”. So the transmission can be considered as indirect, because the bacteria remain in the air. Here below it is clearly shown how is the cycle of transmission.

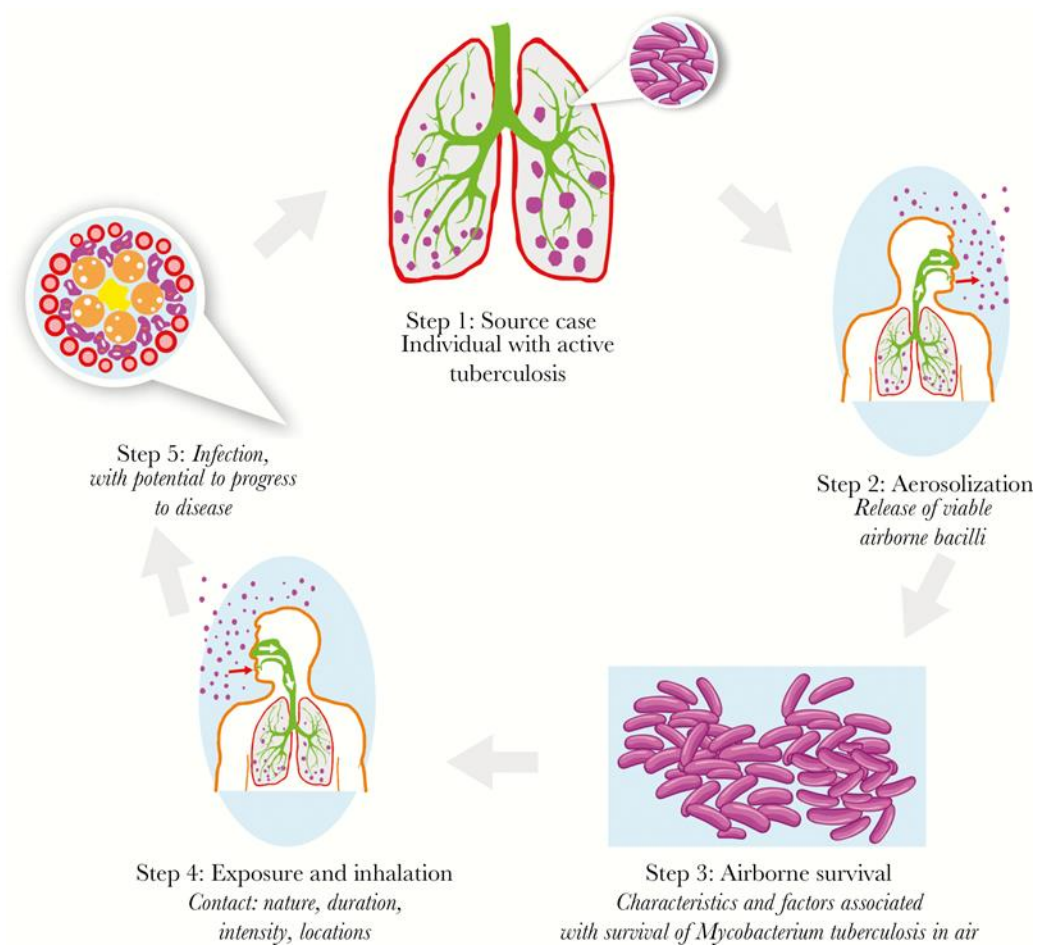


Figure 1: Churchyard et al., 2017.

**3. Describe four or more bacterial vaccine-preventable diseases that have the same modes of transmission.**

Some of the communicable diseases can be prevented through vaccination/immunization, that is the process where dead or weakened micro-organism are introduced in a body in order to stimulate the production of special defensive proteins called antibodies. The presence of antibodies allows the body to protect itself from the development of a disease.

There are some diseases that have the same modes of transmission:

- Tuberculosis
- Diphtheria
- Pertussis
- Meningitis
- Pneumonia

These diseases are developed from bacteria and all transmitted by air, and mainly by sneezing or coughing.

In terms of vaccines, there is the possibility to have the trivalent DPT vaccine, that is including two among the above-mentioned disease (Diphtheria, Pertussis and Tetanus). The meningococcal vaccine has to be administered in a single injection, while the pneumococcal conjugate vaccine is immunizing against the *Streptococcus pneumoniae*, bacterium that cause pneumonia or meningitis. The BCG (*Bacillus Calmette–Guérin*) vaccine is the one protecting from the *Mycobacterium tuberculosis*, that can be also combined with the vaccines against diphtheria and pertussis.

Looking at the symptoms, there are similarities among the clinical conditions. Tuberculosis (*Mycobacterium tuberculosis*) has chronic cough, weight loss, fever and reduction of appetite. This last element is present also in the symptoms of diphtheria (*Corynebacterium diphtheriae*), where there can be also sore throat and slight fever.

For pertussis (*Bordetella pertussis*) we can list runny nose, sneezing, watery eyes, continuous cough, followed by vomiting. Analyzing the signs of meningitis (caused by *Neisseria meningitidis* or *Streptococcus pneumoniae*), we can find fever, headache, neck stiffness and it can lead to coma.

Lastly, pneumonia as infection of the lungs caused by *Streptococcus pneumoniae* or *Haemophilus influenzae* type b (Hib) has cough, fast or difficult breathing. This last bacterium has a vaccine that is usually included in the pentavalent vaccine. As indicated by Ministry of Health and Family Welfare (2012), the pentavalent vaccine provides protection to a child from 5 life-threatening diseases – Diphtheria, Pertussis, Tetanus, Hepatitis B and Hib.

#### **4. What are the causes and methods for preventing bacterial meningitis?**

The bacterial meningitis is an infection that is affecting the brain and the spinal cord. It can be caused by many bacteria, the most common are the *Neisseria meningitidis* or the *Streptococcus pneumoniae*.

The best prevention of the disease can be done through a spread vaccination campaign that with a coverage of the 80% of the population can avoid the diffusion of an epidemic. The critical aspect of this situation is that the children under 2 years cannot receive a full protection from the vaccine, so they are the most vulnerable. The vaccine for the population should include all the different groups of meningococcus bacteria (A, B, C, Y, W135).

Another preventative measure is the education and sensitization of the communities on the symptoms of the disease, how it is transmitted and its treatment in case of infection.

The control action that can be taken are: early identification of the disease and consequent rapid treatment of the person in the health facility and in the community; the information of the case should reach fast the District Health Office, where countermeasures will be put in place.

**5. Explain two characteristics that illustrate how the Anopheles larvae are different from other mosquito larvae. Using illustration is advised**

The Anopheles mosquito is a genus of mosquito that include around 460 species, but only one hundred species of Anopheles carry malaria. In Africa, Anopheles gambiae is one of the best known vector species because of its prominent role in the transmission of the most dangerous malaria parasite species – Plasmodium falciparum. (Afrane Y., Githeko A., Yan G., 2012). The final purpose of identifying the different types of mosquito is the prevention of the spread of malaria.

In order to distinguish one type of mosquito from the others, a determinant is the knowledge of their larval characteristics.



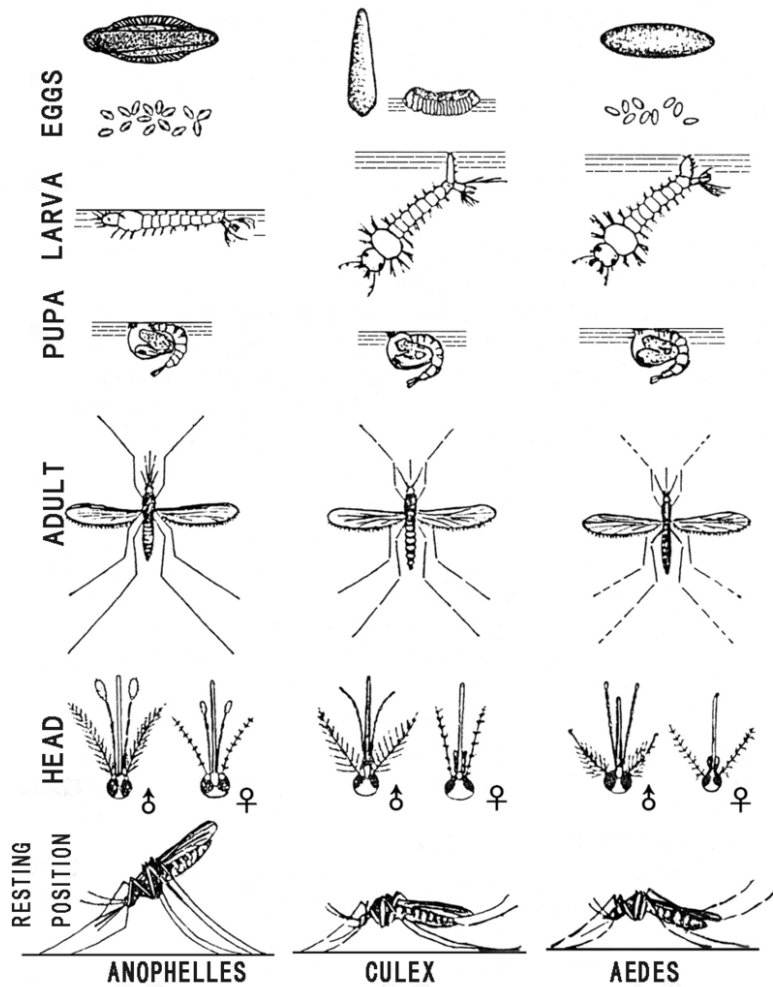


Figure 2: Souza T. (2016)

From this picture it is clear as the anopheles larva is the only one that lay immediately under the surface of the water. The reason is that it does not have the siphon, while the culex and aedes species have the siphon.

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