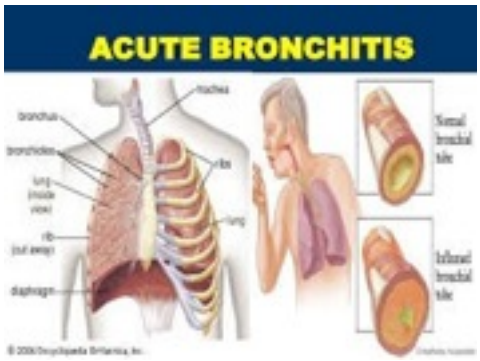
Communicable and Non-communicable Diseases

INTRODUCTION

A communicable disease is defined as an illness that arises from transmission of an infectious agent or its toxic product from an infected person, animal or reservoir to a susceptible host, either directly or indirectly through an intermediate plant or animal host, vector, or environment. Communicable diseases refer to diseases that can be transmitted and make people ill. They are caused by infective agents (pathogens) e.g. bacteria and viruses, which invade the body and multiply or release toxins to cause damages to normal body cells and their functions. In severe cases, they may lead to death. These infective agents can spread from a source of infection (e.g. patients, sick animals) to a person through various routes of transmission.

Populations in developing countries are more disproportionately affected because of poverty a lack of resources, poor infrastructure and inadequate disaster preparedness efforts. Communicable diseases also account for most of the reported deaths

among conflict-affected populations due to displacement, malnutrition and limited access to basic needs. In addition to assessing the disease incidence and prevalence, the prevention and control of disease outbreaks require a thorough understanding of the environmental and host factors, the transmission pattern and other characteristics of causative organisms. More people are travelling more than ever worldwide; diseases and epidemics, therefore, will be more prone to spread rapidly. Communicable disease outbreaks respect no borders. Humanitarian actors must work closely with not only global bodies like WHO, Inter-Agency Standing Committee (IASC) cluster and local health authorities, but also the communities particularly when planning and implementing disease control programmes.



Communicable diseases are a major cause of mortality and morbidity in coordination among the various agencies providing health care often coexist. The main causes of morbidity and mortality in emergencies are diarrhoeal diseases, acute respiratory infections, measles and, in areas where it is endemic, malaria. Other communicable diseases, such as epidemic meningococcal disease, tuberculosis, relapsing fever and typhus, have also caused large epidemics among emergency-affected populations. Malnutrition and trauma are the two main additional causes of illness and death. Ensuring adequate shelter, water, sanitation and food and providing basic health care are the most effective means of protecting the health of those affected by emergencies. A systematic approach to the control of communicable diseases is a key component of humanitarian response, and is crucial to protect the health

of affected populations. This requires co-operation among agencies working at local, national and international levels, and collaboration among all sectors involved in the emergency response – health, food and nutrition, shelter, water and sanitation.

Apart from the infective agents, there are three other factors necessary for the occurrence of communicable diseases:

1. Source of infection

This refers to any environment, in which infective agents can live, parasitize and breed. It includes humans (e.g. patients, carriers and people with latent infections), livestock, insects and soil. The source of infection will normally form the basis for infective agents to infect humans.

2. Mode of transmission

Mode of transmission is through various ways. It could be through direct or indirect contact, droplet transmission, airborne transmission, common vectors (e.g. food-borne, water-borne), vectors (insects), blood or body fluid transmission and congenital infection.

3. Host (Susceptible population)

Hosts refer to the susceptible population. Some people are more prone to become hosts. For instance, elders with chronic diseases are more susceptible to infection as a result of weakened body immunity. Residential care homes for the elderly are collective living places where communicable diseases can easily spread through close person-to-person contact. The frailty of the elders also aids the spread. The source of infection can be staff, visitors or residents (e.g. residents newly discharged from hospital). Person-to-person contact then leads to cross infection, i.e. the transmission of infective agents from one

person to another. For instance, a staff member who fails to wash hands after caring for a resident may spread the infective agents from that resident to the next resident he cares for.

TYPES OF COMMUNICABLE DISEASES

Communicable diseases are broadly classified into the following categories:

1. Enteric diseases
2. Foodborne diseases
3. Waterborne diseases
4. Blood-borne pathogen diseases
5. Sexually transmitted diseases

1. ENTERIC DISEASES

Enteric diseases are infections caused by viruses and bacteria that enter the body through the mouth or intestinal system, primarily as a result of eating, drinking and digesting contaminated foods or liquids. Stomach pain, diarrhea, nausea and vomiting are the typical side effects of enteric diseases.

2. FOODBORNE DISEASES

Foodborne disease is an infection or irritation of the gastrointestinal (GI) tract caused by food or beverages that contain harmful bacteria, parasites, viruses, or chemicals. The majority of foodborne diseases are caused by bacteria, viruses, and parasites. Other foodborne diseases are essentially poisonings caused by toxins, chemicals contaminating the food. Common symptoms of foodborne illness include vomiting, diarrhea, abdominal pain, fever, and chills. Foodborne diseases can also cause dehydration, hemolytic uremic syndrome (HUS), and other complications. Acute foodborne illnesses

may also lead to chronic health problems or even death. Some of the important types of foodborne diseases are Botulism, Campylobacteriosis, E. coli, Hepatitis A, Norovirus Infection, Salmonellosis and Shigellosis.

3. WATERBORNE DISEASES

Water-borne diseases are those caused by drinking water contaminated by human or animal faeces, which contain pathogenic microorganisms. Waterborne diseases are caused by a variety of microorganisms, biotoxins, and toxic contaminants, which lead to devastating illnesses such as cholera, schistosomiasis and other gastrointestinal problems. Water-borne diseases like cholera, gastroenteritis, diarrhoea erupt every year during summer and rainy seasons in India due to poor quality drinking water supply and sanitation.

Waterborne illnesses can cause a variety of symptoms. While diarrhea and vomiting are the most commonly reported symptoms of waterborne illness, other symptoms can include skin, ear, respiratory, or eye problems.

4. BLOOD-BORNE DISEASES

Blood-borne diseases include those caused by blood-borne pathogens. A blood-borne disease can be spread through contamination by blood and other body fluids. The most common examples are HIV, hepatitis B, hepatitis C and viral hemorrhagic fevers. Exposure to bloodborne pathogens can occur through many mechanisms like needle sticks, being splashed with blood or body fluids on the mucous membranes (the mouth, eyes, and nose), even in some cases human bites.

5. SEXUALLY TRANSMITTED DISEASES

Sexually transmitted diseases (STDs) are caused by infections that are passed from one person to another during sexual contact. The

organisms that cause sexually transmitted diseases may pass from person to person in blood, semen, or vaginal and other bodily fluids. Most STDs initially do not cause symptoms. This results in a greater risk of passing the disease on to others. Symptoms and signs of disease may include vaginal discharge, penile discharge, ulcers on or around the genitals, and pelvic pain. STDs acquired before or during birth may result in poor outcomes for the baby. Some STIDs may cause problems with the ability to get pregnant.

Table-1: Mode of Transmission of some communicable diseases

(Source: www.dshs.state.tx.us/idcu/)

Method of Transmission			
Contact	**Respiratory Transmission**	**Fecal-Oral Transmission**	**Blood Transmission**
(touching infected person's skin, body fluid or a contaminated surface)	(passing from the lungs, throat, or nose of one person to another through the air)	(touching feces or objects contaminated with feces then touching the mouth)	(direct contact with blood)

Chickenpox* Cold sores Conjunctivitis Head Lice Impetigo Ringworm Scabies Influenza* Hepatitis B * Pertussis * Pneumonia	Chickenpox* Common Cold Diphtheria Fifth Disease Bacterial Meningitis* Hand-Foot-Mouth Disease Impetigo Measles* Mumps* Rubella * Influenza*	*Campylobacter*** *E. coli* 0157:H7** Enterovirus *Giardia* Hand-Foot-Mouth Disease Hepatitis A* Infectious Diarrhea Pinworms Polio * *Salmonella*** *Shigella* Cryptosporidiosis	Cytomegalovirus Hepatitis B* Hepatitis C HIV infection
* Vaccines are available for preventing these diseases			
** Often transmitted from infected animals through foods or direct contact			

COMMUNICABLE DISEASE CYCLE

Communicable diseases do not always develop in the same way in susceptible hosts. Some diseases produce more non-clinical cases that experience vague, non-specific symptoms or none at all (e.g., TB, cholera, polio) and thus spread the disease without being aware. Other diseases produce more clinical cases with easily detectable symptoms (e.g. measles). However, once exposed, people with as well as people without clinical or biological signs of infection are capable of spreading the disease to other susceptible persons. Such people are known as carriers. Fig1. below illustrates the cycle of communicable disease progression in susceptible hosts/persons. Understanding the unique pace of specific communicable diseases through the cycle helps to identify those individuals that are likely to transmit the disease as well as those at greatest risk of becoming ill or dying within the population.

Some diseases spread very rapidly (within a few hours), while other diseases spread insidiously, triggering a range of effects that might be felt on a wider scale. For example, cholera spreads rapidly and within a very short time, the whole community has been exposed. The opposite situation is that although less than 5% of a population might be infected with HIV, the effects will gradually spread from the individual and household levels to the community. Because People Living with HIV (PLHIV) infection progress from the asymptomatic phase to develop opportunistic infections, then AIDS and finally succumb to death, they might leave behind many other HIV infected family members and AIDS orphans. Analyzing each stage of a particular disease progression together with other sectors helps identify all possible points for disease control both more holistically and comprehensively.

WAYS TO MINIMIZE THE SPREAD OF COMMUNICABLE DISEASE

- Encourage children and adults to wash their hands frequently, especially before handling or preparing foods and after wiping noses, diapering, or using toilets. Sinks, soap, and disposable towels should be easy for children to use. The diapering area should be close to a hand washing area.
- Provide facial tissue throughout the facility and encourage both children and adults to cough or sneeze into the tissue.
- Regularly clean and sanitize all food service utensils, toys, and other items used by children. Discourage the use of stuffed toys or other toys that cannot be sanitized.
- Diapering and food preparation areas should be physically separated from one another and their surfaces should be kept clean, uncluttered, and dry.
- Discourage children and adults from sharing items such as combs, brushes, jackets, hats, and bedding. Maintain a separate container

to store clothing and other personal items and, if possible, provide a separate sleeping area for each child.

- ➢ Wash bedding frequently. Keep changes of clothing on hand and store soiled items in a non-absorbent container that can be sanitized or discarded after use.
- ➢ Keep in mind that having staff members diaper children and prepare food contributes to the spread of illness, especially diarrheal illnesses. Therefore, whenever possible, the same staff member should not perform both tasks.

CONTROL OF COMMUNICABLE DISEASES

Control of communicable diseases continues to be one of the highest public health priorities, both nationally and internationally. Emerging and re-emerging microbial threats and drug resistance pose an ever-increasing challenge to public health practitioners. Added to this are the high public expectations of protection from public health hazards and increasing media interest in public health safety.

The aim of disease control programmes (prevention and treatment) is to reduce excess morbidity and mortality by limiting the spread of diseases of epidemic potential. Proposed interventions will usually include adequate quantities of safe water, sanitation, nutritional services, reproductive health, food aid/food security, shelter and basic clinical care. In addition to considering the effectiveness, feasibility, cost, and speed of implementation of proposed intervention, it is important to consider how it will be integrated within the overall response as well as the culture and behaviour of target populations. Proposed interventions will usually include adequate quantities of safe water, sanitation, nutritional services, reproductive health, food aid/food security, shelter and basic clinical care. In addition to considering the effectiveness, feasibility, cost, and speed of implementation of proposed intervention, it is important to consider how

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Some communicable diseases are highly infectious and cause severe consequences to such an extent that they threaten human lives and affect the economy. If there are proper precautionary or control measures in place, the disaster posed by these communicable diseases can be averted. The evolution of outbreaks of communicable diseases and their management vary to a certain extent with different countries or regions, where the types of communicable diseases occurred and the living environment are different. To safeguard public health and safety, every country or region has legislation stipulating certain communicable diseases as statutory notifiable diseases which warrant special precautions, and policies are developed to prevent outbreaks and to contain their spread.

There are a number of factors crucial to the spread of communicable diseases. They include the infective agent, the source of infection, the mode of transmission and the host - the so-called chain of infection. Hence, the control of the spread of communicable diseases should focus on controlling these four factors so as to break the chain.

- Infective agent - Disinfection to kill the infective agents
- Source of infection - Early detection, isolation and treatment of patients and removal of breeding sites
- Mode of transmission - Maintain good environmental, personal and food hygiene; adopt infection control measures appropriate to the diff rent modes of transmission
- Host (susceptible population) - Build up personal immunity by immunization and healthy lifestyles

Preferably one can prevent communicable disease outbreaks by engaging the communities and ensuring early detection and alert. Implementing disease control measures is quite straightforward provided one knows the starting point, the arrival point and how to get there.

Without an effective monitoring of engaged communities and evaluation systems, measuring and reporting one's progress and the final result might be difficult. In addition, further research on the effectiveness of proposed interventions and the testing of new preventive or treatment measures will enhance national policies and guidelines as well as the reallocation of resources among various stakeholders.

Table-2: Minimum standards for communicable disease prevention and control

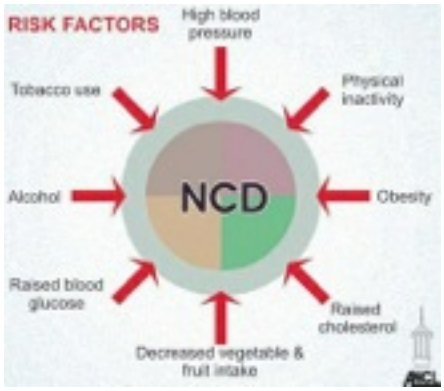
Intervention	Minimum Standards	Target Diseases
Shelter and site planning	Existing shelter and settlement solutions are prioritised.	Diarrhoea,TB, HIV,meningitis,
Water supply	All people have safe and equitable access to water for drinking, cooking and personal and domestic hygiene.	Diarrhoea, typhoid, scabies
Sanitation and hygiene	People have adequate numbers of toilets, sufficiently close to their dwellings to allow them rapid, safe and acceptable access at all times of the day and night; Each disaster-affected household has access to sufficient soap and other items to ensure personal hygiene.	Diarrhoea, Polio
Food safety	People have access to adequate and appropriate food and non-food items; Food is stored, prepared and consumed in an appropriate manner at both the household and community levels; Moderate and severe malnutrition is addressed.	Malnutrition increases risk of disease
Health education	People have access to information and services that are designed to prevent the communicable diseases that contribute most significantly to excess morbidity and mortality.	Diarrhoea, STDs, TB, HIV

Health services	All people have access to health services to reduce mortality and morbidity; People have access to clinical services that are standardised; All children aged 6 months to 15 years have immunity against measles.	All diseases
Vector control	All disaster affected people have the knowledge and means to protect from diseases that are likely to represent a significant risk to health and well-being; Number of disease vectors that pose a risk to people's health and nuisance vectors that pose a risk to people's wellbeing are kept to an acceptable level.	Malaria, trypanosomiasis, leishmaniasis, dengue, yellow fever,typhus, chikungunya, Japanese encephalitis
Control of Environment	People have an environment that is uncontaminated by solid waste, including medical waste, and have the means to dispose their domestic waste conveniently; People have an environment where water erosion and standing water including storm water, floodwater, domestic waste water and wastewater from medical facilities are minimised.	Malaria, dengue, yellow fever
Epidemic preparedness and response	Measures are taken to prepare for and respond to outbreaks of infectious diseases; Outbreaks of communicable diseases are detected,investigated and controlled in a timely and effective manner.	All diseases

NON-COMMUNICABLE DISEASES

Non-communicable diseases (NCDs) are those diseases which cannot be transmitted from one person to another. NCDs can refer to chronic diseases which last for long periods of time and progress slowly. It is a major contributor to the burden of disease in developed countries, and are increasing rapidly in developing countries. This is mainly due to demographic transitions and changing lifestyles of populations associated

with urbanisation. Chronic non-communicable diseases are largely due to preventable and modifiable risk factors such as, high blood cholesterol, high blood pressure, obesity, physical inactivity, unhealthy diet, tobacco use and inappropriate use of alcohol. These factors result in various long-term disease processes, culminating in high mortality rates attributable to stroke, heart attack, tobacco and nutrition induced cancers, obstructive lung diseases and many others.



Non-communicable diseases (NCDs) are currently responsible for over 60% of global deaths. This burden is one of the major public health challenges facing all countries, regardless of their economic status. NCDs threaten economic and social development and, without concerted efforts at country level, are predicted to increase in the coming decade.

According to Mckenna et al (1998), NCD is a disease that has a prolonged course, that does not resolve spontaneously, and for which a complete cure is rarely achieved. It consists of chronic conditions that do not result from an (acute) infectious process and hence are "not communicable."

NCDs are characterized by complex etiology (causes), multiple risk factors, long latency period, non-contagious origin (non-communicable), prolonged course of illness and functional impairment or disability.

TYPES OF NON-COMMUNICABLE DISEASES

Non-communicable diseases are classified into the following seven categories:

1. Cardiovascular disease
2. Cancer
3. Chronic respiratory disease

4. Diabetes
5. Chronic neurologic disorders
6. Musculoskeletal diseases
7. Unintentional injuries

1.CARDIOVASCULAR DISEASE

Cardiovascular disease (CVD) is a group of disorders of the heart and blood vessels, and may include:

Coronary heart disease	Disease of the blood vessels supplying the heart muscle
Cerebrovascular disease (Stroke)	Disease of the blood vessels supplying the brain
Peripheral arterial disease	Disease of blood vessels supplying the arms and legs
Congenital heart disease	Malformations of heart structure existing at birth

Cardiovascular disease is the number one cause of death globally.

2. CANCER

Cancer is a generic term for a large group of diseases that can affect any part of the body.

"Cancer is a rapid creation of abnormal cells that grow beyond their usual boundaries, and which can then invade adjoining parts of the body and spread to other organs" (WHO, 2012). There are different types of cancer occurring in various parts of the body – cervical cancer, lung cancer, breast cancer, prostrate cancer, colorectal cancer, mouth cancer, stomach cancer, blood cancer etc.

3. CHRONIC RESPIRATORY DISEASE

Chronic respiratory diseases are chronic diseases of the airways and other structures of the lung. Chronic respiratory disease is a leading cause of death in many countries. It is caused due to many risk factors – cigarette smoking, occupational dust and chemicals, environmental tobacco smoke (ETS), indoor and outer air pollution. It includes chronic obstructive pulmonary disease like bronchitis and emphysema; asthma; occupational lung diseases and pulmonary hypertension.

4. DIABETES

Diabetes is a metabolic disease in which the person has high blood glucose (blood sugar), either because insulin production is inadequate, or because the body's cells do not respond properly to insulin, or both. Patients with high blood sugar will typically experience polyuria (frequent urination), they will become increasingly thirsty (polydipsia) and hungry (polyphagia).

There are 4 types of diabetes: Type 1, Type 2, Gestational, and Pre-Diabetes (Impaired Glucose Tolerance). In Type 1 diabetes the body does not produce insulin while in Type 2 diabetes the body does not produce enough insulin for proper function. Type 2 is caused by modifiable risk factors and is the most common worldwide. Greater than 90% of all adult diabetes cases are Type 2. Healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use can prevent or delay the onset of Type 2 diabetes.

The most common diabetes symptoms include frequent urination, intense thirst and hunger, weight gain, unusual weight loss, fatigue, cuts and bruises that do not heal, male sexual dysfunction, numbness and tingling in hands and feet.

5. CHRONIC NEUROLOGIC DISORDERS

Chronic neurological disorder is any disorder of the body nervous system. The specific causes of neurological problems vary, but can include genetic disorders, congenital abnormalities or disorders, infections, lifestyle or environmental health problems including malnutrition and brain injury, spinal cord injury or nerve injury. Chronic neurological diseases include Parkinson's disease, other movement disorders including dystonia, ALS (Amyotrophic lateral sclerosis) and Huntington's disease, Alzheimer's disease, neuromuscular disease, multiple sclerosis, epilepsy, dementias etc. Symptoms mainly include paralysis, muscle weakness, poor coordination, loss of sensation, seizures, confusion, pain and altered levels of consciousness.

6. MUSCULOSKELETAL DISEASES

Musculoskeletal disorders (MSDs) are injuries or pain in the body's joints, ligaments, muscles, nerves, tendons, and structures that support limbs, neck and back. Muscle tissue can be damaged with the wear and tear of daily activities. Trauma to an area (jerking movements, auto accidents, falls, fractures, sprains, dislocations, and direct blows to the muscle) also can cause musculoskeletal pain. Other causes of pain include postural strain, repetitive movements, overuse, and prolonged immobilization. Changes in posture or poor body mechanics may bring about spinal alignment problems and muscle shortening, therefore causing other muscles to be misused and become painful.

Symptoms of MSD vary from person to person, but the common symptoms are pain, fatigue and sleep disturbances. Common MSDs are arthritis, o**steoporosis, osteomalacia,** t**endonitis, bursitis, muscular dystrophy etc.**

7. UNINTENTIONAL INJURIES

Unintentional injuries refer to injuries that were unplanned. Unintentional injuries include only those injuries that occur without intent of harm. Such injuries are frequently called accidents. Unintentional injuries can occur in any age group, but children and the elderly are more vulnerable. Disability can result from many types of accidents, including motor vehicle accidents, drug overdoses, falls, or fires. The chance of recovery depends on the type and severity of the injury.

CONTROL OF NON-COMMUNICABLE DISEASES

NCDs can be controlled by reducing the behavioural risk factor thereby reducing the probability of the disease. WHO has prioritized four different risk factors:

- Physical inactivity – Most of the world's population does not get enough physical activity due to various social and economic changes. Global changes in physical activity contributes to 6% coronary heart disease, 7% type 2 diabetes, 10% breast cancer, 10%colon cancer and 9% premature mortality.
- Tobacco use - Tobacco kills upto half of its users. Tobacco use causes serious health effects.
- Alcohol use – 11.5% of all global drinkers are episodic, heavy users. 2.5 million people die from alcohol consumption per year. The majority of adults consume at low-risk levels.
- Unhealthy diets (increased fat and sodium, with low fruit and vegetable intake) - Overall daily consumption of unhealthy diets like fats, meats and nutrient poor foods have increased in most countries leading to serious health effects.

CONCLUSION

Communicable diseases are a major cause of mortality and morbidity. A systematic approach to the control of communicable diseases is a key component to protect the health of affected populations. Control of communicable diseases should focus on controlling the four factors viz. the infective agent, the source of infection, the mode of transmission and the host. It will also include adequate quantities of safe water, sanitation, nutritional services, reproductive health, food security, shelter and basic clinical care.

Non-communicable diseases can be controlled by reducing the behavioural risk factor thereby reducing the probability of the disease. Overall daily consumption of unhealthy diets like fats, meats and nutrient poor foods should be avoided.