جامعة الفرات الاوسط التقنية
كلية التقنيات الصحية والطبية \ كوفة
قسم صحة المجتمع
المرحلة الرابعة

اسم المادة	باللغة العربية	السيطرة على الامراض الانتقالية	السنة الدراسية الرابعة	عدد الساعات الدراسيه			
	باللغة الانكليزية	Control of communicable disease		نظري	عملي	مجموع	عدد الوحدات
لغة التدريس للماده : اللغه الانكليزيه				٢	٤	٦	٤

أهداف المادة:
الهدف العام :يتعرف الطالب على أهم الأمراض الانتقالية وطرق السيطرة عليها .

الهدف الخاص :يكون قادرا على خوض مجالات انتشار الأمراض الانتقالية وطرق انتقالها – طرق السيطرة عليها – قياس نسبة انتشارا لمرض

المفردات النظرية	المفردات العملية
تفاصيل المفردات	تفاصيل المفردات
STD (Syphilis and Gonorrhea)	Concept of prevention in general
Diarrheal diseases	to see Visit to CDC Prevention of leishmaniasis in Iraq
Diarrhea caused by E. coli Acute viral Rota viral enteritis	Prevention of malaria in Iraq
Food borne diseases: Cholera Typhoid fever & salmonellosis	Prevention of bilharziasis in Iraq
Epidemic viral Gastroenteritis	Prevention of toxoplasmosis in Iraq
Campylobacter enteritis	Prevention of hemorrhagic in Iraq
Candiasis	Visit to T.B. institute to see the policy of DOTS program
Yellow fever	
Leishmaniasis Malaria	Surveillance of diseases
Toxoplasmosis	
Pediculosis Scabies	Investigation of an epidemic
Teaniasis	
Bilharziasis	Outbreak investigation
Hydatid diseases	
Review of important topics	Review

Conceptes of Prevention

"Prevention is better then cure"

The goals of medicine are to promote health, to preserve health, to restore health when it is impaired, and to minimize suffering and distress. These goals are embodied in the word "prevention"

Prevention; Definition and Concept:-

Actions aimed at eradicating, eliminating or minimizing the impact of disease and disability, or if none of these are feasible, retarding the progress of the disease and disability.

In modern day, the concept of prevention has become broad-based. It has become customary to define prevention in terms of four levels:

- Primordial prevention
- Primary prevention
- Secondary prevention
- Tertiary prevention

Determinants of Prevention:-

Successful prevention depends upon:

- a knowledge of causation.
- dynamics of transmission.
- identification of risk factors and risk groups
- availability of prophylactic or early detection and treatment measures.
- an organization for applying these measures to appropriate persons or groups, and
- continuous evaluation of and development of procedures applied

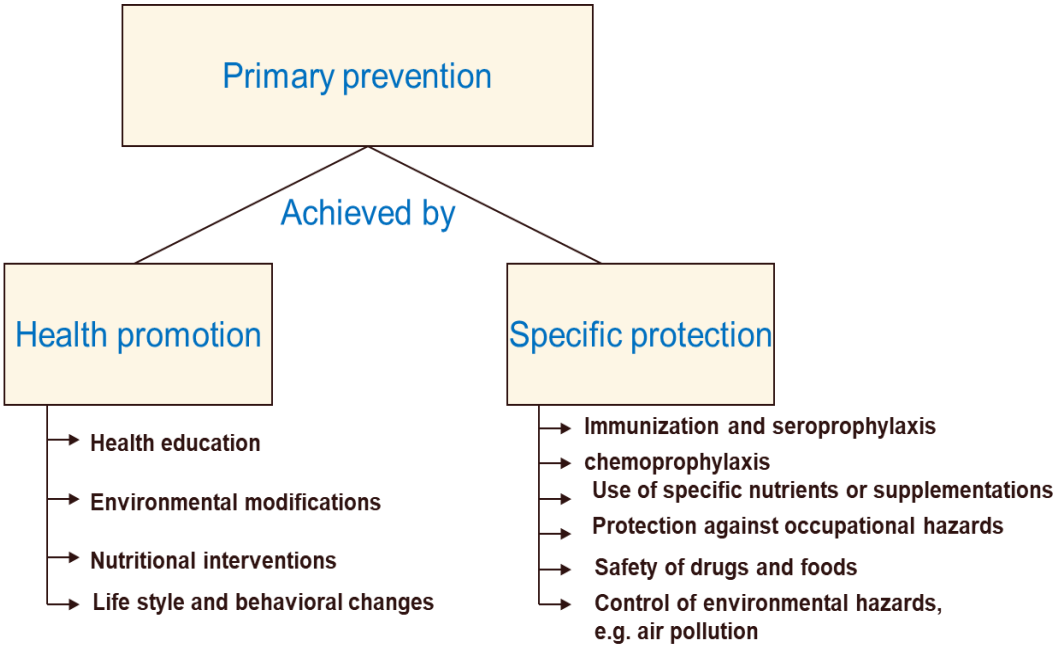
Primordial prevention:-

- Primordial prevention consists of actions and measures that inhibit the emergence of risk factors in the form of environmental, economic, social, and behavioral conditions and cultural patterns of living etc.
- It is the prevention of the emergence or development of risk factors in countries or population groups in which they have not yet appeared
- For example, many adult health problems (e.g., obesity, hypertension) have their early origins in childhood, because this is the time when lifestyles are formed (for example, smoking, eating patterns, physical exercise).
- In primordial prevention, efforts are directed towards discouraging children from adopting harmful lifestyles
- The main intervention in primordial prevention is through individual and mass education

Primary prevention:-

- Primary prevention can be defined as the action taken prior to the onset of disease, which removes the possibility that the disease will ever occur.
- It signifies intervention in the pre-pathogenesis phase of a disease or health problem.
- Primary prevention may be accomplished by measures of "Health promotion" and "specific protection"
- It includes the concept of "positive health", a concept that encourages achievement and maintenance of "an acceptable level of health that will enable every individual to lead a socially and economically productive life".

• Primary prevention may be accomplished by measures designed to promote general health and well-being, and quality of life of people or by specific protective measures



Approaches for Primary Prevention:-

The WHO has recommended the following approaches for the primary prevention of chronic diseases where the risk factors are established:

a. Population (mass) strategy

• Directed at the whole population irrespective of individual risk levels.

• For example, studies have shown that even a small reduction in the average blood pressure or serum cholesterol of a population would produce a large reduction in the incidence of cardiovascular disease

• The population approach is directed towards socio-economic, behavioral and lifestyle changes

b. High -risk strategy

- Aims to bring preventive care to individuals at special risk.
- This requires detection of individuals at high risk by the optimum use of clinical methods.

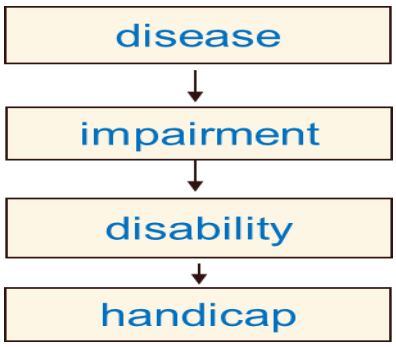
Secondary prevention:-

- It is defined as " action which halts the progress of a disease at its incipient stage and prevents complications."
- The specific interventions are: early diagnosis (e.g. screening tests, and case finding programs….) and adequate treatment.
- Secondary prevention attempts to arrest the disease process, restore health by seeking out unrecognized disease and treating it before irreversible pathological changes take place, and reverse communicability of infectious diseases.
- It thus protects others from in the community from acquiring the infection and thus provide at once secondary prevention for the infected ones and primary prevention for their potential contacts.

Tertiary prevention:-

- It is used when the disease process has advanced beyond its early stages.
- It is defined as "all the measures available to reduce or limit impairments and disabilities, and to promote the patients' adjustment to irremediable conditions."
- Intervention that should be accomplished in the stage of tertiary prevention are disability limitation, and rehabilitation.

Disability limitation:-

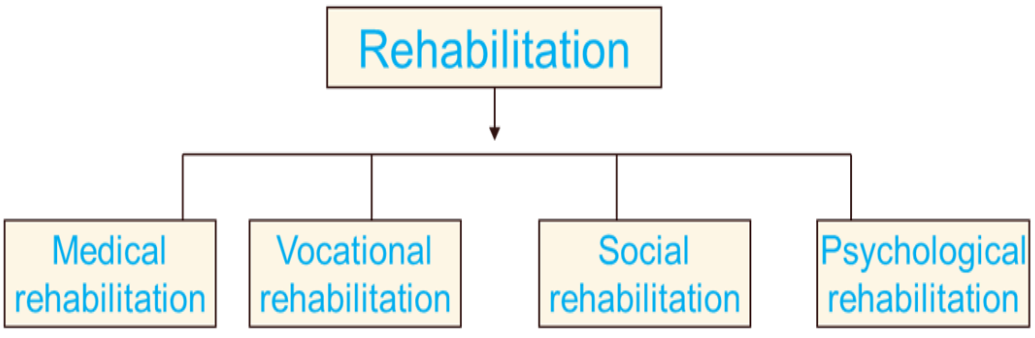


Impairment: is "any loss or abnormality of psychological, physiological or anatomical structure or function."

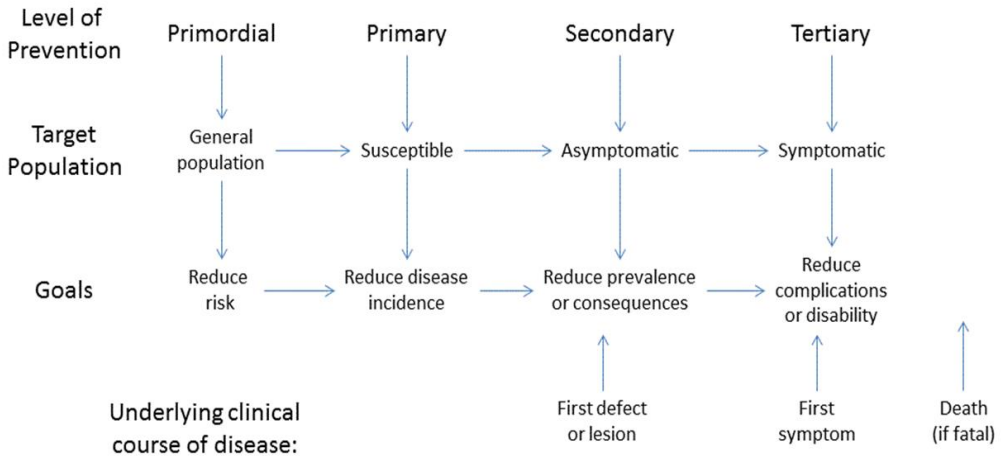
Disability: is "any restriction or lack of ability to perform an activity in the manner or within the range considered normal for the human being."

Handicap: is termed as "a disadvantage for a given individual, resulting from an impairment or disability, that limits or prevents the fulfillment of a role in the community that is normal (depending on age, sex, and social and cultural factors) for that individual."

Rehabilitation: is " the combined and coordinated use of medical, social, educational, and vocational measures for training and retraining the individual to the highest possible level of functional ability."



A Classification of Preventive Strategies



Control:-

• Concept of control: The term disease control describes ongoing operations aimed at reducing:

• The incidence of disease

• The duration of disease and consequently the risk of transmission

• The effects of infection, including both the physical and psychosocial complications

• The financial burden to the community.

Control activities focus on primary prevention or secondary prevention, but most programs combine both.

control → elimination → eradication

Disease Elimination:-

• Between control and eradication, an intermediate goal has been described, called "regional elimination"

- The term "elimination" is used to describe interruption of transmission of disease, as for example, elimination of measles, polio and diphtheria from large geographic regions or areas
- Regional elimination is now seen as an important precursor of eradication

Disease Eradication:-

- Eradication literally means to "tear out by roots".
- It is the process of "Termination of all transmission of infection by extermination of the infectious agent through surveillance and containment".
- Eradication is an absolute process, an "all or none" phenomenon, restricted to termination of an infection from the whole world. It implies that disease will no longer occur in a population.

- To-date, only one disease has been eradicated, that is smallpox.

Surveillance:-

Surveillance means to watch over with great attention, authority and often with suspicion

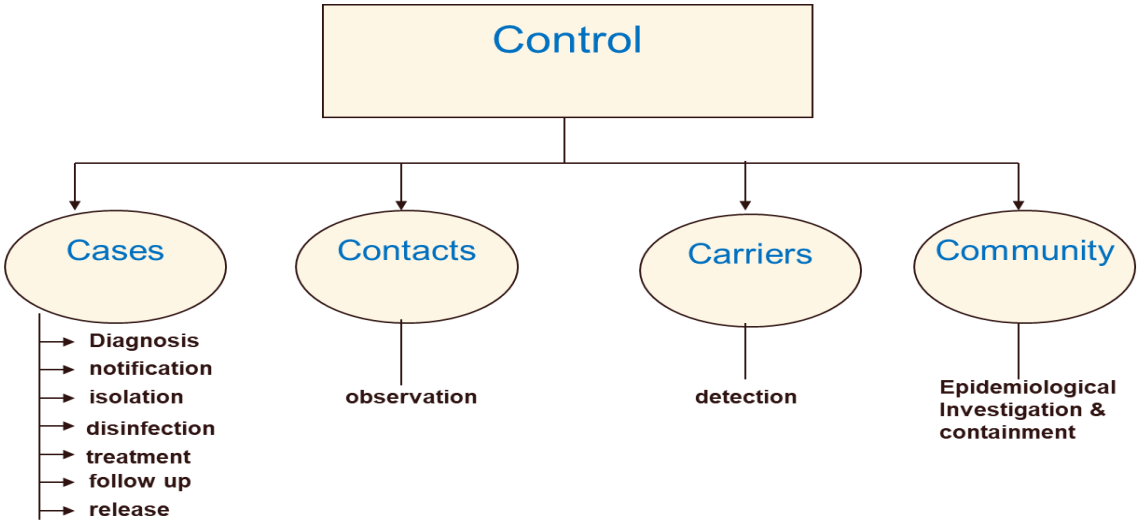
According to another, surveillance is defined as "the continuous scrutiny (inspection) of the factors that determine the occurrence and distribution of disease and other conditions of ill-health"

The main objectives of surveillance are:

(a) to provide information about new and changing trends in the health status of a population, e.g., morbidity, mortality, nutritional status or other indicators and environmental hazards, health practices and other factors that may affect health

(b) to provide feed-back which may be expected to modify the policy and the system itself and lead to redefinition of objectives

(c) provide timely warning of public health disasters so that interventions can be mobilized



Evaluation of control:-

- Evaluation is the process by which results are compared with the intended objectives, or more simply the assessment of how well a program is performing.
- Evaluation should always be considered during the planning and implementation stages of a program or activity.
- Evaluation may be crucial in identifying the health benefits derived (impact on morbidity, mortality, sequelae, patient satisfaction).
- Evaluation can be useful in identifying performance difficulties.
- Evaluation studies may also be carried out to generate information for other purposes, e.g., to attract attention to a problem, extension of control activities, training and patient management, etc.

Prevention of Leishmaniasis in Iraq

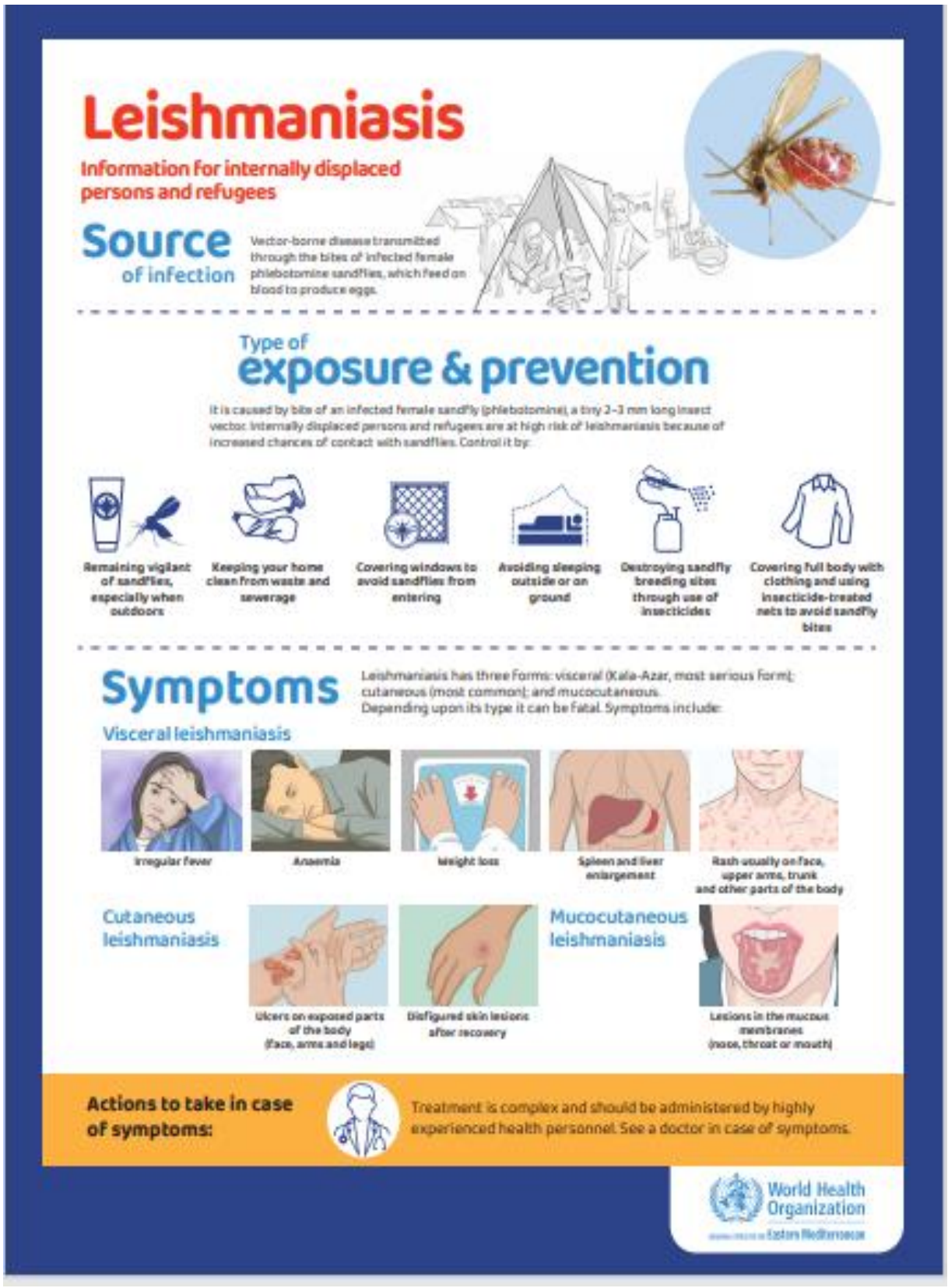
Leishmaniasis: is an infection spread by sandfly bites. There are three different forms of infection of varying severity.

Leishmaniasis is a parasitic infection transmitted by the bites of sandflies. Sandflies are tiny 2-3 mm flies that mainly bite outdoors in the evening/overnight. The disease is found in Central and South America, Southern Europe, Africa, the Middle East and Asia and is linked to poverty.

The Illness:

Symptoms start weeks to months after an infected sandfly bite and progress slowly. There are 3 main forms of infection:

1- **Cutaneous Leishmaniasis:** A painless red spot develops at site of bite and gradually progresses over weeks to months to an ulcer. More than one ulcer may be present, and they can heal without treatment, but often scar.
2- **Mucocutaneous Leishmaniasis:** Infection occurs in the lining of the nose, mouth, or throat and can lead to destruction of the nasal septum, palate, mouth or throat causing severe disfigurement and breathing problems.
3- **Visceral Leishmaniasis (also known as Kala-azar):** The infection spreads to the liver, spleen and bone marrow causing fever, loss of appetite, weight loss and abdominal pain. This form is often fatal if untreated.



Recommendations for Travellers:

There is no vaccine against human leishmaniasis.

Travellers to rural and/or forested/jungle areas of regions where the infection is present will be most at risk.

Travellers should be advised to avoid Sandfly bites by:

- Avoiding outdoor activities after dusk where possible.
- Covering skin with clothing where possible.
    - Consider permethrin impregnation of clothing when outdoor activity is unavoidable.
- Using insect repellent e.g. DEET on exposed skin.
- Sleeping under insecticide-impregnated bednets (fine mesh size is required) or in air-conditioned rooms.
- Using fans/ventilators which disrupt the movement of sandflies and sleeping elevated from the floor; sandflies are weak fliers.

Treatment:

Leishmaniasis can be cured with treatment. Treatment is variable and can be complex. It is influenced by the type of infection, and ranges from allowing self healing to the use of tablets and intravenous drug regimes. Treatment is undertaken in an Infectious Disease/Tropical Medicine unit.

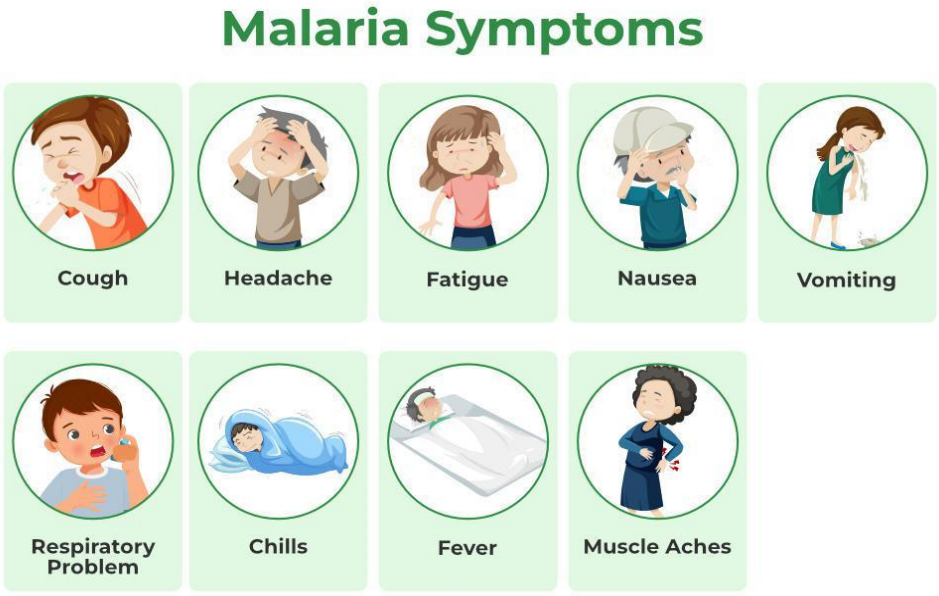
Prevention:

Leishmaniasis could be prevented by reducing human contact with infected phlebotomine sandflies (the vector), or by reducing the number of infected animals (the reservoir).

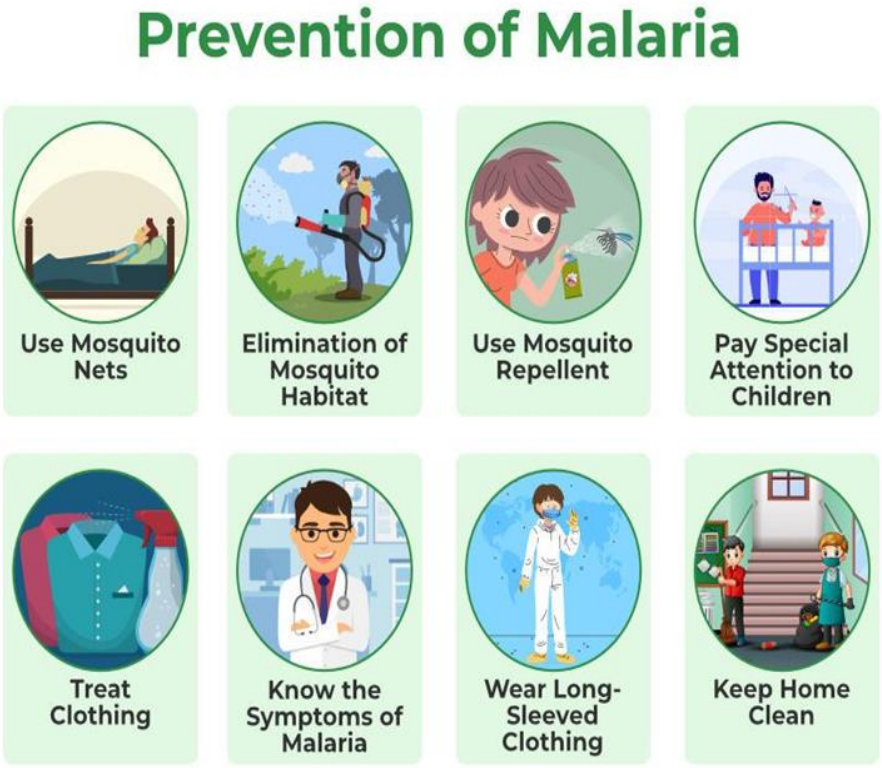
Prevention of Malaria in Iraq

Malaria is an infectious disease caused by an infected mosquito with a parasite, a bite of an infected mosquito, that harms both humans and animals. Malaria can become fatal, sometimes in hot areas like Africa.

When infected mosquito bites, parasites invade the bloodstream of animals. Malaria is a parasitic disease not caused by bacteria or viruses. If proper treatment is not provided, then serious help problems can be evolved. Like seizures, brain damage, organ failure, and in some cases death of the person.



Malaria is not common in the U.S. There is no vaccine for malaria currently available in the U.S. There are simple steps you can take to prevent malaria.



- The best way to prevent malaria is to prevent mosquito bites.
- And if you are traveling to an area where malaria is widespread, take medications to prevent malaria.

Steps you can take

To prevent mosquito bites

- Use Environmental Protection Agency (EPA)-registered insect repellents with one of the active ingredients below:
  - DEET (Insect repellents that contain DEET offer the best protection against mosquito bites.)
  - Picaridin (known as KBR 3023 and icaridin outside the US)

- IR3535
- Oil of lemon eucalyptus (OLE)
- Para-menthane-diol (PMD)
- 2-undecanon

- Wear loose-fitting, long-sleeved shirts and pants.
- Use 0.5% permethrin to treat clothing and gear (such as boots, pants, socks, and tents) or buy permethrin-treated clothing and gear.
  - Do not use permethrin products directly on skin.
- Keep windows and doors closed or covered with screens to keep mosquitoes out of your house.
- Repair broken screening on windows, doors, porches, and patios.
- Empty standing water at least once a week to prevent mosquitos from laying eggs.

Prevention of Bilharziasis in Iraq

Schistosomiasis, also known as bilharzia, is an infection caused by a parasitic worm that lives in fresh water in subtropical and tropical regions.

The worms that cause schistosomiasis live in fresh water, such as:Ponds,lakes, rivers, reservoirs and canals.

You can become infected if you come into contact with contaminated water – for example, when paddling, swimming or washing – and the tiny worms burrow into your skin.

Once in your body, the worms move through your blood to areas such as the liver and bowel.

After a few weeks, the worms start to lay eggs. Some eggs remain inside the body and are attacked by the immune system, while some are passed out in the person's pee or poo.

Symptoms of schistosomiasis:

- a high temperature (fever)
- an itchy, red, blotchy and raised rash
- a cough
- diarrhoea
- muscle and joint pain

- tummy pain
- a general sense of feeling unwell

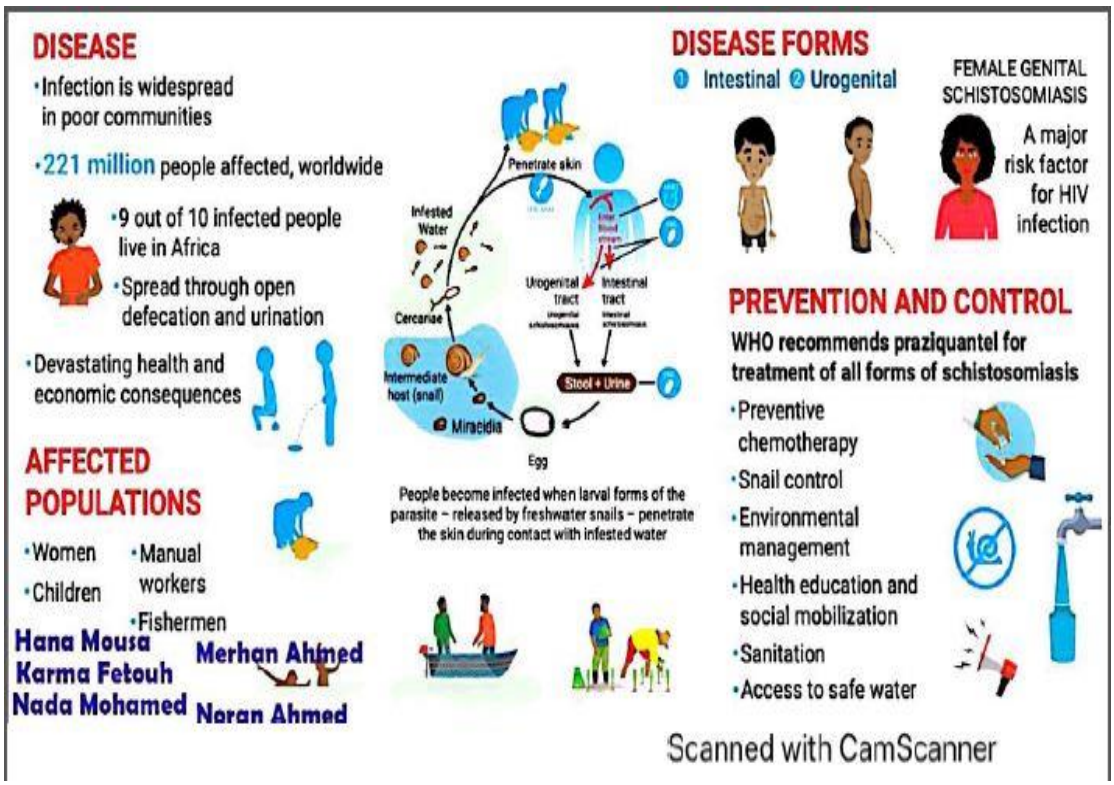
This is known as chronic schistosomiasis.

Treatments:

Schistosomiasis can usually be treated successfully with a short course of a medication called praziquantel, which kills the worms.Praziquantel is most effective once the worms have grown a bit, so treatment may need to be repeated a few weeks after your first dose.Steroid medication can also be used to help relieve the symptoms of acute schistosomiasis, or symptoms caused by damage to the brain or nervous system.

Prevention:

There's no vaccine for schistosomiasis, so it's important to be aware of the risks and take precautions to avoid exposure to contaminated water.


DISEASE
•Infection is widespread in poor communities
•221 million people affected, worldwide
•9 out of 10 infected people live in Africa
•Spread through open defecation and urination
•Devastating health and economic consequences
AFFECTED POPULATIONS
•Women
•Children
•Manual workers
•Fishermen
Hana Mousa
Karma Fetouh
Nada Mohamed
Merhan Ahmed
Noran Ahmed
Penetrate skin
Infested Water
Cercariae
Urogenital tract
Intestinal tract
Intermediate host (snail)
Miracidia
Stool + Urine
Egg
People become infected when larval forms of the parasite – released by freshwater snails – penetrate the skin during contact with infested water
DISEASE FORMS
1 Intestinal 2 Urogenital
FEMALE GENITAL SCHISTOSOMIASIS
A major risk factor for HIV infection
PREVENTION AND CONTROL
WHO recommends praziquantel for treatment of all forms of schistosomiasis
•Preventive chemotherapy
•Snail control
•Environmental management
•Health education and social mobilization
•Sanitation
•Access to safe water
Scanned with CamScanner

Prevention of Toxoplasmosis in Iraq

Toxoplasmosis is a common condition that occurs worldwide in most birds and warm-blooded mammals, including humans. In most cases, toxoplasmosis does not have any symptoms. This is because a healthy immune system is usually able to defend the body from the parasite and prevent it from causing illness.

Toxoplasmosis is caused by infection with ***Toxoplasma gondii*** (T. gondii), which is one of the world's most common parasites. T. gondii can be found in:

- Undercooked or raw meat,
- Raw cured meat, such as parma ham or salami,
- Unpasteurised goat's milk,
- Cat faeces, and
- Soil or cat litter that is contaminated with infected cat faeces.

Toxoplasmosis cannot be passed on through person-to-person contact, but it can be passed from a pregnant woman to her unborn baby. This is only possible if a women catches the infection either:

- During pregnancy, or
- Up to three months before she conceives.

Reduce Risk from Food:

To prevent risk of toxoplasmosis and other infections from food:Cook food to safe temperatures. A food thermometer should be used to measure the internal temperature of cooked meat. Color is not a reliable indicator

that meat has been cooked to a temperature high enough to kill harmful pathogens like *Toxoplasma*. Do not sample meat until it is cooked. USDA recommends the following for meat preparation.

To reduce risk of toxoplasmosis from the environment:

- Avoid drinking untreated water.
- Wear gloves when gardening and during any contact with soil or sand because it might be contaminated with cat feces that contain *Toxoplasma*. Wash hands with soap and water after gardening or contact with soil or sand.
- Teach children the importance of washing hands to prevent infection.
- Keep outdoor sandboxes covered.

- Feed cats only canned or dried commercial food or well-cooked table food, not raw or undercooked meats.
- Ensure that the cat litter box is changed daily. The *Toxoplasma* parasite does not become infectious until 1 to 5 days after it is shed in a cat's feces.
- If you are pregnant or immunocompromised:
    1. Avoid changing cat litter if possible. If no one else can perform the task, wear disposable gloves and wash your hands with soap and water afterwards.
    2. Keep cats indoors to prevent them from hunting and reduce the chances they will become infected with *Toxoplasma*.

3. Do not adopt or handle stray cats, especially kittens. Do not get a new cat while you are pregnant or immunocompromised.

Sexually Transmitted Diseases I

(Syphilis)

Sexually transmitted diseases (STDs), also known as sexually transmitted infections (STIs), are very common. Millions of new infections occur every year in the United States.

STDs pass from one person to another through sexual contact.

STDs don't always cause symptoms or may only cause mild symptoms. Therefore, it is possible to have an infection and not know it. That is why getting an STD test is important if you are having sex. If you receive a positive STD diagnosis, know that all are treatable with medicine and some are curable entirely.

There are dozens of STDs. Some STDs, such as syphilis, gonorrhea, and chlamydia, are spread mainly by sexual contact. Other diseases, including Zika, Ebola, and other viruses , can be spread sexually but are more often spread through ways other than sex.

STDs are preventable. If you have sex, know how to protect yourself and your sex partner(s) from STDs.

Syphilis

Syphilis is a chronic, infectious, sexually transmitted infection (STI) that begins in the mucous membranes and quickly becomes systemic, spreading to nearby lymph nodes and the bloodstream. Untreated syphilis progresses in four stages: primary, secondary, latent, and late (formerly

called tertiary). The incidence of syphilis in the United States is highest in people between ages 15 and 39, in drug users, and in those infected with human immunodeficiency virus (HIV).

Untreated syphilis can lead to crippling or death. With early treatment, however, the prognosis is excellent. The incubation period varies but typically lasts about 3 weeks.

Causes:-

The spirochete *Treponema pallidum* causes syphilis. Transmission occurs primarily through sexual contact during the primary, secondary, and early latent stages of infection. Prenatal transmission is also possible.

Complications:-

Aortic regurgitation or aneurysm, meningitis, and widespread central nervous system damage can result from advanced syphilis.

Assessment finding:-

The typical patient history points to unprotected sexual contact with an infected person or with multiple or anonymous sexual partners.

A patient with primary syphilis may present with one or more chancres (small, fluid-filled lesions) on the genitalia, anus, fingers, lips, tongue, nipples, tonsils, or eyelids. In female patients, chancres may develop on the cervix or vaginal wall. These usually painless lesions start as papules and then erode. They have indurated, raised edges and clear bases and typically heal after 3 to 6 weeks, even when untreated. In the primary

stage, palpation may revealenlarged unilateral or bilateral regional lymph nodes (adenopathy). In secondary syphilis (beginning within a few days or up to 8 weeks after the initial chancres appear), the patient may complain of headache, nausea, vomiting, malaise, anorexia, weight loss, sore throat, and a slight fever. Inspection may reveal symmetrical mucocutaneous lesions.

The rash of secondary syphilis may appear macular, papular, pustular, or nodular. Lesions are uniform, well defined, and generalized. Macules typically erupt between rolls of fat on the trunk and proximally on the arms, palms, soles, face, and scalp. In warm, moist body areas the lesions enlarge and erode, producing highly contagious, pink or grayish white lesions (condylomata lata). Alopecia, which is usually temporary, may occur with or without treatment. The patient may also complain of brittle, pitted nails. Palpation may disclose generalized lymphadenopathy. In latent syphilis, physical signs and symptoms are absent except for the possible recurrence of mucocutaneous lesions that resemble those of secondary syphilis. In late syphilis, the patient's complaints vary with the involved organ. Late syphilis has three subtypes: neurosyphilis, late benign syphilis, and cardiovascular syphilis. If neurosyphilis affects meningovascular tissue, the patient may report headache, vertigo, insomnia, hemiplegia, seizures, and psychological difficulties. If it affects parenchymal tissue, the patient may report paresis, alteration in intellect, paranoia, illusions, and hallucinations

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. A patient with late benign syphilis may complain of gummas—lesions that develop between 1 and 10 years after infection. A single gumma may be a chronic, superficial nodule or a deep, granulomatouslesion that's solitary, asymmetrical, painless, indurated, and large or small. Visible on the skin and mucocutaneous tissue, gummas commonly affect bones and can develop in any organ. In cardiovascular syphilis, decreased cardiac output may cause decreased urine output and decreased sensorium related to hypoxia. Auscultation may reveal pulmonary congestion.

Diagnosis tests:-

- Dark-field microscopy identifies *T. pallidum* from lesion exudate and provides an immediate diagnosis.
- Nontreponemal serologic tests include the Venereal Disease Research Laboratory (VDRL) slide test, the rapid plasma reagin test, and the automated reagin test. These tests can detect nonspecific antibodies that become reactive within 1 to 2 weeks after the primary syphilis lesion appears or 4 to 5 weeks after the infection begins.
- Treponemal serologic studies include the fluorescent treponemal antibody absorption test, the T. pallidum hemagglutination assay, and the microhemagglutination assay. These tests detect the specific antitreponemal antibody and can confirm positive screening results.
- Cerebrospinal fluid examination identifies neurosyphilis when the total protein level is higher than 40 mg/dl, the VDRL slide test is reactive, and the white blood cell count exceeds 5 mononuclear cells

Treatment:-

In early syphilis, treatment may consist of a single injection of I.M. penicillin G benzathine. Syphilis lasting longer than 1 year may respond to additional doses of penicillin G benzathine I.M. Patients who are allergic to penicillin may be treated successfully with tetracycline or erythromycin. Tetracycline is contraindicated during pregnancy.

Nursing considrations:-

◗ Follow standard precautions when assessing the patient, collecting specimens, and treating lesions.

◗ Check for a history of drug sensitivity before administering the first dose of medication.

◗ Assess for complications of late syphilis if the patient's infection is older than 1 year. In late syphilis, provide symptomatic care during prolonged treatment.

Safety & Prevention:-

- Report all cases of syphilis to the appropriate health authorities.
- Teach the patient about the prescribed medication, including dosage, administration, and possible adverse effects.
- Urge the patient to inform his or her sexual partners about the infection and to encourage them to seek testing and treatment.
- Inform the patient that using condoms may provide protection against STIs.

Sexually Transmitted Diseases II

(Gonorrhea)

Gonorrhea is a common sexually transmitted infection that usually starts as an infection of the genitourinary tract, especially the urethra and cervix. It can also cause infection in the eyes (conjunctivitis), pharynx, and anorectal area; pharyngeal and anorectal infections are not uncommon in females and homosexual males. Left untreated, gonorrhea spreads through the blood to the joints, tendons, meninges, and endocardium; in females, it also can lead to chronic pelvic inflammatory disease (PID) and sterility. Gonorrhea is especially prevalent among young people and those who have multiple sexual partners. With adequate treatment, the prognosis is excellent, although re-infection is common.

Causes:

Gonorrhea is caused by the bacterial organism Neisseria gonorrhoeae (gonococcus), which is transmitted almost exclusively through sexual contact with an infected person. A child born to an infected mother can contract gonococcal ophthalmia neonatorum during passage through the birth canal. A patient with gonorrhea can contract gonococcal conjunctivitis by touching the eyes with a contaminated hand. Genitourinary gonorrhea in a child is considered an indicator of possible sexual abuse.

Complications:

Gonorrhea can lead to PID, acute epididymitis, proctitis, salpingitis, septic arthritis, dermatitis, and perihepatitis. Severe gonococcal conjunctivitis can lead to corneal ulceration and, possibly, blindness. Rare complications include meningitis, osteomyelitis, pneumonia, and acute respiratory distress syndrome.

Assessment findings:

The patient may report unprotected sexual contact (vaginal, oral, or anal) with an infected person, an unknown partner, ormultiple sex partners. He or she may also have a history of sexually transmitted infection. After a 3- to 6-day incubation period, male patients may complain of dysuria, although patients of both genders can remain asymptomatic.

Patients with rectal infection may be asymptomatic or may complain of anal pruritus, burning, and tenesmus and pain with defecation. Patients with pharyngeal infection may be asymptomatic or may complain of a sore throat. Some females may suffer uterine invasion, often around menstruation.

Assessment of a patient with gonorrhea reveals a low-grade fever. If the disease has become systemic, or if the patient has developed PID or acute epididymitis, the fever is higher. Other assessment findings vary with the infection site. Inspection of the male patient's urethral meatus reveals a purulent discharge; such discharge may be expressed from a female patient's urethra, and her meatus may appear red and edematous.

Inspection of the cervix with a speculum discloses a friable cervix and a greenish yellow discharge, the most common sign in females.

Vaginal inspection reveals engorgement, redness, swelling, and a profuse purulent discharge (The vagina is the most common infection site in girls over age 1.) If the patient has a rectal infection, inspection may reveal a purulent discharge or rectal bleeding. With an ocular infection, inspection may show a purulent discharge from the conjunctiva; with a pharyngeal infection, redness and a purulent discharge may be noted. Palpation of the patient with PID reveals tenderness over the lower quadrant, abdominal rigidity and distention, and adnexal tenderness (usually bilateral). In a patient with perihepatitis, palpation discloses right upper quadrant tenderness. If the infection has become systemic, papillary skin lesions—possibly pustular, hemorrhagic, or necrotic—may appear on the hands and feet.

Assessment of a patient with a systemic infection may also reveal pain and a cracking noise when moving an involved joint. Asymmetrical involvement of only a few joints— typically the knees, ankles, and elbows—may differentiate gonococcal arthritis from other forms of arthritis. Signs of gonococcal ophthalmia neonatorum include lid edema, bilateral conjunctival infection, and abundant purulent discharge 2 to 3 days after birth. Adult conjunctivitis, most common in males, causes unilateral conjunctival redness and swelling. Untreated gonococcal conjunctivitis can progress to corneal ulceration and blindness.

Diagnostic tests:

- A culture from the infection site (the urethra, cervix, rectum, or pharynx), grown on a Thayer-Martin medium, usually establishes the diagnosis. A culture of conjunctival scrapings confirms gonococcal conjunctivitis. In male patients, a Gram stain that shows gram-negative diplococci may confirm gonorrhea.
- Diagnosis of gonococcal arthritis requires identification of gram-negative diplococci on a smear from joint fluid or skin lesions.
- Complement fixation and immunofluorescent assays of serum reveal antibody titers four times the normal rate.

Treatment:

Ceftriaxone (Rocephin) by I.M. injection is recommended by the Centers for Disease Control and Prevention (CDC) for all types of gonorrhea; presumptive treatment of concurrent Chlamydia trachomatis infection is oral doxycycline (Doryx). Uncomplicated urogenital or rectal gonorrhea may be treated with a single oral dose of cefixime (Suprax). Gonorrhea may also be treated with a single dose of azithromycin (Zithromax), per CDC guidelines. Resistance to penicillin and tetracycline is common, and some resistance to quinolones and cephalosporins has been documented, which underscores the need for follow-up testing after treatment.

Treatment for gonococcal conjunctivitis requires a single dose of ceftriaxone I.M. and one lavage of the infected eye with normal saline solution. Routine instillation of 1% silver nitrate drops or erythromycin

ointment into the eyes of neonates has greatly reduced the incidence of gonococcal ophthalmia neonatorum.

Nursing considerations:

- Use standard precautions when obtaining specimens for laboratory examination and when caring for the patient.
- Carefully place all soiled articles in containers, and dispose of them according to facility policy.
- Use contact precautions for patients with an eye infection.
- Report all cases of gonorrhea to the local public health authorities. Report all cases of gonorrhea in children to child abuse authorities.
- Routinely instill prophylactic medications, according to facility protocol, in the eyes of all neonates on admission to the nursery.
- Report all cases of gonorrhea to the state health department or the CDC. Patient teaching.
- Urge the patient to inform all sexual partners about the infection so that they can seek treatment.
- Instruct the patient to take the antibiotics as prescribed, even if feeling better and symptoms have resolved.

Prevention:

To prevent re-infection, tell the patient to avoid sexual contact with anyone suspected of being infected, to use condoms during intercourse, and to wash genitalia with soap and water before and after intercourse.

Diarrhoeal disease

Diarrhoeal disease is the second leading cause of death in children under five years old, and is responsible for killing around 525 000 children every year. Diarrhoea can last several days, and can leave the body without the water and salts that are necessary for survival. In the past, for most people, severe dehydration and fluid loss were the main causes of diarrhoea deaths. Now, other causes such as septic bacterial infections are likely to account for an increasing proportion of all diarrhoea-associated deaths. Children who are malnourished or have impaired immunity as well as people living with HIV are most at risk of life-threatening diarrhoea.

Diarrhoea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). Frequent passing of formed stools is not diarrhoea, nor is the passing of loose, "pasty" stools by breastfed babies.

Diarrhoea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral and parasitic organisms. Infection is spread through contaminated food or drinking-water, or from person-to-person as a result of poor hygiene.

Interventions to prevent diarrhoea, including safe drinking-water, use of improved sanitation and hand washing with soap can reduce disease risk. Diarrhoea should be treated with oral rehydration solution (ORS), a solution of clean water, sugar and salt. In addition, a 10-14 day supplemental treatment course of dispersible 20 mg zinc tablets shortens diarrhoea duration and improves outcomes.

There are three clinical types of diarrhoea:

- acute watery diarrhoea – lasts several hours or days, and includes cholera;
- acute bloody diarrhoea – also called dysentery; and
- persistent diarrhoea – lasts 14 days or longer.

Scope of diarrhoeal disease:

Diarrhoeal disease is a leading cause of child mortality and morbidity in the world, and mostly results from contaminated food and water sources. Worldwide, 780 million individuals lack access to improved drinking-water and 2.5 billion lack improved sanitation. Diarrhoea due to infection is widespread throughout developing countries.

In low-income countries, children under three years old experience on average three episodes of diarrhoea every year. Each episode deprives the child of the nutrition necessary for growth. As a result, diarrhoea is a major cause of malnutrition, and malnourished children are more likely to fall ill from diarrhoea.

Dehydration:

The most severe threat posed by diarrhoea is dehydration. During a diarrhoeal episode, water and electrolytes (sodium, chloride, potassium and bicarbonate) are lost through liquid stools, vomit, sweat, urine and breathing. Dehydration occurs when these losses are not replaced.

The degree of dehydration is rated on a scale of three.

- Severe dehydration (at least two of the following signs):
  - lethargy/unconsciousness
  - sunken eyes
  - unable to drink or drink poorly
  - skin pinch goes back very slowly (≥2 seconds)
- Some dehydration (two or more of the following signs):
  - restlessness, irritability
  - sunken eyes
  - drinks eagerly, thirsty
- No dehydration (not enough signs to classify as some or severe dehydration).

Causes:

- **Infection:** Diarrhoea infections is caused by a host of bacterial, viral and parasitic organisms, most of which are spread by faeces-contaminated water. Infection is more common when there is a shortage of adequate sanitation and hygiene and safe water for drinking, cooking and cleaning. Rotavirus and *Escherichia coli*, are the two most common etiological agents of moderate-to-severe diarrhoea in low-income countries. Other pathogens such as *cryptosporidium* and *shigella* species may also be important. Location-specific etiologic patterns also need to be considered.
- **Malnutrition:** Children who die from diarrhoea often suffer from underlying malnutrition, which makes them more vulnerable to diarrhoea. Each diarrhoeal episode, in turn, makes their

malnutrition even worse. Diarrhoea is a leading cause of malnutrition in children under five years old.

- **Source:** Water contaminated with human faeces, for example, from sewage, septic tanks and latrines, is of particular concern. Animal faeces also contain microorganisms that can cause diarrhoea.
- **Other causes:** Diarrhoeal disease can also spread from person-to-person, aggravated by poor personal hygiene. Food is another major cause of diarrhoea when it is prepared or stored in unhygienic conditions. Unsafe domestic water storage and handling is also an important risk factor. Fish and seafood from polluted water may also contribute to the disease.

Prevention and treatment:

Key measures to prevent diarrhoea include:

- access to safe drinking-water;
- use of improved sanitation;
- hand washing with soap;
- exclusive breastfeeding for the first six months of life;
- good personal and food hygiene;
- health education about how infections spread; and
- rotavirus vaccination.

Key measures to treat diarrhoea include the following:

- Rehydration: with oral rehydration salts (ORS) solution. ORS is a mixture of clean water, salt and sugar. It costs a few cents per

treatment. ORS is absorbed in the small intestine and replaces the water and electrolytes lost in the faeces.

- Zinc supplements: zinc supplements reduce the duration of a diarrhoea episode by 25% and are associated with a 30% reduction in stool volume.
- Rehydration: with intravenous fluids in case of severe dehydration or shock.
- Nutrient-rich foods: the vicious circle of malnutrition and diarrhoea can be broken by continuing to give nutrient-rich foods – including breast milk – during an episode, and by giving a nutritious diet – including exclusive breastfeeding for the first six months of life – to children when they are well.
- Consulting a health professional, in particular for management of persistent diarrhoea or when there is blood in stool or if there are signs of dehydration.

Diarrheal Disease Caused by *Escherichia Coli*

Escherichia coli are gram-negative bacteria that inhabit the gastrointestinal tract. Most types do not cause illness, but 5 pathotypes are associated with diarrhea: enterotoxigenic *E. coli* (ETEC), Shiga toxin–producing *E. coli* (STEC), enteropathogenic *E. coli* (EPEC), enteroaggregative *E. coli* (EAEC), and enteroinvasive *E. coli* (EIEC). In addition, diffusely adherent *E. coli* (DAEC) might also be associated with diarrhea. Pathotypes that are common causes of urinary tract infections, bloodstream infections, and meningitis are not covered here.

E. coli serotypes are determined by surface antigens (O and H), and specific serotypes tend to cluster within specific pathotypes. Pathotype determination typically is based on testing for virulence genes. Some *E. coli* have virulence genes of >1 pathotype; for example, the O104:H4 strain that caused a 2011 outbreak in Germany produced Shiga toxin and had adherence properties typical of EAEC.

STEC also are called verotoxigenic *E. coli* (VTEC), and the term enterohemorrhagic *E. coli* (EHEC) commonly is used to specify STEC strains capable of causing human illness, especially bloody diarrhea and hemolytic uremic syndrome (HUS).

Transmission:

Diarrheagenic *E. coli* pathotypes can be passed in the feces of humans and other animals. Transmission occurs through the fecal–oral route, via consumption of contaminated food or water, and through person-to-person contact, contact with animals or their environment, and swimming

in untreated water. Humans constitute the main reservoir for non-STEC pathotypes that cause diarrhea in humans. The intestinal tracts of animals, especially cattle and other ruminants, are the primary reservoirs of STEC.

Epidemiology:

World Health Organization (WHO) Global Burden of Foodborne Diseases report estimated ≈111 million illnesses and ≈63,000 deaths caused by diarrheagenic *E. coli* globally each year. Rates of infection vary by region, and certain types of diarrheagenic *E. coli* infections, mainly ETEC, are associated with travel to low- and middle-income countries. The incidence of travel-associated diarrhea caused by *E. coli* is likely underestimated because many travelers do not seek medical care or have stool testing performed, particularly if diarrhea is non-bloody, as commonly occurs with ETEC infection. Moreover, many clinical laboratories do not use methods that can detect diarrheagenic *E. coli* other than STEC in stool samples.

STEC infections are most commonly reported in industrialized countries, and ≈85% of STEC infections among international travelers are caused by non-O157 serotypes.

Clinical Presentation:

Several different subtypes of Escherichia coli cause diarrhea. The epidemiology and clinical manifestations vary greatly depending on the subtype. When needed, organism-specific diagnosis can be made by polymerase chain reaction testing of stool. Treatment is typically supportive.

E. coli normally inhabit the gastrointestinal tract; however, some strains have acquired genes that enable them to cause intestinal infection. When ingested, the following strains can cause diarrhea:

- Enterohemorrhagic E. coli is the most clinically significant subtype in the United States. It produces Shiga toxin, which causes bloody diarrhea (hemorrhagic colitis). Thus, this subtype is sometimes termed Shiga toxin–producing E. coli (STEC). E. coli O157:H7 is the most common strain of this subtype in the United States. Undercooked ground beef, unpasteurized milk and juice, and contaminated water are possible sources. Person-to-person transmission is common in the day care setting. Outbreaks associated with exposure to water in recreational settings (eg, pools, lakes, water parks) have also been reported. Hemolytic-uremic syndrome is a serious complication that develops in 5 to 10% of STEC cases (and in 10 to 15% of O157:H7 cases), most commonly among the young and old.
- Enterotoxigenic E. coli produces two toxins (one similar to cholera toxin) that cause watery diarrhea. This subtype is the most common cause of traveler's diarrhea in people visiting low- and middle-income countries.
- Enteropathogenic E. coli causes watery diarrhea. Once a common cause of diarrhea outbreaks in nurseries, this subtype is now rare.
- Enteroinvasive E. coli causes bloody or nonbloody diarrhea, primarily in low- and middle-income countries. It is rare in the United States.

- Enteroaggregative E. coli causes diarrhea of lesser severity but longer duration than the other subtypes. As with some of the other subtypes, it is more common in low- and middle-income countries and can be a cause of traveler's diarrhea.

Diagnosis:

Diagnostic testing is not usually recommended for uncomplicated travelers' diarrhea unless treatment is indicated. Until recently, diarrheagenic *E. coli* other than STEC could not be distinguished from non-pathogenic *E. coli* in stool using routine tests in clinical laboratories. Commercial molecular tests have increasingly become available and can identify ETEC, EPEC, EAEC, and EIEC through detection of virulence genes..

Treatment

Maintenance of hydration and electrolyte balance with oral rehydration is important, especially in patients with vomiting or profuse diarrhea. Travelers with mild non-bloody diarrhea can use loperamide to decrease the frequency of loose stools. Travelers can use loperamide as an adjunctive therapy to antibiotics taken for moderate or severe travelers' diarrhea.

Azithromycin is preferred for bloody diarrhea or severe illness and is an option for moderate non-bloody diarrhea. Fluoroquinolones (e.g., ciprofloxacin) can be effective, but resistant strains are increasing in frequency, particularly in Asia; other agents are also preferred because fluoroquinolones have been associated with adverse effects.

If treatment with azithromycin or a fluoroquinolone does not improve the condition within 24 hours, travelers should continue the antibiotic for no longer than 3 days. A 3-day course of rifaximin is effective for some non-bloody diarrheal illnesses.

Antimicrobial-resistant *E. coli* are increasing worldwide. Carefully weigh the decision to use an antibiotic against the severity of illness; the possibility that the pathogen is resistant; and the risk for adverse reactions (e.g., HUS, rash, other manifestations of allergy), antibiotic-associated colitis, and vaginal yeast infection. Some studies suggest that loperamide combined with antibiotics can be used safely in many patients.

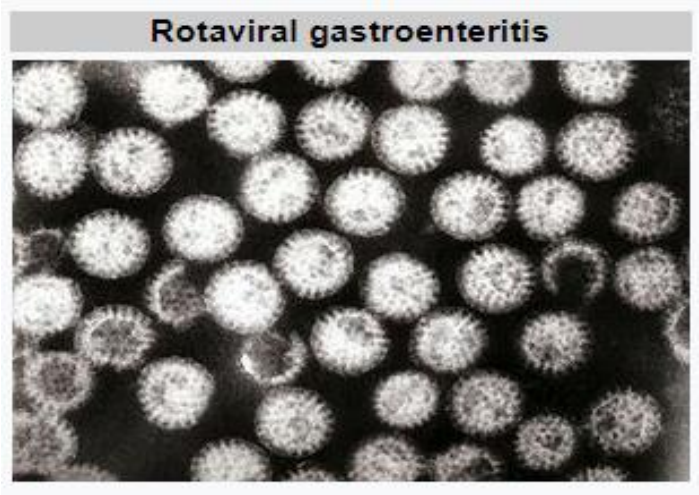
Prevention:

No vaccine is available for *E. coli* infection. Although bismuth subsalicylate and certain antimicrobial agents (e.g., fluoroquinolones, rifaximin) can prevent *E. coli* diarrhea, chemoprophylaxis is not recommended for most travelers. Furthermore, antimicrobial drug use can adversely affect the intestinal microbiota and increase susceptibility to gut infections.

Remind travelers of the importance of adhering to food and water precautions and instruct travelers about the importance of handwashing.

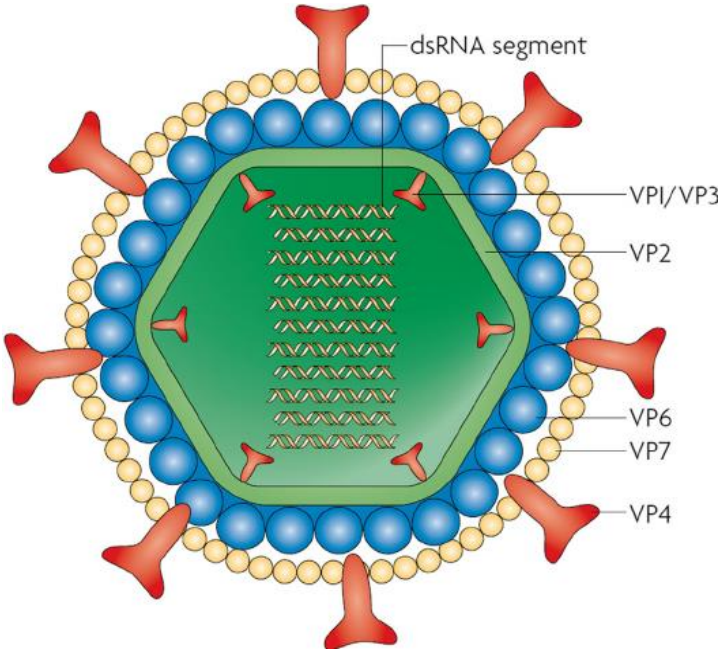
Acute Rota Viral Enterities

Rotavirus is the most common cause of sporadic, severe, dehydrating diarrhea in young children worldwide (peak incidence, 3 to 15 months). Diagnosis is based on clinical suspicion, but polymerase chain reaction testing as part of a multiplex panel for a variety of causes of acute gastroenteritis can be done.



Rotaviruses are a genus of double-stranded RNA virus in the family *Reoviridae* with a diameter of 75 nm,is relatively large among the enteric viruses. Unlike the other enteric viruses, which are generally icosahedral in shape, rotaviruses have a more complex morphology. The capsid consists of three concentric layers of protein, inside of which is the dsRNA genome, which range from approximately 670 to 3300 base pairs in length. Rotavirus is one of six genera in the subfamily Sedoreovirinae in the family Reoviridae Rotaviruses are classified based on the inner shell antigen (VP6), termed the group antigen. Based on the VP6 antigen, there are seven groups of rotaviruses, designated groups A–G. The most important species causing infection in

humans is Group A Rotavirus, although people have also been infected with Rotavirus Groups B and C.



Rotavirus gastroenteritis: is a major cause of severe diarrhoea among infants and young children globally. It is caused by *rotavirus*. The diarrhea tends to be watery and is frequently accompanied by fever, vomiting and abdominal pain. By the age of five, nearly every child in the world has been infected with rotavirus at least once. However, with each infection, immunity develops, and subsequent infections are less severe; adults are rarely affected. There are five species of this virus, referred to as A, B, C, D, and E. Rotavirus A, the most common, causes more than 90% of infections in humans.

The virus is transmitted by the faecal-oral route. It infects and damages the cells that line the small intestine and causes gastroenteritis (which is often called "stomach flu" despite having no relation to influenza). and accounts for up to 50% of hospitalisations for severe

diarrhoea in infants and children, its importance is still not widely known within the public health community, particularly in developing countries. In addition to its impact on human health, rotavirus also infects animals, and is a pathogen of livestock.

Symptoms and Signs of Rotavirus Gastroenteritis:

- Rotavirus gastroenteritis in infants and young children may last 5 to 7 days.
- Vomiting occurs in 90% of patients, and fever > 39° C (> 102.2° F) occurs in about 30%.
- Diarrhea is watery and non-bloody.
- In adults the symptoms of rotavirus gastroenteritis are usually mild. In children, the diarrhea is more likely to cause severe dehydration and even death.

Diagnosis of Rotavirus Gastroenteritis

- Immune-based assays
- Polymerase chain reaction (PCR) testing

Diagnostic testing is not routinely done except to diagnose an outbreak; when done, it involves tests to identify rotavirus in the stool. Enzyme-linked immunosorbent assay (ELISA) and latex agglutination are two commonly used tests.

Nucleic acid testing (PCR) is very sensitive and is often done in a multiplex PCR panel, including a number of causes of gastroenteritis.

Treatment of Rotavirus Gastroenteritis:

- Oral or IV fluids
- Sometimes antidiarrheal agents and/or antiemetics

Supportive care including rehydration with fluids and electrolytes is the mainstay of treatment and is all that is needed for most adults. Oral glucose-electrolyte solutions, broth, or bouillon may prevent dehydration or treat mild dehydration. Children may become dehydrated more quickly and should be given an appropriate rehydration solution (several are available commercially- Oral Rehydration). An antiemetic (eg, ondansetron) may be given if vomiting makes oral rehydration difficult.

Isotonic IV fluids such as Ringer's lactate and normal saline solution should be given when there is severe dehydration, shock, or altered mental status and ileus or failure of oral rehydration therapy (see also the Infectious Diseases Society of America's [IDSA] ,IV rehydration should be continued until pulse, perfusion, and mental status normalize.

Antidiarrheal agents should not be given to children < 18 years of age with acute diarrhea. Antidiarrheals can be considered in adult patients with watery diarrhea (as shown by heme-negative stool), especially during an outbreak, suggesting a viral cause is likely. However, antidiarrheals may cause deterioration of patients with *Clostridioides difficile* or *E. coli* O157:H7 infection and thus should not be given to any patients in whom the cause of diarrhea has not been identified and in whom these disorders may be suspected (ie, based on recent antibiotic use, bloody diarrhea, heme-positive stool, or diarrhea with fever).

Prevention of Rotavirus Gastroenteritis:

Two live-attenuated oral rotavirus vaccines are available that are safe and effective against the majority of strains responsible for disease. Rotavirus immunization is part of the recommended infant vaccination schedule.

Food borne diseases

Foodborne diseases can occur if you eat foods that are contaminated with harmful pathogens such as bacteria, viruses, and fungi.

Although people may use the terms "foodborne illness" and "food poisoning" interchangeably, there are minor differences between the two.

"Foodborne illness" is an umbrella term that describes any illness caused by consuming foods or beverages contaminated with harmful pathogens- such as bacteria, viruses, and fungi or their toxins.

A foodborne illness may be due to an infection or intoxication.

A foodborne infection can occur if you eat foods that contain live bacteria or other pathogens. These pathogens can later grow in your gut and cause symptoms such as abdominal cramping, diarrhea, and vomiting.

On the other hand, intoxication also called food poisoning>

Foodborne illnesses may result from any of the following sources:

- **Bacteria:** These may be present in raw and undercooked meat, fish, and poultry; unpasteurized dairy products; contaminated fruits and vegetables; and contaminated drinking water.
- **Viruses:** Viruses are transmitted to the body through food contaminated by viral particles.
- **Parasites:** Contaminated water and soil can transmit harmful parasites to fresh produce, seafood, meat, poultry, and other foods.

- **Prions:** These infectious proteins are associated with "mad cow disease" and can come from eating parts of cattle, such as the brain tissue.
- **Naturally occurring chemicals:** Naturally occurring toxins in mushrooms, staple foods such as corn and cereal, and mold on grains can cause long-term health complications.
- **Environmental pollutants:** Byproducts of plastic production and waste management, as well as heavy metals such as lead and mercury found in water and soil, can contaminate foods and lead to foodborne illnesses.

How are foodborne illnesses treated?

Treatment for foodborne illnesses may involve a combination of at-home remedies and over-the-counter and prescription medications.

However, the types of medications that healthcare professionals prescribe will depend on the type of pathogen responsible for the foodborne illness and the severity of symptoms. Severe cases may require hospitalization.

A healthcare professional may recommend that you:

- drink extra fluids to stay hydrated if you have diarrhea or vomiting
- get extra rest if you are feeling fatigued
- take antibiotics, if prescribed
- take antitoxin as administered
- consider surgery for some parasitic and toxic cases

What can you do to prevent foodborne illness?

Preventing foodborne illness is an important public health task. The U.S. Department of Agriculture and the CDCTrusted Source have issued food safety guidelines to help you avoid becoming sick with a foodborne illness.

They recommend:

- **Washing your hands:** Wash your hands often and thoroughly with warm, soapy water for at least 20 seconds before and after handling raw or cooked foods, using the bathroom, handling pets, or tending to anyone who is ill.
- **Cleaning items well:** Clean food surfaces, utensils, and cutting boards with hot, soapy water after each use. Learn how to clean your wooden cutting board.
- **Separating foods:** Keep raw meat, poultry, seafood, and eggs separate from cooked and ready-to-eat foods, including fruits and vegetables, to avoid cross contamination.
- **Cooking food thoroughly:** Cook foods to a safe internal temperature to avoid undercooking and reduce foodborne illness risk. Use this detailed cooking temperature list to guide you.
- **Avoiding raw beverages:** Avoid drinking raw and unpasteurized dairy and juice products.
- **Storing food properly:** Keep foods out of the temperature danger zone of 40–140°F (5–60°C) by thawing frozen food safely in the refrigerator and refrigerating foods within 2 hours of cooking.

- **Isolating when you're sick:** Stay at home if you're feeling unwell and avoid preparing food for others during this time, even for several days after your symptoms have subsided.

Cholera

Cholera, also known as Asiatic or epidemic cholera, is an acute enterotoxin-mediated GI infection caused by the gram-negative bacillus Vibrio cholerae. It produces profuse, watery diarrhea that starts suddenly and has a "fishy" odor, vomiting, massive fluid and electrolyte loss and, possibly, hypovolemic shock, metabolic acidosis, and death. Infection confers only transient immunity. A similar bacterium,Vibrio parahaemolyticus, causes food poisoning.

Causes:

Humans are the only hosts and victims of *Vibrio cholerae*, a motile, aerobic organism. It is transmitted through food and water contaminated with fecal material from carriers or people with active infections. Infection also occurs after eating shellfish from recognized environmental reservoirs of cholera.

Cholera occurs during the warmer months and is most prevalent among lower socioeconomic groups. Susceptibility to cholera may be increased by a deficiency or absence of hydrochloric acid.

Complications:

Complications associated with cholera include hypoglycemia, severe electrolyte depletion, hypovolemic shock, metabolic acidosis, renal failure, liver failure, bowel ischemia, and bowel infarction.

Assessment findings:

After an incubation period ranging from several hours to 5 days, cholera produces acute, painless, profuse, watery diarrhea and effortless

vomiting (without preceding nausea). As diarrhea worsens, the stools contain white flecks of mucus (rice-water stools).

Diagnostic tests:

- Stool or vomitus culture will reveal V. cholerae.
- Blood work will reveal elevated blood urea nitrogen and creatinine levels. Increases in serum lactate, protein, and phosphate levels result in a reduced bicarbonate level and an elevated anion gap. The arterial pH is usually low. Calcium and magnesium levels are usually high, and potassium levels are either normal or low.
- Dark-field microscopic examination of fresh feces will show rapidly moving bacilli (like shooting stars).
- Stool cultures will be negative for Escherichia coli infection, salmonellosis, and shigellosis.

Treatment:

Improved sanitation and the administration of cholera vaccine to travelers in endemic areas can control this disease. The vaccine confers only 60% to 80% immunity and is effective for only 3 to 6 months. Thus, vaccination is impractical in endemic areas. Treatment requires rapid I.V. infusion of large amounts (50 to 100 ml/minute) of isotonic saline solution, alternating with isotonic sodium bicarbonate or sodium lactate. Potassium replacement may be added to the I.V. solution. Antibiotic therapy can shorten the course of infection and reduce the rehydration requirement. When I.V. infusions have corrected hypovolemia, fluid infusion decreases to quantities sufficient to maintain normal pulse and

skin turgor or to replace fluid loss through diarrhea. An oral glucose-electrolyte solution can be substituted for I.V. infusions. In mild cholera, oral fluid replacement is adequate. If symptoms persist despite fluid and electrolyte replacement, treatment includes tetracycline.

Nursing considertions:

◗ Monitor output (including stool volume) and I.V. infusion accurately. To detect overhydration, carefully observe neck veins, take serial weights, and auscultate the lungs (fluid loss in cholera is massive, and improper replacement may cause potentially fatal renal insufficiency).

◗ Perform good hand hygiene before and after contact with the patient or the patient's environment and when moving from a contaminated area to a clean area during patient care.

Safety:

Observe standard precautions (wear a gown and gloves when handling feces-contaminated articles or when a danger of contaminating clothing exists); observe contact precautions if the patient is incontinent or diapered, or to control outbreaks in a facility

Patient teaching:

◗ Instruct the patient and family about proper hand hygiene.

◗ Travel precautions to areas where cholera has occurred should include the following:

- Drink only water that has been boiled or treated with chlorine or iodine. Other safe beverages include tea and coffee made with boiled water and carbonated bottled beverages with noice.

- Eat only foods that have been cooked thoroughly and are still hot, or fruit that you have peeled yourself.

- Avoid undercooked or raw fish or shellfish, including ceviche.

- Eat only cooked vegetables; avoid salads.

- Avoid street vendors.

- Do not bring perishable seafood back to the United States.

Salmonellosis

A common infection in the United States, salmonellosis is caused by gram-negative bacilli of the genus Salmonella, a member of the Enterobacteriaceae family. About 40,000 cases of salmonellosis are reported yearly in the form of enterocolitis, bacteremia, localized infection, typhoid fever, or paratyphoid fever.

Nontyphoidal forms can produce mild to moderate illness that lasts 4 to 7 days and carries a low mortality.

Typhoid fever, caused by *Salmonella typhi*, is the most severe form of salmonellosis and can last up to 4 weeks. Mortality is about 3% in those who receive treatment. Ten percent of untreated cases result in fatality. An attack of typhoid fever confers lifelong immunity, although the patient may become a carrier. Salmonellosis is 20 times more common in patients with acquired immunodeficiency syndrome.

Causes:

Of an estimated 1,700 serotypes of Salmonella, serotypes typhimurium and enteritidis are the most common in the United States. Nontyphoidal salmonellosis generally follows the ingestion of contaminated or inadequately processed foods, especially eggs, chicken, turkey, and duck. Cooking foods to an appropriate temperature reduces the risk of contracting salmonellosis. Other causes include contact with infected people or animals or ingestion of contaminated dry milk or drugs of animal origin. Salmonellosis may occur in children younger than age 5 via the fecal-oral route. Enterocolitis and bacteremia are common (and

more virulent) among infants, elderly persons, and people already weakened by other infections; paratyphoid fever is rare in the United States. Typhoid fever usually results from drinking water contaminated by the excretions of a carrier or from ingesting contaminated shellfish. (Contamination of shellfish occurs by leakage of sewage from offshore disposal depots.) Most typhoid patients are younger than age 30; most carriers are women older than age 50. The incidence of typhoid fever in the United States is on the rise as a result of increased travel to endemic areas.

Complications:

Salmonellosis may result in such complications as intestinal perforation or hemorrhage, cerebral thrombosis, pneumonia, endocarditis, myocarditis, meningitis, pyelonephritis, osteomyelitis, cholecystitis, hepatitis, septicemia, and acute circulatory failure.

Assessment findings:

Clinical manifestations of salmonellosis vary but usually include fever, abdominal pain, and severe diarrhea with enterocolitis. Headache, increasing fever, and constipation are more common in typhoidal infection.

Diagnostic tests:

◗ Blood or stool culture identifies the organism. Other appropriate culture specimens include urine, bone marrow, pus, and emesis. In endemic areas, clinical symptoms of enterocolitis allow a working

diagnosis before the cultures are positive. The presence of S. typhi in stool 1 or more years after treatment indicates that the patient is a carrier, which is true of 3% of patients.

◗ Widal reaction, an agglutination reaction against somatic and flagellar antigens, may suggest typhoid with a fourfold rise in titer. However, drug use or hepatic disease can also increase these titers and invalidate test results.

◗ Other supportive laboratory values may include transient leukocytosis during the first week of typhoidal salmonellosis, leukopenia during the third week, and leukocytosis in patients with local infection.

Treatment:

Nontyphoidal Salmonella infections usually resolve in 4 to 7 days and commonly don't require treatment other than maintaining hydration with oral fluids. Patients withsevere diarrhea may require I.V. fluids. Antibiotics, such as ampicillin, trimethoprimsulfamethoxazole (Bactrim), or ciprofloxacin (Cipro), aren't typically necessary unless the infection spreads from the intestines. Salmonella has become resistant to many antibiotics as a result of antibiotic use in the food supply. Antibiotic therapy for typhoid fever, paratyphoid fever, and bacteremia depends on organism sensitivity and may include amoxicillin, chloramphenicol and, in severely toxemic patients, trimethoprimsulfamethoxazole, ciprofloxacin, or ceftriaxone (Rocephin). Localized abscesses may also need surgical drainage. Enterocolitis requires a short course of antibiotics only if it causes septicemia or prolonged fever. Other treatments include

bed rest and fluid and electrolyte replacement. The administration of camphorated tincture of opium, kaolin with pectin, diphenoxylate, codeine, or small doses of morphine may be necessary to relieve diarrhea and control cramps in patients who must remain active.

Nursing considerations:

◗ Report all infections caused by Salmonella to the state health department.

◗ Observe the patient closely for signs and symptoms of bowel perforation resulting from erosion of intestinal ulcers.

◗ Record intake and output accurately, and maintain adequate I.V. hydration. When the patient can tolerate oral feedings, encourage high-calorie fluids such as milkshakes. Watch for constipation.

◗ Provide good skin and mouth care. Turn the patient frequently, and perform mild passive exercises as indicated. Apply mild heat to the abdomen to relieve cramps.

◗ If the patient has positive stool cultures on discharge, tell him or her to be sure to wash the hands after using the bathroom and to avoid preparing uncooked foods, such as salads, for family members. These patients shouldn’t work as food handlers until culture results are negative.

Food poisoning

Food poisoning, or Gastroenteritis is illness caused by eating contaminated food. Bacteria, viruses and parasites or their toxins present in the food are the main causes of food poisoning.

The presence of infectious organisms in food can occur in any processing or manufacturing industry. Foods cooked at home can also cause contamination if it's incorrectly handled.

Vomiting, diarrhea, nausea, or bloating is the common food poisoning symptoms that can start within hours of consuming contaminated food. In most cases, food poisoning resolves without treatment. However, if the condition becomes serious, you must get the right medical treatment.

Staphylococcal infections:

Staphylococcal infections, commonly called staph infections, are caused by a genus of bacteria called Staphylococcus. There are more than 30 strains (types) of Staphylococcus bacteria. The most common human pathogen is Staphylococcus aureus. A pathogen is an organism that causes disease.

Healthcare providers prescribe antibiotics to treat staphylococcal infections. In severe cases, a staph infection can cause serious health complications and death.

Different types of staph bacteria cause problems in various parts of your body. Staphylococcal infection can affect on the digestive system: If you eat something containing bacteria, you can get food poisoning, leading to vomiting and diarrhea.

While anyone can get a staph infection, certain people are at higher risk than others. People who work in hospitals are more likely to have the bacteria on their skin. Staph infections occur most often in people who:

Inject drugs.

Are hospitalized, have recently had surgery, or have catheters or medical devices in their body.

Manage a chronic condition like diabetes, vascular disease or eczema.

Have a weakened immune system.

Are breastfeeding.

Have worn a tampon for an extended time.

Symptoms and Causes:

Signs and symptoms of staph infection

- Some staph infections of food poisoning: Symptoms can be severe and include vomiting and diarrhea.
- Mastitis: Occurs mostly in people who are breastfeeding, mastitis leads to inflammation, pain and abscesses.
- Septicemia: Staph bacteria in your bloodstream can cause blood poisoning, also called sepsis. Symptoms include fever and dangerously low blood pressure (hypotension.(
- Toxic shock syndrome: A severe form of septicemia, toxic shock syndrome (TSS) symptoms include fever, muscle aches and a rash that looks like sunburn.
- Endocarditis: This infection of the lining of your heart muscle is often caused by staph infection. Your heart valves and actual heart muscle may also be affected. Symptoms include fever, sweating, weight loss and fast heart rate.

How do people get staph infection؟

Staph infections spread in the ways that other infections spread, through coughs and sneezes, as well as other ways, including:

Diagnosis and Tests:

Food poisoning: Your provider will ask you long you've been ill and how bad the symptoms are. You may need to provide a stool sample.

Mastitis: After considering your symptoms, your provider may send a sample of your milk to a lab to test for the presence of bacteria.

Toxic shock syndrome: Your healthcare provider may take a urine or blood sample to check for bacteria. Sometimes, they will also order a CT scan to see if the infection affects your organs.

Treatment:

Healthcare providers also prescribe oral antibiotics (taken by mouth) to treat staph infections inside your body and on your skin. The antibiotic will vary depending on the type of infection. In severe staph infections, providers use IV (intravenous) antibiotics to kill the bacteria.

If you have a more serious staph infection that requires an IV, your provider may suggest that you go to the hospital for a period of time.

If left untreated, staph infections can be deadly. Rarely, staph germs are resistant to the antibiotics commonly used to treat them. This infection, called methicillin-resistant Staphylococcus aureus (MRSA), causes severe infection and death.

Prevention:

Prevention depends on the type of infection. To reduce your risk of a staph infection, you should follow these tips:

Food poisoning: You can reduce your risk of food poisoning by handling food safely, ensuring that it's cooked properly and refrigerating perishable food within two hours.

Toxic shock syndrome: You should change tampons every four to eight hours and use tampons with the lowest effective absorbency.

Bacillus cereus :

Bacillus cereus is a Gram-positive aerobic or facultatively anaerobic, motile, spore-forming, rod-shaped bacterium that is widely distributed environmentally. While *B. cereus* is associated mainly with food poisoning, it is being increasingly reported to be a cause of serious and potentially fatal non-gastrointestinal-tract infections. Food poisoning related to *Bacillus cereus* usually goes away on its own within 24 hours.

The pathogenicity of *B. cereus*, whether intestinal or nonintestinal, is intimately associated with the production of tissue-destructive exoenzymes. Among these secreted toxins are four hemolysins, three distinct phospholipases, an emesis-inducing toxin, and proteases. The major hurdle in evaluating *B. cereus* when isolated from a clinical specimen is overcoming its stigma as an insignificant contaminant. Outside its notoriety in association with food poisoning and severe eye infections, this bacterium has been incriminated in a multitude of other clinical conditions such as anthrax-like progressive pneumonia, fulminant sepsis, and devastating central nervous system infections, particularly in immunosuppressed individuals, intravenous drug abusers, and neonates. Its role in nosocomial acquired bacteremia and wound infections in postsurgical patients has also been well defined, especially when intravascular devices such as catheters are inserted. Primary cutaneous infections mimicking clostridial gas gangrene induced subsequent to trauma have also been well documented. *B. cereus* produces a potent β-lactamase conferring marked resistance to β-lactam antibiotics. Antimicrobials noted to be effective in the empirical management of a

B. cereus infection while awaiting antimicrobial susceptibility results for the isolate include ciprofloxacin and vancomycin.

- If you have severe diarrhea or vomiting, your provider may recommend getting IV fluids..

Shigellosis

Shigella bacteria cause an infection called shigellosis. Shigella can spread easily from one person to another—and it only takes a small amount of Shigella to cause illness. Learn how Shigella spreads and why some people have a greater chance of getting sick.

Shigella bacteria cause an infection called shigellosis. Shigella cause an estimated 450,000 infections in the United States each .

The four species of Shigella are:

- *Shigella sonnei* (the most common species in the United States)
- *Shigella flexneri*
- *Shigella boydii*
- *Shigella dysenteriae*

S. dysenteriae and *S. boydii* are rare in the United States, though they continue to be important causes of disease in areas with less access to resources. *Shigella dysenteriae* type 1 can be deadly.

Shigella spread easily; it takes just a small number of bacteria to make someone ill. People with a Shigella infection can spread the infection to others for several weeks after their diarrhea ends.

Shigella germs spread easily from one person to another and it only takes a small amount to make someone sick with a disease called shigellosis. Learn how Shigella germs spread and why some people have a greater chance of getting infected.

- **Getting Shigella germs on their hands** and then touching their food or mouth. This can happen after:
    - Changing the diaper of a sick child or caring for a sick person.
    - Touching surfaces contaminated with germs from poop from a sick person. Surfaces include diaper pails, changing tables, bathroom fixtures, and toys.
- **Eating food** that was prepared by someone who has a Shigella infection (shigellosis).
    - Foods that are consumed raw are more likely to be contaminated with Shigella germs.
    - Shigella germs can also get on fruits and vegetables if the fields where they grow are contaminated with poop containing the germ.
- **Swallowing recreational water** (for example, lake or river water) while swimming or drinking water that is contaminated with poop containing the germ.

Groups of People Who Are Most Likely to Get Sick

- **Shigella infection (shigellosis) is most common among young children.** Children can get infected if they put unwashed hands in their mouth after touching something that is contaminated with *Shigella* germs. These germs can spread easily among children and to family members and others in the community. In fact, many outbreaks occur in settings such as childcare and school.

People can get a *Shigella* infection (shigellosis) after putting something in their mouth or swallowing something that has come into contact with the stool (poop) of someone with a *Shigella* infection.

You can reduce your chance of getting infected by following these tips:

- **Carefully wash your hands with soap and water** during key times:
  - Before any activity.
  - Before preparing food or eating.
  - After going to the bathroom, changing a diaper, or cleaning up after someone who went to the bathroom.
- **Take care when changing diapers.**
  - As soon as you change a diaper, throw it away in a covered, lined garbage can.
  - Clean up any leaks or spills from the diaper right away.
  - Wash your hands and the child's hands with soap and water right away.
- **Avoid swallowing water** from ponds, lakes, or swimming pools.
- **When traveling internationally**, follow safe food and water habits and wash hands often with soap and water.
- **If you or your partner has been diagnosed with shigellosis, do not have sex.** To reduce the chance of *Shigella* spreading, wait at least two weeks after diarrhea ends to have sex.

Help prevent the spread of *Shigella* infection to others when you are sick

- **Wash hands often**, especially:

- Before eating or preparing food.
- After using the bathroom or changing diapers.

- **Do NOT** prepare food if you are sick or share food with anyone.
- **Do NOT** swim.

Clostridium Perfringens:

Clostridium perfringens is a common food poisoning caused by C. perfringens bacteria. It causes diarrhea and stomach cramps. You usually get it from eating contaminated meat or poultry that's been left out for too long. C. perfringens food poisoning usually isn't serious and goes away on its own.

Clostridium perfringens (C. perfringens) food poisoning is an illness you can get from eating food contaminated with C. perfringens bacteria. It's usually not serious. It causes stomach cramps and watery diarrhea. Symptoms last for a day or two.

C. perfringens also causes more serious conditions when it infects wounds, including gas gangrene and anaerobic cellulitis.

Food poisoning from C. perfringens is common. About 1 million people in the U.S. get sick from food contaminated with C. perfringens each year.

C. perfringens food poisoning is common. It can be unpleasant, but it's usually not serious. Drink plenty of fluids and don't hesitate to contact your healthcare provider if you're not getting better within a few days.

Symptoms and Causes:

Stomach cramps and watery diarrhea are common symptoms of C. perfringens food poisoning. It usually doesn't cause vomiting or fever. Symptoms start six to 24 hours after you eat contaminated food.

Bacteria cause C. perfringens food poisoning. When you eat food contaminated with the bacteria, they release toxins into your gastrointestinal tract (intestines). The toxins cause inflammation (enteritis), leading to diarrhea and cramping.

C. perfringens is most commonly found in gravies, red meat (beef, pork) and poultry (chicken, turkey). It's less common in fish and vegetables.

Complications :

C. perfringens food poisoning rarely leads to complications. But there's a small risk of serious illness, including:

Dehydration: Diarrhea can cause you to lose fluids faster than you're able to replace them. Drinking water and broth can prevent dehydration, especially if you have mild diarrhea. If you have severe diarrhea or vomiting, you may need to see a healthcare provider so they can help you stay hydrated.

Sepsis: If C. perfringens gets into your bloodstream, it can quickly destroy blood cells and cause sepsis. Sepsis is a life-threatening reaction to infection. It's a very rare complication of food poisoning.

Diagnosis and Tests:

Providers usually diagnose food poisoning based on your symptoms. If they need to test you, you'll provide a stool (poop) sample. Your provider will send your sample to a lab, where they'll test it for C. perfringens and other germs that can make you sick. If there's an outbreak of sickness, health officials may test food to find the source of the bacteria.

Management and Treatment:

There's no specific treatment for food poisoning caused by C. perfringens. It usually goes away on its own within a day or two. Drink plenty of fluids to prevent dehydration.

If you're very sick, your provider will treat you with antibiotics. This usually isn't necessary.

Prevention:

- Washing your hands before and after preparing food or eating.

- Washing food prep and eating surfaces and utensils before and after use.
- Cooking foods to a safe temperature before eating (depending on the meat, 145 F to 165 F, or 62 C to 73 C).
- Refrigerate or freeze meat, poultry and seafood as soon as possible. Don’t leave prepared food out for longer than two hours.
- Avoid eating food that has been sitting out unheated for more than an hour.