Endemic Infections in Saudi Arabia

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OBJECTIVES

By the end of the lecture the student should be able to know:

- Common terminology describing Endemicity.
- Common Endemic disease in KSA especially:
  - Typhoid, salmonella/Brucella.
  - Gastroenteritis, Viral hemorrhagic fever (Dengue, RVF).
  - Leishmaniasis, MERS-COV, Malaria.
- For each endemic diseases: Epidemiology, Pathogenesis, Clinical features, Complications, Diagnostic workup, Differential diagnosis, Treatment & prevention.

INTRODUCTION

It is of major importance that healthcare workers be aware of how to deal with Endemic disease because of cases of spread in society, being prevented & curable.

Key Outlines:

- Commonly used definition & Endemicity.
- Major common endemic disease in KSA.
- Importance of cost effective workshop, prevention.

Take home message:

Preventing & correctly treating endemic diseases will lead to better health and cost effective use of resources.

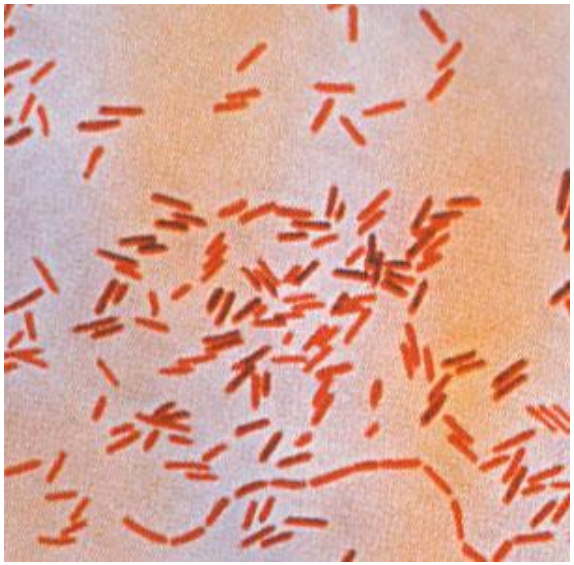
Recommended Books:

As recommended by the college and dept. of medicine**.**

DEFINITIONS

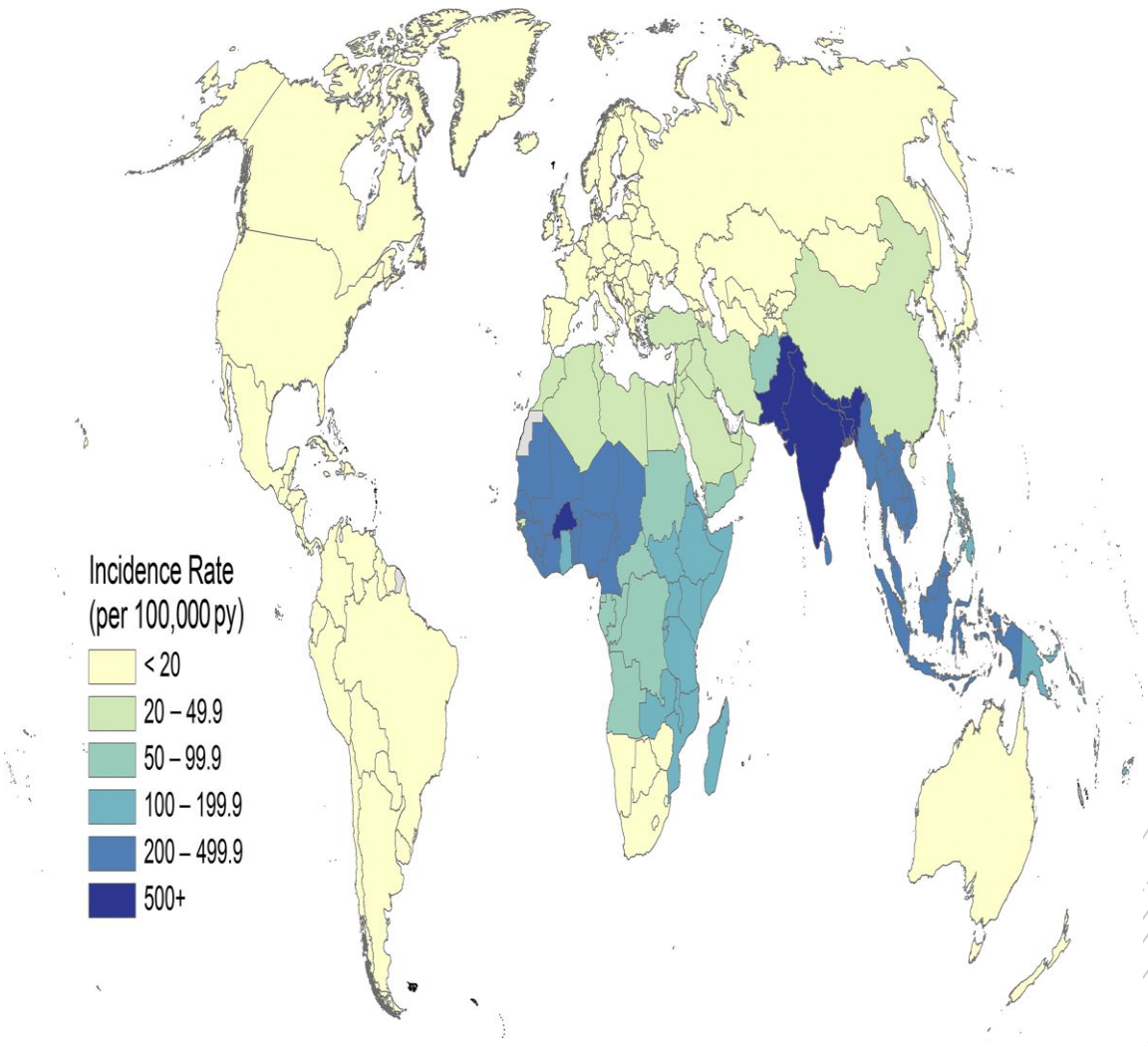
- The amount of a particular disease that is usually present in a community is referred to as baseline or **endemic** level.
- **Sporadic** is a disease that occurs infrequently and irregularly.
- **Endemic** refers to the constant presence and/or usual prevalence of a disease or infectious agent in a population within a geographic area.
- **Hyperendemic** refers to persistent, high levels of disease occurrence.
- **Epidemic** refers to an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area.
- **Outbreak** carries the same definition of epidemic, but is often used for a more limited geographic area.
- **Pandemic** refers to an epidemic that has spread over several countries or continents, usually affecting a large number of people.

TYPHOID FEVER



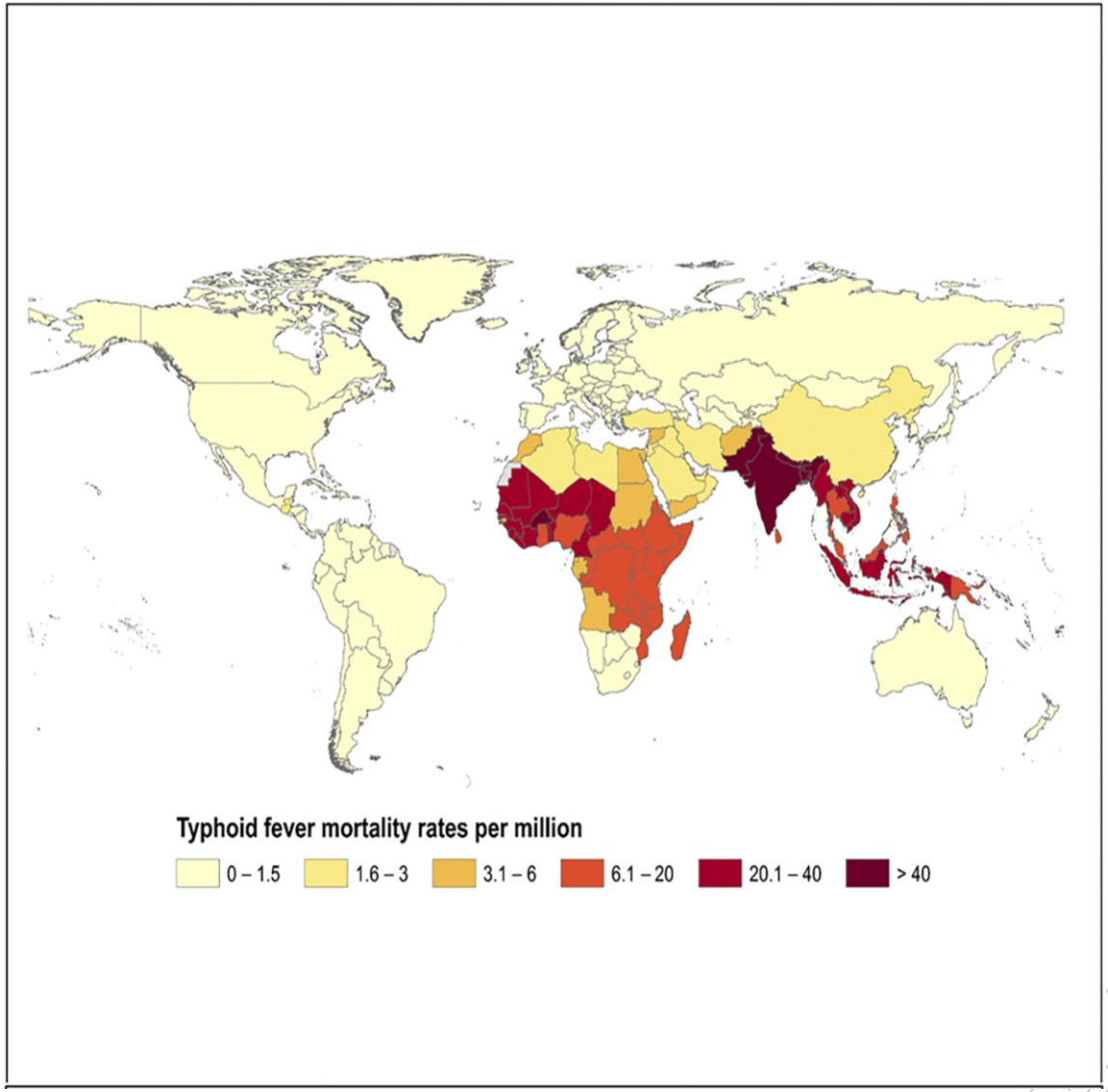
- It is an acute febrile disease, caused by ***Salmonella typhi*** and S. paratyphi A, B,C.
- *S. typhi* and *paratyphi* lives only in humans.
- Persons with typhoid fever carry the bacteria in their bloodstream and intestinal tract.
- Carriers recovering from typhoid fever shed *S.* Typhi in their feces.
- It is transmitted through the ingestion of food or drink contaminated by infected people.

EPIDEMIOLOGY



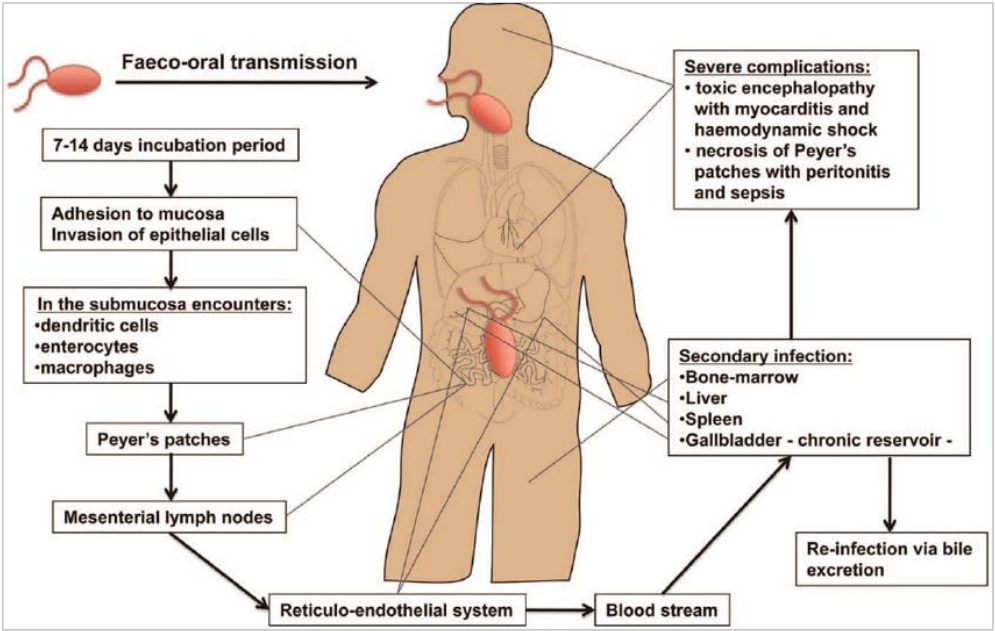
*Estimated incidence of typhoid and paratyphoid fevers by country per 100,000 population, 2015.

EPIDEMIOLOGY



*Estimated global mortality from typhoid and paratyphoid fever by country per million, 2015.

PATHOGENESIS OF ENTERIC FEVER

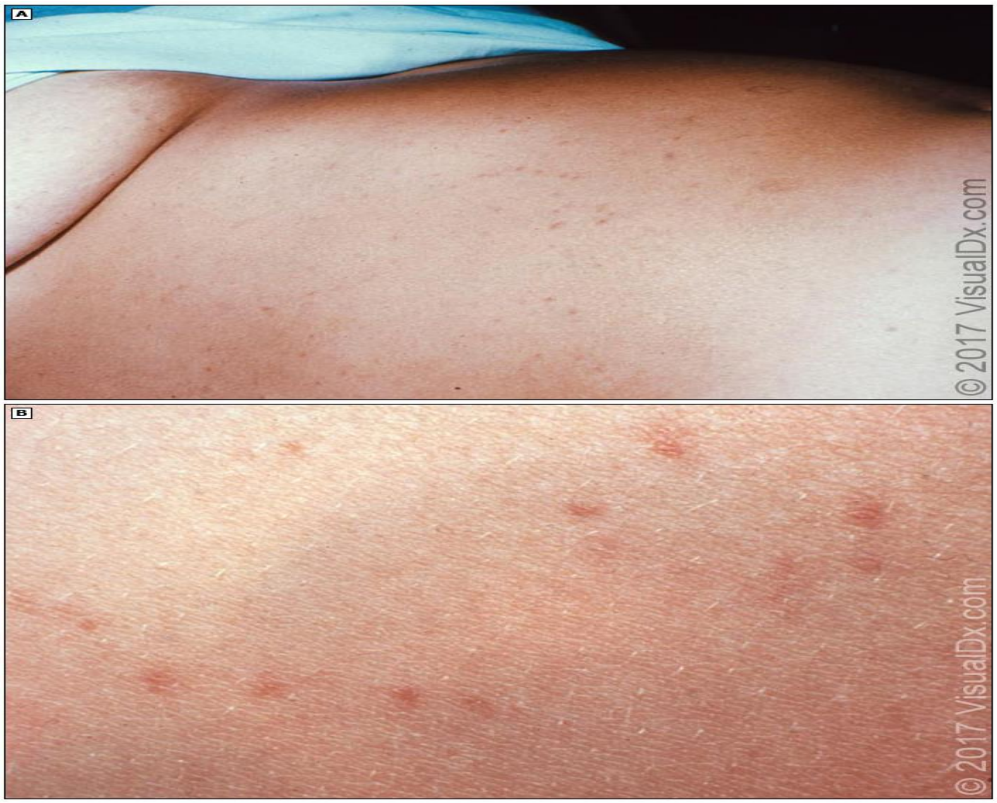


- The organisms penetrate ileal mucosa.
- Reach mesenteric lymph nodes - multiply there.
- Invade Blood stream.
- Infect Liver, Gall Bladder, spleen, Kidney, Bone marrow.
- After 7-10 days bacilli pass into blood stream (secondary bactermia).

CLINICAL FEATURES

- Develop 1- 3 weeks after exposure.
- May be mild or severe. Gradual onset:
  - Intermittent fever.
  - Malaise, headache.
  - Abdominal pain.
  - Constipation or diarrhea.
  - Rose-colored spots on the chest.
  - Enlarged spleen or liver.
- Healthy carrier state may follow acute illness.

RASH IN TYPHOID



- Rose spots: 2 -4 mm in diameter raised discrete irregular blanching pink maculae's found in front of chest.
- Appear in crops of up to a dozen at a time.
- Fade after 3 – 4 days.

COMPLICATIONS

- Pneumonia, meningitis, osteomyelitis.
- Severe intestinal hemorrhage and intestinal perforation.
- If not treated can be fatal.

CARRIERS

- 5% of the survivors continue to excrete the organism for months = carriers.
- In carriers the bacteria remain in the gall bladder and are shed into the intestine.

INVESTIGATIONS

- WBC.
- ESR .
- Blood, bone marrow, or stool cultures.
- Widal test (serum agglutination test). It has cross reactions– false positives. Also false negatives. Not a good test.

BLOOD CULTURES IN TYPHOID FEVERS

- Bacteremia occurs early in the disease.
- Blood Cultures are positive in:
  - 1st week in 90%.
  - 2nd week in 75%.
  - 3rd week in 60%.
  - 4th week and later in 25%.

DIFFERENTIAL DIAGNOSIS

- Brucellosis.
- Tuberculosis.
- Infective endocarditis .
- Lymphoma.
- Adult Still's disease .
- Malaria.

TREATMENT

- 3rd generation cephalosporins, like Ceftriaxone are effective.
- Fluoroquinolones, like ciprofloxacin are the drugs of choice for treatment of typhoid fever.
- Fever may continue for several days after starting therapy.
- The majority are cured with antibiotics.
- 10% may relapse.

PREVENTION AND CONTROL (WHO,2018)

Control measures:

- Health education.
- Access to safe water and adequate sanitation
- Antibiotic treatment.
- Excluding disease carriers from food handling.
- A vaccine is available recommended for travelers to high risk areas. It does not provide full protection.

TYPHOID VACCINE

- Two vaccines have been used for many years to protect people from typhoid fever:
  - an injectable vaccine based on the purified antigen for people aged over 2 years.
  - a live attenuated oral vaccine in capsule formulation for people aged over 5 years.
- These vaccines do not provide long-lasting immunity and are not approved for children younger than 2 years old.
- A new typhoid conjugate vaccine, with longer lasting immunity, was prequalified by WHO in December 2017 for use in children from the age of 6 months.

TRAVELING TO TYPHOID ENDEMIC AREAS

- The following recommendations will help ensure safety while travelling:
  - Ensure food is properly cooked and still hot when served.
  - Avoid raw milk and products made from raw milk. Drink only pasteurized or boiled milk.
  - Avoid ice unless it is made from safe water.
  - When the safety of drinking water is questionable, boil it or if this is not possible, disinfect it with a reliable, slow-release disinfectant agent (usually available at pharmacies).
  - Wash hands thoroughly and frequently using soap, in particular after contact with pets or farm animals, or after having been to the toilet.
  - Wash fruits and vegetables carefully, particularly if they are eaten raw. If possible, vegetables and fruits should be peeled.

BRUCELLOSIS

- Systemic febrile illness.
- Zoonosis. It occurs worldwide.
- B. melitensis and B. abortus are the most frequent.
- The incubation period is 1 – 4 weeks.

EPIDEMIOLOGY

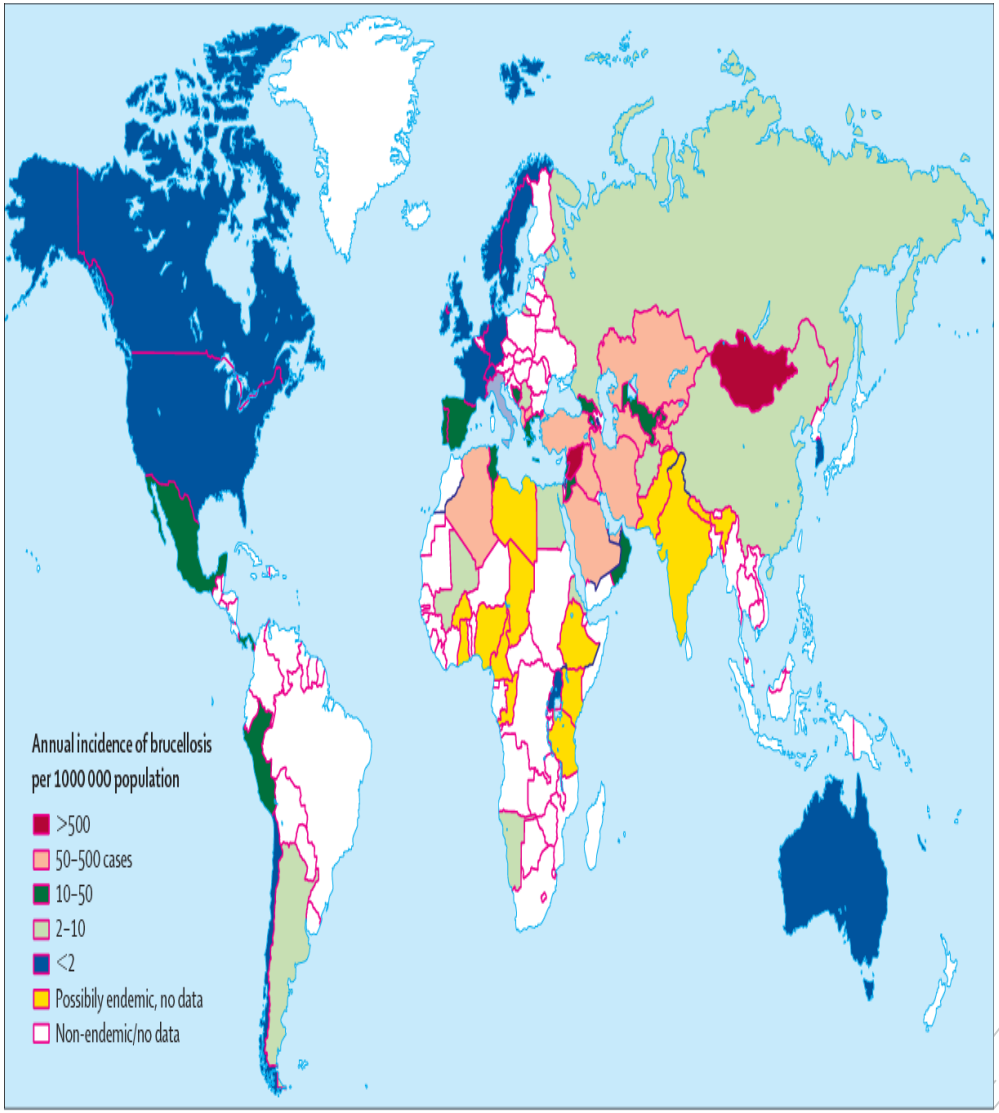


Figure 1: Worldwide incidence of human brucellosis

TRANSMISSION

Infection transmitted to humans by:

- contact with fluids or meat from infected animals (sheep, cattle, goats, pigs, camels or other animals).
- eating food products such as unpasteurized milk and cheese.
- The disease is rarely, if ever, transmitted between humans.

PATHOGENESIS

- Enters the body.
- To lymph nodes.
- To blood stream.
- Reticulo-endothelial System.
- Blood.
- Any organ.

CLINICAL MANIFESTATIONS

Often fits one of the three pattern:

- Acute febrile illness resembling typhoid
- Fever & acute mono-arthritis (hip/knee)
- low grade fever, low back pain, hip pain

CLINICAL MANIFESTATIONS

Symptoms :

- Fever.
- Night sweats.
- Fatigue.
- Anorexia.
- Weight loss.
- Arthralgia.
- Low back pain.
- Depression.

Signs:

- Arthritis.
- Lymphadenopathy.
- Hepatosplenomegaly.

LOCALIZED BRUCELLOSIS

- Osteoarticular disease: especially sacroileitis, vertebral spondylitis and large joints arthritis.
- Genitourinary disease, especially epididymo-orchitis.
- Neurobrucellosis, usually presenting as meningitis, radiculopathy.
- Abscess involving the liver, spleen, abdomen.

DIFFERENTIALS

- Typhoid fever.
- Tuberculosis.
- Infective endocarditis.
- Collagen vascular disease.
- Lymphoma.

INVESTIGATIONS

- WBC.
- ESR.
- Blood cultures

  slow growth = 4 weeks.
- Serology: SAT positive in recent infection

  No diagnostic level...>1:320.

TREATMENT

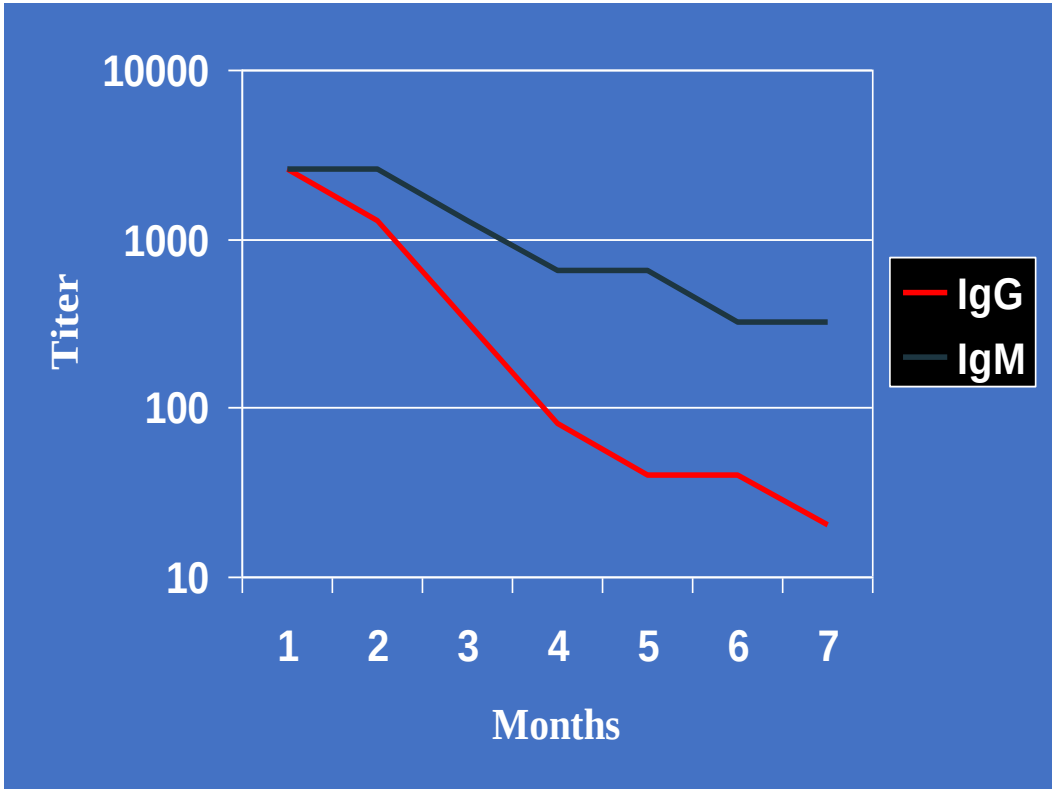
- Treatment for uncomplicated Brucellosis:
  - Streptomycin (10 days) + Doxycycline for 6 weeks.
  - Rifampicin + Doxycycline for 6 weeks.
  - TMP/SMX + Doxycycline for 6 weeks.

  - RIMFAPICIN(1ST Line RX Of TB),in Brucellosis use RIFAMP. ONLY in: Br Endocarditis, NeuroBrucellosis, Pregnancy & Certain Children populations.
- Treatment of complicated Brucellosis
  - Endocarditis, meningitis.
  - No uniform agreement.
  - Usually 3 antibrucella drugs for Not Less than 3 months.

RELAPSE

- About 10 percent of patients relapse after therapy.
- Most relapses occur within three months following therapy and almost all occur within six months.
- Relapse should prompt assessment for a focal lesion, especially hepatosplenic abscess
- Most relapses can be treated successfully with a repeat course of a standard regimen.

TREATED BRUCELLOSIS



CASE

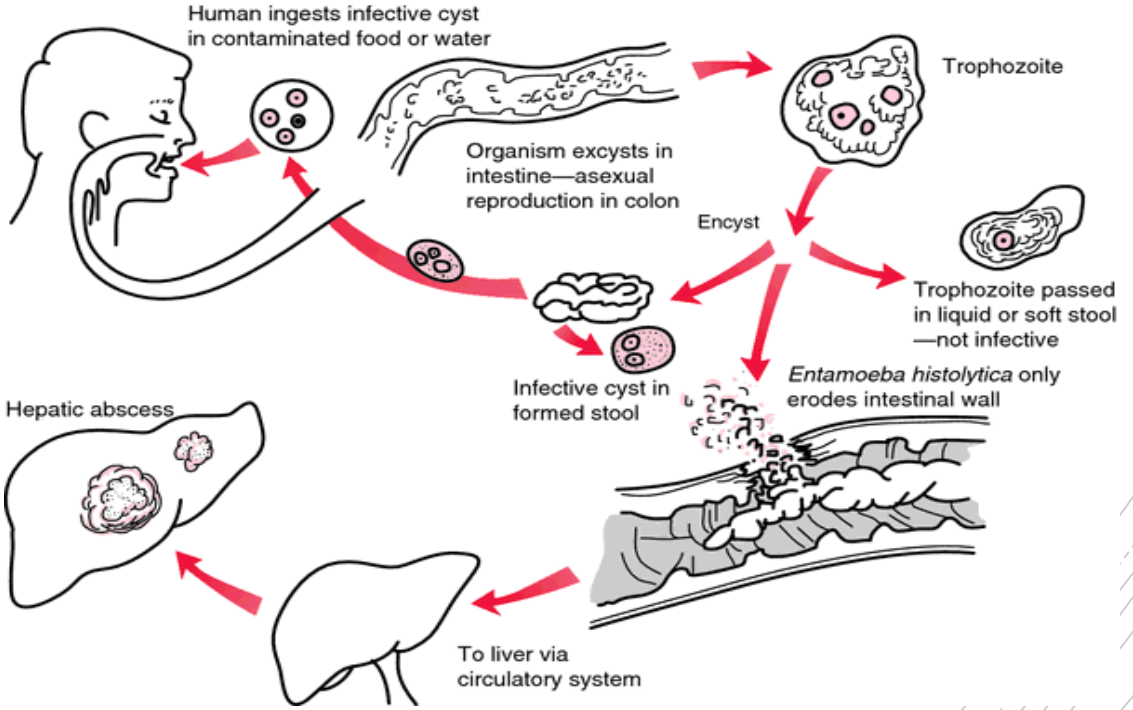
- A 22 year old student presented with nausea, abdominal pain and diarrhea for 2 days. On examination, he was febrile with mild peri-umbilical tenderness.

GASTROENTERITIS (Intestinal Amebiasis)

- Transmission: by cysts.
- Causes invasive colitis.

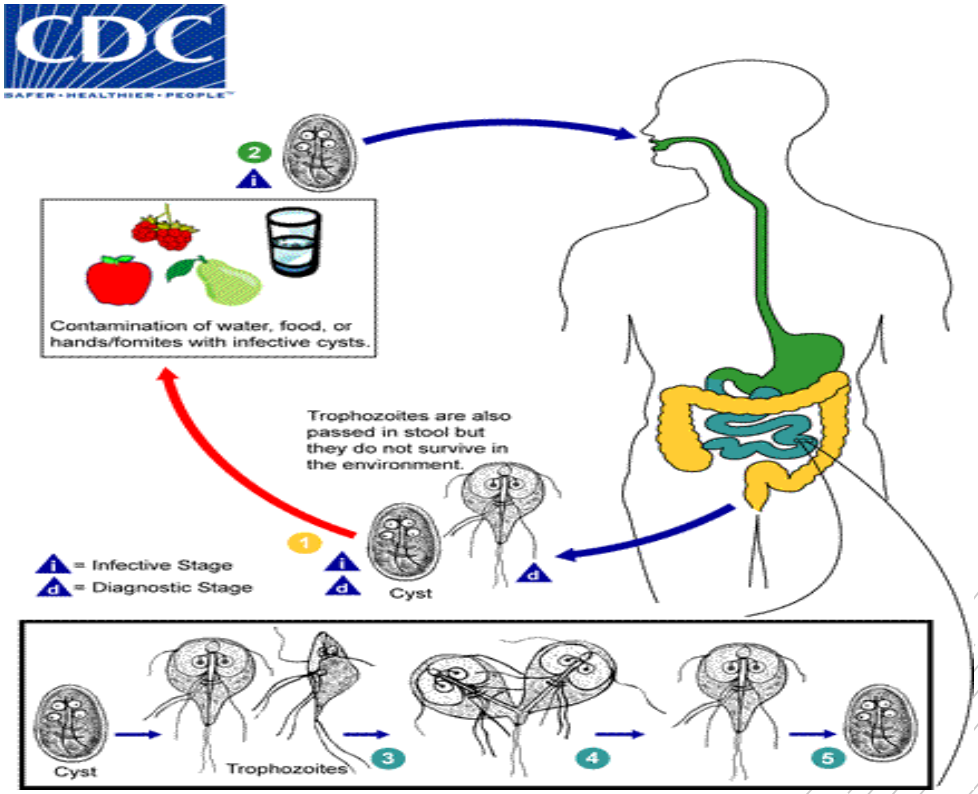
- Presentation:
  - Asymptomatic.
  - acute dysentery.
  - chronic amebiasis.

- Complications: liver abscess.
- Diagnosis: stool microscopy, serology.
- Treatment: metronidazole.



GASTROENTERITI (Giardiasis)

- Transmission:
  - Colonize upper small intestine.
- Presentation: asymptomatic – mild to moderate: abd. pain, flatulence.
- May become chronic.
- Diagnosis: stool microscopy.
- Treatment: metronidazole.



VIRAL HEMORRHAGIC FEVERS: (dengue fever)

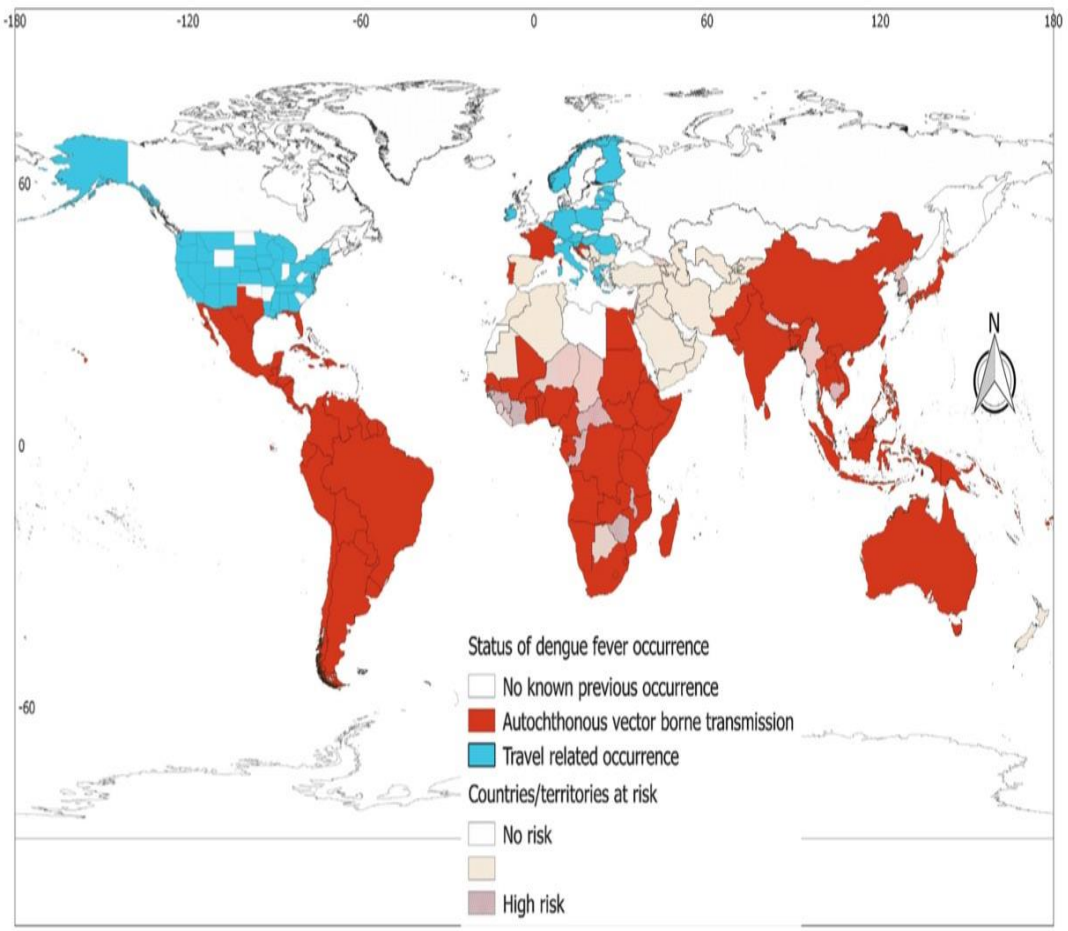


Figure 5. Global dengue fever occurrence. The global distribution of dengue fever corresponds well with the global dengue risk. The distribution of dengue fever extends to the temperate part of the world, with some European countries reporting its occurrence. It is emphasized that displaying occurrences at the country level overstates the distribution of the virus, especially in China, Argentina, and Chile.

DENGUE VIRUS

- Causes dengue and dengue hemorrhagic fever.
- Is an arbovirus.
- Transmitted by mosquito: Aedes Aegypti.
- Composed of single-stranded RNA.
- Has 4 serotypes (DEN-1, 2, 3, 4).

DENGUE CLINICAL SYNDROMES

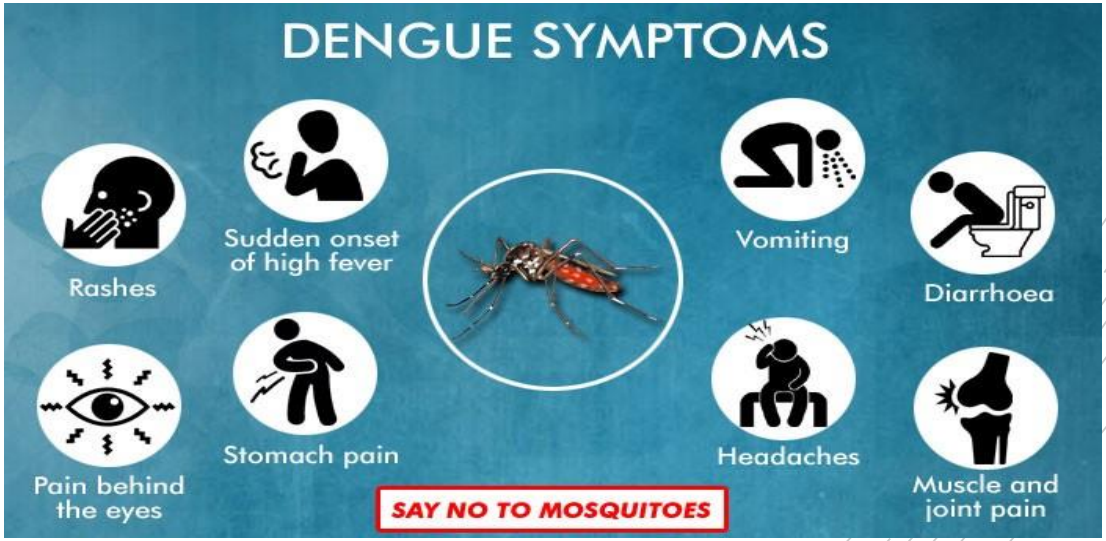
- Undifferentiated fever.
- Classic dengue fever.
- Dengue hemorrhagic fever.
- Dengue shock syndrome.

CLINICAL CHARACTERISTICS OF DENGUE FEVER

- Fever.
- Headache.
- Muscle and joint pain.
- Nausea/vomiting.
- Rash.
- Hemorrhagic manifestations.

HEMORRHAGIC MANIFESTATIONS OF DENGUE

- Skin hemorrhages: petechiae, purpura, ecchymoses.
- Gingival bleeding.
- Nasal bleeding.
- Gastro-intestinal bleeding: hematemesis, melena.
- Hematuria.
- Increased menstrual flow.



DANGEROUS SIGNS IN DENGUE HEMORRHAGIC FEVER

- Abdominal pain - intense and sustained.
- Persistent vomiting.
- Abrupt change from fever to hypothermia, with sweating and prostration.
- Restlessness or somnolence.

PREVENTION

- Elimination & destruction of mosquitos and larval habitat:

  Space Spraying of insecticide is not usually effective.

  Spraying residual insecticides in-door.

  Larval source reduction : Cover water holding containers.

- Personal protection against mosquito biting:

  Screening

  Protective clothing

  Repellents

- Centralized, vertically-structured programs with military-type organization, strict supervision, high level of discipline.
- Vaccine not yet available, though human trials conducted

TREATMENT

- Symptomatic treatment.
- Hydration.
- Avoid NSAIDS or Aspirin, only acetaminophen for fever, headache or arthralgia.
- Platelet transfusion only if platelets <10-20.

RIFT VALLEY FEVER

What is Rift Valley fever?

- Rift Valley fever (RVF) is an acute, fever-causing viral disease that affects domestic animals (such as cattle, buffalo, sheep, goats, and camels) and humans. RVF is most commonly associated with mosquito-borne epidemics during years of unusually heavy rainfall.
- The disease is caused by the RVF virus, a member of the genus Phlebovirus in the family Bunyaviridae. The disease was first reported among livestock by veterinary officers in Kenya in the early 1900s.

RIFT VALLEY FEVER

On 11 September 2000, the Ministry of Health (MOH) of the Kingdom of Saudi Arabia (Riyadh) received reports of unexplained severe hepatitis in 7 patients from the Jizan region at the southwestern border of Saudi Arabia.

A team from the MOH started investigations within 24 h after notification. Clinical manifestations included low-to-moderate–grade fever, abdominal pain, vomiting, diarrhea, and elevated liver enzyme levels progressing to liver failure, encephalopathy or encephalitis, disseminated intravascular coagulation (DIC), renal failure, and, in 5 of the 7 patients, death.

RIFT VALLEY FEVER

- Next outbreak was reported in Yemen.
- Now Rift valley fever is considered to be at a low level of endemicity in Saudi Arabia.
- Treatment is symptomatic.
- Vaccines for veterinary use are available.

LEISHMANIASIS

- leishmaniasis is a protozoal disease caused by Leishmania parasite, which is transmitted by the sand fly.

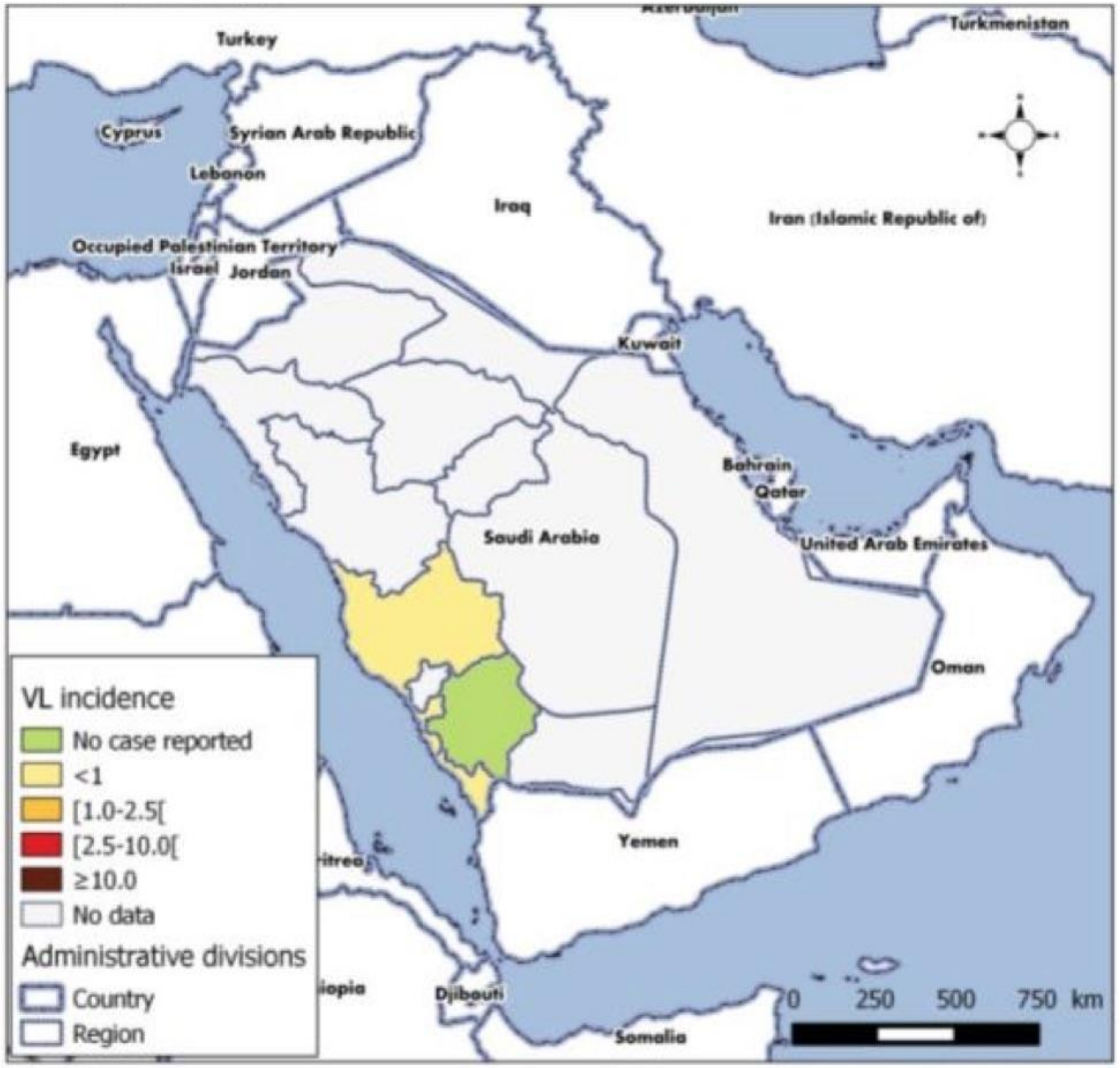
- Leishmaniasis is of three types:
  - cutaneous leishmaniasis.
  - muco-cutaneous.
  - visceral (Kala-azar).

SAUDI ARABIA & LEISHMANIASIS

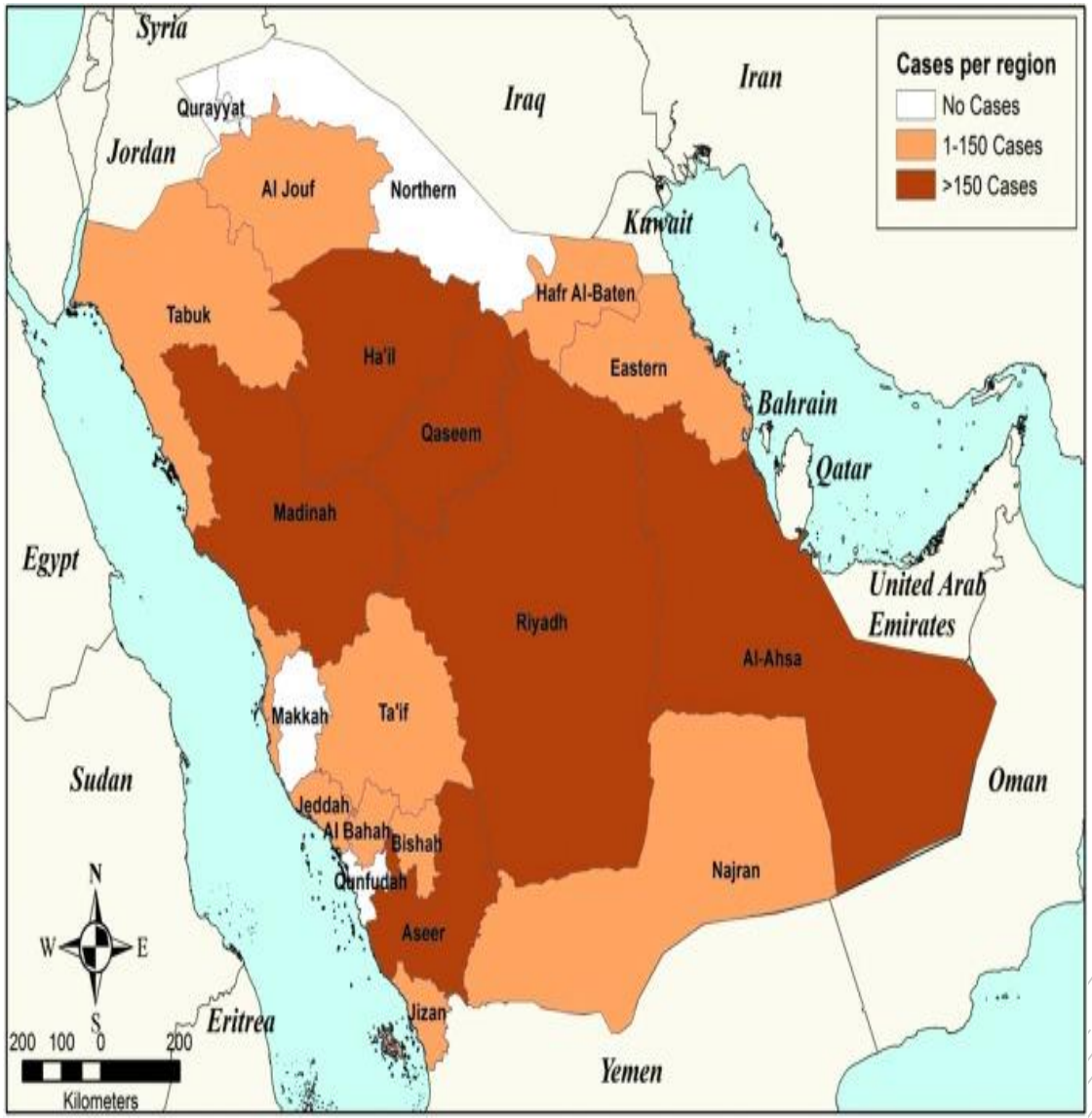
- It is known in the Kingdom since 1950.
- Ministry of Health established the Leishmaniasis unit in the 1980s to follow the disease in the country.

VISCERAL LEISHMANIASIS

Incidence of VL Saudi Arabia in 2014 at region level per 10 000 population

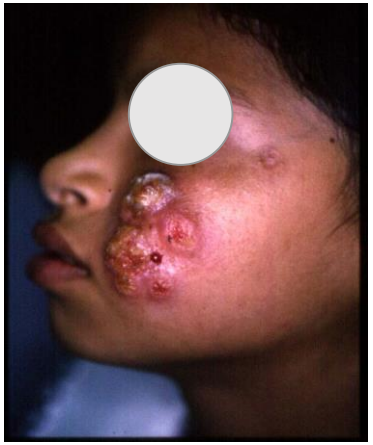


GEOGRAPHIC DISTRIBUTION OF CUTANEOUS LEISHMANIASIS

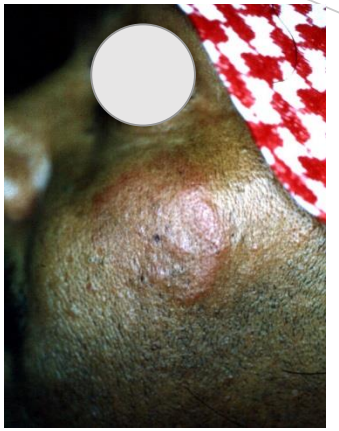


Map of the Kingdom of Saudi Arabia showing the distribution of reported cases of CL in 2015 by region.

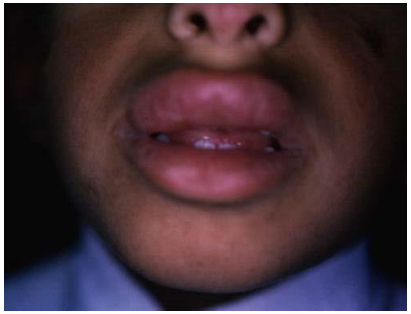
TYPES OF CUTANEOUS LEISHMANIASIS



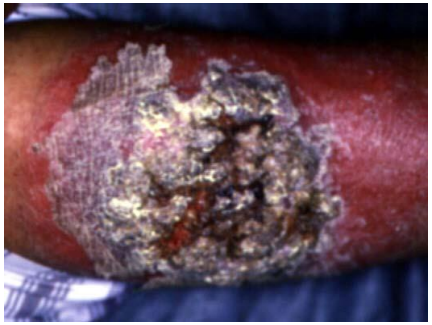
Hyperkeratotic



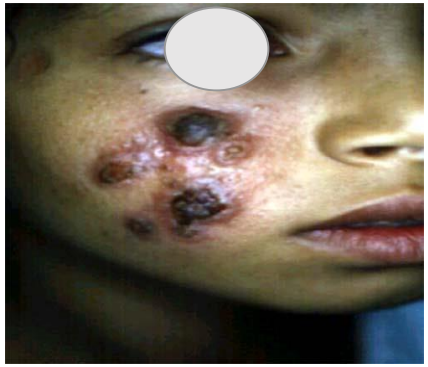
Recidivans



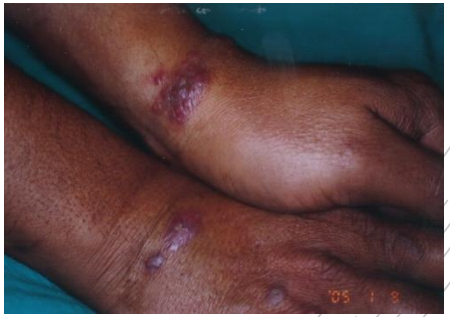
Mucosal

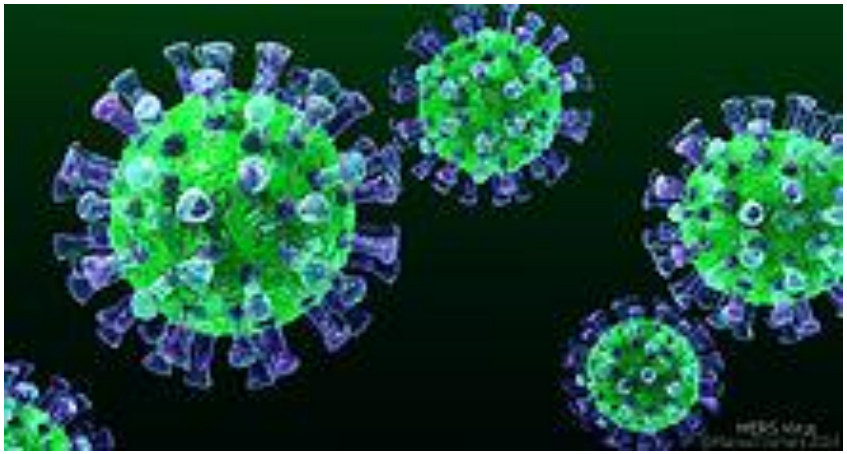


Erysipeloid



Plaque





MERS CoV

MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS

CNN

5 DEAD FROM SARS-LIKE VIRUS

Scientists race to understand deadly new virus | Science News - Mozilla Firefox

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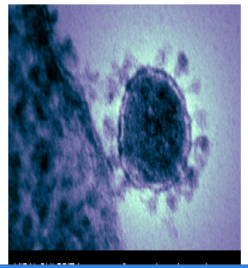
NEWS IMMUNE SCIENCE, 2013 SN TOP 25

Scientists race to understand deadly new virus

SARS-like infection causes severe illness, but may not spread quickly

BY TINA HESMAN SAEY 5:18PM, FEBRUARY 27, 2013

WASHINGTON – A deadly new virus has scientists scrambling to learn more about it and figure out whether the virus will become a pandemic or remain a limited threat.



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MERS CoV

OUTBREAK :

-2012 emerged in Saudi Arabia

-2014 March -April increased dramatically in Arabian Peninsula → declined sharply in ensuing months. → still detected cases

-2015 May -early July : in South Korea : large outbreak (the index case was an individual who had traveled to the Arabian Peninsula)

-2015: large outbreak began in a hospital in Riyadh, Saudi Arabia

Last data:

https://www.moh.gov.sa/CCC/events/national/Pages/2019.aspx

WHERE DOES THE VIRUS COME FROM?

- Partial sequence found in bat in Saudi Arabia near location of human case.
- Growing evidence that camels play an important role in transmission across the region.
- Virus has been detected in dromedary camels in:
- Saudi Arabia, Egypt and Qatar.
- Antibodies have been found in camels in: (? Cross reactivity !!)
- Jordan, Tunisia, Ethiopia, Nigeria, Egypt, Saudi Arabia, Canary Islands, UAE.
- MERS-CoV likely widespread in camels throughout region.
- Transmission likely occurring from camel to human.

CASE DEFINITION AND SURVEILLANCE GUIDANCE

Age	Clinical Presentation	Epidemiologic Link
Adults	I. Severe pneumonia (severity score ≥3 points) (Appendix A) or ARDS (based on clinical or radiological evidence)	Not required
Adults[2]	II. Unexplained deterioration[3] of a chronic condition of patients with congestive heart failure or chronic kidney disease on hemodialysis	Not required
Children and adults	III. Acute febrile illness (T ≥38^0 C) with/without respiratory symptoms OR IV. Gastrointestinal symptoms (diarrhea or vomiting), AND leukopenia (WBC≤3.5x10^9 /L) or thrombocytopenia (platelets < 150x109/L)	Within 14 days before symptom onset: 1. Exposure[4] to a confirmed case of MERS-CoV infection OR 2. Visit to a healthcare facility where MERS-CoV patients(s) has recently (within 2 weeks) been identified/treated OR 3. Contact with dromedary camels[5] or consumption of camel products (e.g. raw meat, unpasteurized milk, urine)

MERS CoV: DIAGNOSIS AND TREATMENT

DIAGNOSIS:

Real-time reverse-transcriptase polymerase chain reaction (rRT-PCR) for respiratory secretions.

EXPERIMENTAL TREATMENT:

- Convalescent plasma.
- IVIG.
- IFN.
- Protease Inhibitors used In HIV infection.
- Ribavirin.
- Corticosteroids.
- Nitazoxanide.
- Cyclosporin A.
- Combination therapy.

Treatment is mainly SUPPORTIVE

No vaccine available

OTHER ENDEMIC DISEASES OF SAUDI ARABIA

- Malaria is endemic in Saudi Arabia.
- Tuberculosis is endemic in Saudi Arabia.

These are amongst the most important of the endemic diseases.

Malaria and Tuberculosis have been covered fully in previous lectures.

THANK YOU