



SEASONAL AWARENESS AND ALERT LETTER (SAAL)

For Epidemic-prone infectious diseases in Pakistan

Summer / Monsoon Season

OBJECTIVES OF SAAL

- To alert concerned health authorities and professionals at all levels about the epidemic-prone infectious diseases in the summer/Monsoon season.
- To facilitate the preparations for timely and efficient response to the encountered alerts/outbreaks/ epidemics and thus reduce the associated morbidity and mortality.

DATA SOURCES

The available national data collected during 2015 to May 2020 by FE&DSD, NIH, Provincial Health Departments, Provincial Disease Surveillance & Response Units (PDSRUs), Expanded Program on Immunization (EPI), Directorate of Malaria Control and laboratory based data from NIH has been analyzed to assess the exhibited patterns of high priority communicable diseases.

The description of all priority diseases has been arranged in an alphabetical order. Additionally, under the section of National Potential Public Health Events, technical detail on the Heat stroke and Primary Amebic Meningoencephalitis infection is included. Ebola Virus disease and Middle East Respiratory Syndrome Corona Virus (MERS CoV) have been shared as International Public Health Events.

Outbreak - Prone Diseases	Alerts
Chikungunya	
Cholera (Acute watery Diarrhea)	
Coronavirus disease 2019 (COVID-19)	
Crimean Congo Hemorrhagic Fever (CCHF)	
Dengue Fever	
Diphtheria	
Leishmaniasis	
Malaria	
Measles	
Meningococcal Meningitis	
Pertussis	
Poliomyelitis	
Typhoid Fever (XDR)	
	High Alert- peak occurrence in the Summer/Monsoon season
	Medium Alert- cases will be encountered and may show up as an outbreak

Cholera (Acute Watery Diarrhea)

Introduction: Cholera is an acute, diarrheal illness caused by infection of the intestine due to bacterium *Vibrio cholerae*. It remains a global threat to public health and is global indicator of inequity and lack of social development. It is estimated that every year, there are 1.3 to 4.0 million cases of cholera, and 21,000 to 143,000 deaths worldwide due to the infection (1).

Clinical Picture: Cholera infection is often mild or without symptoms, but can sometimes be severe and life threatening. Approximately 5-10% infected persons in the early stages will have severe disease characterized by profuse watery diarrhea, vomiting, and leg cramps. In these people, rapid loss of body fluids leads to dehydration and shock (1).

Reservoir of Infection: Humans and aquatic environment are reservoirs for *V. cholerae* O1 and O139. Humans are considered the primary reservoir and can be asymptomatic carriers (2).

Infectious Agent: *Vibrio cholerae* (1)

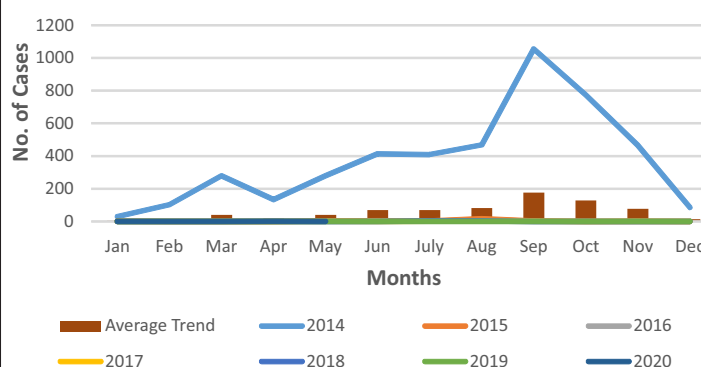
Mode of transmission: Infection results from ingestion of organisms present in contaminated food and water or directly from person to person by the fecal–oral route (3)

Incubation period: Few hours to 5 days (4)

Infectivity period: The contagious period for cholera begins as soon as the organism is excreted in the feces. This can occur as early as about 6 to 12 hours after exposure to the bacteria and can last for about 7 to 14 days (5).

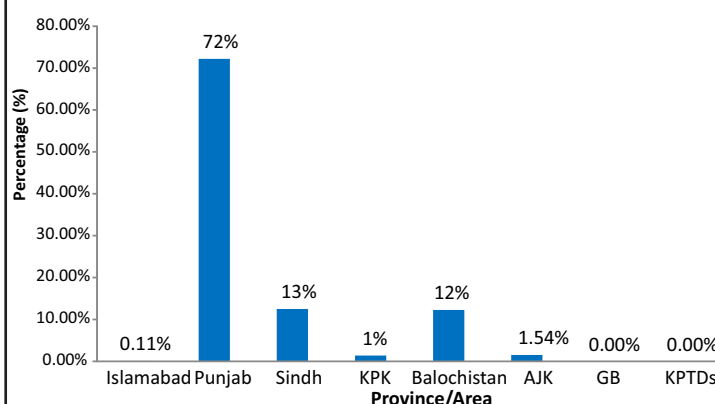
Seasonality: Throughout the year; higher incidence from August to November in hot, humid and rainy season (6).

Reported Lab Confirmed AWD Cases month wise in Pakistan from January 2014 to May 2020 (n=4,551)



Geographical Distribution in Pakistan:

Province/Area wise Distribution of Lab Confirmed AWD Cases in Pakistan from January 2014 to May 2020 (n=4,551)



Alert Threshold: One suspected case of AWD is an alert (7).

Outbreak Threshold: One lab confirmed case, or cluster of 6 or more cases of AWD in one location, is an outbreak (7).

Case Definitions:

Suspected case: Three or more abnormally loose or fluids stools in the past 24 hours and/or with dehydration

Probable Case:

- Person aged over 5 years with severe dehydration or death from acute watery diarrhea with or without vomiting OR
- Person aged above / less 2 years with acute watery diarrhea in an area where there is a Cholera outbreak.

Confirmed Case: Any suspected case confirmed through isolation of *Vibrio cholerae* 01 or 0139 from the stool (7)

Specimen Collection and Transportation:

- Place specimen in clean container and transport to laboratory within two hours of collection at room temperature
- If there is a 72 hours delay, place stools soaked swab in a Cary-blair transport medium (7).

Case Management: ORS should be given orally every hour. Even with severe dehydration, intravenous electrolyte solutions should be used only for initial rehydration, including those who are in shock. Severely dehydrated patients require administration of intravenous fluids. Ringer's Lactate Solution (Hartman's Solution) is the preferred fluid for intravenous rehydration.

Antibiotics (Doxycycline, Ciprofloxacin, Cefixime, Cotrimoxazole, Erythromycin) reduce the duration of disease and period of excretion of *V. cholerae* in the stool of an infected patient (7).

Preventive measures & vaccination: Ensure adequate safe drinking water supply and proper sanitation. (7).

People (visitors or residents) in areas where cholera is occurring or has occurred should observe the following recommendations:

- Drink only bottled, or chemically treated water and bottled or canned carbonated beverages. When using bottled drinks, make sure that the seal has not been broken. To make water safe for drinking, it is advisable to boil or chlorinate it.
- Use bottled, boiled or chemically treated water to wash Fruits, Vegetables & dishes and for preparing food.
- To disinfect water: boil for 1 minute or filter the water and add 2 drops of household bleach or ½ an iodine tablet per liter of water
- Avoid drinking tap water
- Wash hands often with soap and clean water
- If no water and soap are available, use an alcohol-based hand cleaner (with at least 70% ethyl alcohol)
- Clean hands especially before eating or preparing food and after using the bathroom
- Eat food that is packaged or is freshly cooked.
- Do not eat raw and undercooked meat or unpeeled fruits and vegetables
- Dispose off feces in a sanitary manner to prevent contamination of water and food sources (4)

Vaccination: A single-dose live oral cholera vaccine (lyophilized CVD 103-HgR) for adults 18–64 years old is recommended who are traveling to an area of active cholera transmission. Two other oral inactivated or non-live cholera vaccines, Dukoral® and ShanChol®, are World Health Organization (WHO) prequalified. No cholera vaccine is 100% protective and

vaccination against cholera is not a substitute for standard prevention and control measures (4).

References: References are available in online version at www.nih.org.pk

Coronavirus Disease 2019 (COVID-19)

Introduction: A Novel Coronavirus Disease (COVID-19), is a member of the coronavirus family that has never been identified or encountered before. Coronaviruses are large family of viruses causing illness in humans as well as among animals i.e. camels, cats and bats. MERS-COV and SARS-CoV-1 also belongs to the same family.

Outbreak of this viral disease started in Wuhan city, capital of central China's Hubei province during late December 2019, when a cluster of patients were admitted to hospitals in Wuhan with an initial diagnosis of pneumonia of unknown aetiology (1). The cluster was epidemiologically linked to a local seafood and wet animal wholesale market, suggestive of zoonotic spill over. Amid the rising spread of the 2019 Novel Coronavirus cases globally, the World Health Organization has declared this outbreak as a Public Health Emergency of International Concern (PHEIC) on January 30, 2020 (2).

COVID-19 cases from 26th February to 31st May, 2020 in Pakistan:

Number of COVID-19 suspected cases till date	Number of COVID-19 Lab. confirmed cases till date	Number of deaths due to COVID-19 till date
5,27,173	72,460	1,543

Infectious Agent: Severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) belongs to the beta CoV category of coronavirus family. It's a single-stranded RNA genome (3).

Clinical Picture: The clinical course of the COVID-19 is divided into three categories;

Mild Symptoms: It usually presents with symptoms of upper respiratory tract viral infection, including fever, cough (dry), sore throat, and nasal congestion. Some patients may present with gastrointestinal symptoms like nausea, vomiting, diarrhea, loss of sense of smell and taste.

Moderate Symptoms: Respiratory symptoms include cough and shortness of breath (or tachypnea in children) with or without fever may present, coupled with headache, muscle pain, or malaise and later loss of smell and taste in some cases.

Severe Symptoms: High grade fever is associated with severe dyspnea, respiratory distress, tachypnea (> 30 breaths/min), and hypoxia (SpO₂ < 90% on room air). However, the fever symptom must be interpreted carefully as even in severe forms of the disease, it can be moderate or even absent. Cyanosis can occur in children. In this definition, the diagnosis is clinical, and radiologic imaging is used for excluding complications. Chest imaging utilized includes chest radiograph, CT scan, or lung ultrasound demonstrating bilateral opacities (lung infiltrates > 50%) (4).

Asymptomatic/Atypical presentation: Nasopharyngeal/Oropharyngeal RT-PCR positive for SARS-CoV-2 but having no symptoms.

Reservoir: Its origin is not entirely understood, the genomic analyses suggest that SARS-CoV-2 probably evolved from a strain found in bats and snakes. The potential amplifying mammalian host, intermediate between bats and humans, is, however, not known (5).

Modes of Transmission: COVID-19 virus is primarily

transmitted between people through respiratory droplets via coughing, sneezing, or talking and contact routes. It may be possible that a person can become infected by touching a surface or object (fomites) that has the virus present on it and then touching their own mouth, nose, or possibly their eyes, but this is not thought to be the main way the virus spreads. Airborne transmission may be possible in specific circumstances and settings in which procedures or support treatments that generate aerosols are performed; i.e., endotracheal intubation, bronchoscopy, administration of nebulized treatment, turning the patient to the prone position, disconnecting the patient from the ventilator, non-invasive positive-pressure ventilation, tracheostomy, and cardiopulmonary resuscitation.(6)

Incubation Period: It ranges from 02 days to 14 days from the date of last contact to infected person.

Period of Communicability: 02 days before the onset of symptoms and up to 10 days after the onset of illness in mild disease and up to 02 weeks or more in case of severe disease.

Note: COVID-19 is an emerging disease and with the day to day evolving situation, there is more to learn about its transmissibility, severity, and other features.

Alert Threshold: One probable case is an alert and requires an immediate investigation.

Outbreak Threshold: One lab confirmed case of COVID-19 is an outbreak (7).

Case Definitions:

Suspected Case: A. Patient with acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g. cough, shortness of breath), AND a history of travel to or residence in a location reporting community transmission of COVID-19 disease during the 14 days prior to symptom onset; OR

B. A patient with any acute respiratory illness AND having been in contact with a confirmed or probable COVID-19 case (see definition of contact) in the last 14 days prior to symptom onset; OR

C. A patient with severe acute respiratory illness (fever and at least one sign/symptom of respiratory disease, e.g., cough, shortness of breath; AND requiring hospitalization) AND in the absence of an alternative diagnosis that fully explains the clinical presentation. (7)

Probable Case: A. Suspected case for whom testing for the COVID-19 virus is inconclusive. OR

B. A suspect case for whom testing could not be performed for any reason.

Confirmed Case: A person with laboratory confirmation of COVID-19 infection, irrespective of clinical signs and symptoms. (7)

Contact: A contact is a person who experienced any one of the following exposures during 2 days before and 14 days after the onset of symptoms of a probable or confirmed case:

1. Face-to-face contact with a probable or confirmed case within 1 meter/3 feet and close contact for more than 15 minutes;
2. Direct physical contact with a probable or confirmed case;
3. Direct care for a patient with probable or confirmed COVID-19 disease without using proper personal protective equipment; OR

4. Other situations as indicated by local risk assessments.

Note: for confirmed asymptomatic cases, the period of contact is measured as the 2 days before through the 14 days after the date on which the sample was taken which led to confirmation.(7)

Laboratory Confirmation: Routine confirmation of COVID-19 cases is based on detection of COVID-19 virus nucleic acid (RNA) by real time RT-PCR assays. RNA can be extracted from samples such as oropharyngeal/nasopharyngeal swabs, nasal swabs/secretions, bronchoalveolar lavage fluid/washings or sputum, using any standard extraction protocols or kits.

Specimen Collection and Transportation: For transport of samples (nano pharyngeal / oropharyngeal swab) for viral detection, use viral transport medium (VTM) containing antifungal and antibiotic supplements. Avoid repeated freezing and thawing of specimens. If VTM is not available sterile saline may be used instead (in which case, duration of sample storage at 4 °C may be different from what is indicated below.

Aside from specific collection materials also assure other materials and equipment are available: e.g. transport containers and specimen collection bags and packaging, coolers, and cold packs or dry ice, labels and permanent markers, PPE, materials for decontamination of surfaces, etc.(8)

Specimen	Transport to laboratory at	Storage till testing	Comments
Nasopharyngeal and oropharyngeal Swab	4°C	=48 hours: 4 °C >48 hours: -70 °C	The nasopharyngeal and oropharyngeal swabs should be placed in the same tube to increase the viral load.
Bronchoalveolar lavage	4°C	=48 hours: 4 °C >48 hours: -70 °C	
Sputum	4°C	=48 hours: 4 °C >48 hours: -70 °C	Ensure the material is from the lower respiratory tract
(Endo) tracheal aspirate, nasopharyngeal aspirate or nasal wash	4°C	=48 hours: 4 °C >48 hours: -70 °C	

Laboratory testing for 2019 novel coronavirus in suspected human cases.
WHO/2019-nCoV/laboratory/2020.3

Case Management: There is no specific therapeutic presently approved by the U.S. Food and Drug Administration (FDA) to prevent or treat COVID-19. There is no proven role of prophylactic chloroquine or hydroxychloroquine at this time. Current clinical management includes infection prevention & control measures and supportive care, including supplemental oxygen and mechanical ventilatory support when indicated.

Preventive Measures:

1. Clean hands regularly with an alcohol-based hand rub, or wash thoroughly with soap and water.
2. Clean surfaces regularly with recommended disinfectants (70% Ethyl Alcohol or 0.5% bleach solution).
3. Avoid touching eyes, nose and mouth with contaminated hands.
4. Practice respiratory hygiene by coughing or sneezing into a bent elbow or tissue and then immediately dispose off
5. Wear a medical/surgical mask if you have respiratory symptoms and perform hand hygiene after disposing off of the mask
6. Maintain a minimum of mandatory 2 meter or six feet

distance from individuals with respiratory symptoms.

- Healthcare workers are required to select and use appropriate PPE.

Administrative controls

- Ensure the availability of IPC resources such as PPE, appropriate infrastructure, clear IPC policies, access to lab testing, triage and patient placement, adequate staff and training of the staff.

Environmental and engineering controls

- Stay in the ventilated rooms
- Clean the surfaces with recommended disinfectants.

Social Behavior Change:

- Practice social distancing, particularly from individuals showing respiratory symptoms.
- Avoid mass gatherings like weddings, cinemas, crowded shopping malls and restaurants.(9)

Vaccination: No vaccine is currently available. Trials are in process for COVID-19 vaccine. There is currently no evidence that people who have recovered from COVID-19 and have developed antibodies are protected from a second infection. Hence it's a fallacy that detection of antibodies to the SARS-CoV-2, the virus that causes COVID-19, could serve as the basis for an "immunity passport" or "risk-free certificate" that would enable individuals to travel or to return to work assuming that they are protected. The development of immunity to a pathogen through natural infection is a multi-step process. (10)

References: References and Guidelines are available in online version at www.nih.org.pk

CRIMEAN-CONGO HEMORRHAGIC FEVER (CCHF)

Introduction: A tick-borne zoonotic viral disease that is asymptomatic in infected animals, but can be a serious threat to humans (1). Human infections begin with nonspecific febrile symptoms, but can progress to a serious hemorrhagic syndrome with a high case fatality rate (10–40%) (2). It is one of the most widely distributed viral hemorrhagic fevers occurring in different parts of Africa, Middle-East, Asia and Europe. CCHF is endemic in Pakistan with sporadic outbreaks. (3). Occurrence of virus is correlated with the distribution of *Hyalomma* tick species (Principle vector) (4).

Clinical Picture: Sudden onset with initial signs and symptoms including headache, high grade fever, backache, joint pain, upper abdominal pain, vomiting, redness of eyes, a flushed face, sore throat, and petechiae (red spots) on the palate. Symptoms may also include jaundice along with changes in mood and sensory perception. With progression of the illness, large areas of severe bruising, severe nose bleeds, and uncontrolled bleeding at injection sites can be seen, usually beginning on the fourth day of illness and lasting for about two weeks(5).

Infectious Agent: Crimean-Congo Haemorrhagic Fever (CCHF) Virus belongs to *Bunyaviridae* family (1)

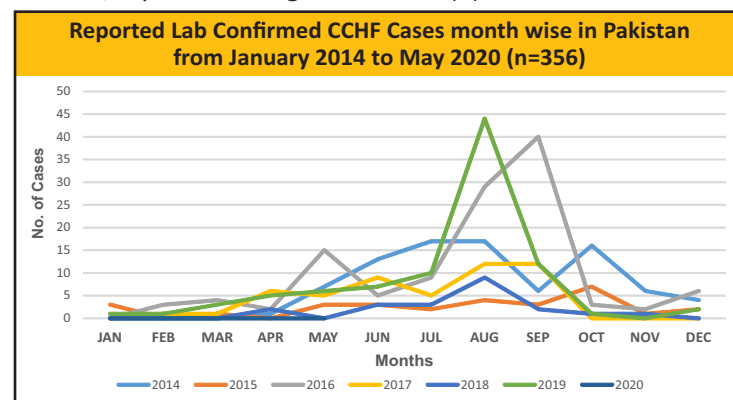
Reservoir: *Hyalomma* tick, domestic animals, such as cattle, goats, sheep, rodents, such as hedgehogs, rats, hares and birds are generally resistant with the exception of Ostrich (6).

Mode of transmission: Bite of the infected *Hyalomma* tick (vector), handling of tick infested animals, direct contact with blood / tissue of infected domestic animals (slaughtering); or direct contact with blood / tissue of infected patients. Nosocomial infections are common sources of transmission (7).

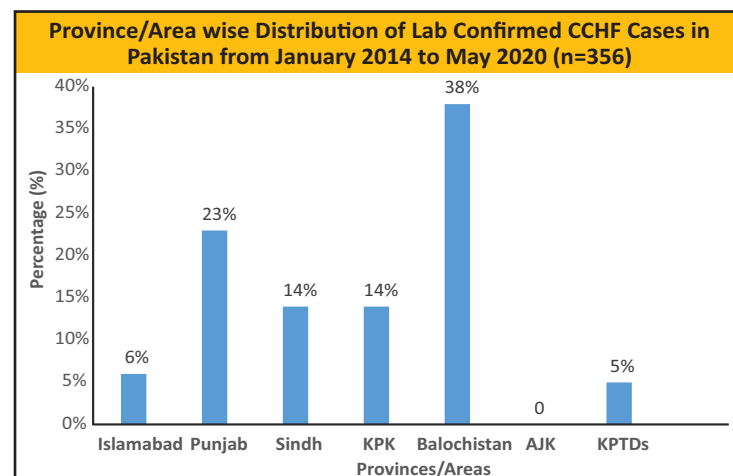
Incubation Period:

- 1-3 days after tick bite
- 5–6 days after exposure to infected blood or tissues with a (documented) maximum of 13 days (8).

Seasonality: Peak of cases occur during Fall and Spring seasons, associated with life-cycle of ticks, exposure of new born animals, exposure of migrant animals (9).



Geographical Distribution in Pakistan: Since the diagnosis of first human case of CCHF in 1976, the sporadic cases have continued to occur all over in Pakistan and predominantly from Balochistan.



Alert Threshold: One probable case is an alert and requires immediate investigation (11).

Outbreak Threshold: One lab confirmed case of CCHF is an outbreak (11).

Case definitions:

Suspected Case: Any person with sudden onset of fever over 38.5°C for more than 72 hours and less than 10 days, especially in a CCHF endemic area and those in contact with livestock such as shepherds, butchers, animal handlers and health care personals (11).

Probable Case: Suspected case with history of febrile illness of 10 days or less with an epidemiological link AND any two of the following: thrombocytopenia less than 50,000/mm³, petechial or purpuric rash, epistaxis, haematemesis, haemoptysis, blood in urine and/or stools, ecchymosis and gum bleeding (11).

Confirmed Case: Suspected/Probable case confirmed through PCR and/or serology (11).

Laboratory Confirmation: Blood for PCR test and ELISA test

Specimen Collection and Transportation: Collect 3-5ml of blood in vacutainer observing strict biosafety precautions. Keep in upright position to prevent hemolysis. Transport to the laboratory in triple package with ice packs along with a prominent Bio-Hazard label and complete lab request form with brief history of the patient (11).

Case Management

- Patients with probable or confirmed CCHF should be isolated and cared for using strict barrier-nursing techniques with recommended Infection Prevention & Control (IPC) measures i.e. standard plus contact precautions. Use additional precautions, (droplet/aerosol) in case of any extensive contact/procedure.
- Only designated medical / para-medical staff and attendants should attend the patient.
- All medical, para-medical staff and attendants should wear recommended Personal Protective Equipment (PPE) before entering the isolation room and must dispose it properly after use.
- All secretions of the patient and hospital clothing in use of the patient and attendants should be treated as infectious and where possible, should be autoclaved before incinerating.
- Every effort should be made to avoid spills, pricks, injury and accidents during the management of patients. Needles should not be re-capped but discarded in proper safety disposal box.
- All used material e.g. syringes, gloves, cannula, tubing etc. should be collected in autoclave-able bags and autoclaved before incinerating.
- After the patient is discharged from the hospital, room surfaces should be wiped down with disinfectant like sodium hypochlorite (NaOCl) 10% solution and the room should be fumigated in case of risk for tick infestation (12).

Treatment: General supportive therapy is the mainstay of CCHF management. Intensive monitoring to guide volume and blood component replacement is recommended. If the patient meets the case definition for probable CCHF, oral Ribavirin needs to be initiated immediately in consultation with the attending physician. Studies suggest that Ribavirin is most effective if given within the first 6 days of illness. Oral Ribavirin: 30 mg/kg as loading dose, followed by 16 mg/kg every 6 hours for 4 days and then 8 mg/kg every 8 hours for next 3 days (12).

Prophylaxis Protocol:

- The efficacy for post exposure Ribavirin in the management of hospital-associated CCHF, remains anecdotal.
- It may be given in a high loading dose (35 mg/kg orally followed by 15 mg/kg three times daily for 10 days) and only for high-risk settings e.g. needle stick injury, mucous membrane contamination, emergency resuscitative contact, or prolonged intimate exposure during transport after baseline blood tests.
- Household or other contacts of the case who may have been exposed to infected ticks or animals, or who recall indirect contact with case body fluids should be monitored for 14 days from the date of last contact with the patient or other source of infection by taking the temperature twice daily. If the patient develops temperature of 38.5°C or greater, with headache and muscle pains, he/she would be considered as a probable case and should be admitted to hospital and started on Ribavirin treatment immediately (12).

Preventive measures: Educate public about the mode of transmission and personal protection. Persons living in endemic areas must be educated on:

- o Avoidance of areas where tick vectors are abundant,

especially when they are active (spring to fall).

- o Regular examination of clothing and skin for ticks, and their removal (without crushing them).
- o Wearing light colored clothing, covering legs and arms, and using repellents on the skin.
- o Other measures, such as wearing gloves or other protective clothing to prevent skin contact with infected tissues or blood, may be taken by persons who work with livestock or other animals.

For tick control, animal dipping/spraying in an insecticide solution of Permethrin/Pyrethrin/DEET is used. Injectable insecticide like Ivermectin is also recommended.

- Butchers should wear gloves and other protective clothing to prevent skin contact with freshly slaughtered meat, blood and other tissues. Meat should be drained for least 30 minutes, before distribution to public.
- Hospitals in endemic areas should ensure standard plus contact precautions in OPD and emergency rooms. Ensure injection safety measures and maintain stock of Ribavirin with PPE.
- Bio-safety is the key element to avoid nosocomial infection. Suspected or confirmed CCHF cases must be isolated and cared by using barrier-nursing techniques to prevent transmission of infection to health workers and others.
- In case of death of patient positive with CCHF, family members should be advised to follow safe burial practices.
- Exposed contacts: Those with high risk exposure (needle stick, sharps, blood or body fluids) contacts should be observed for fever for 14 days. If fever develops, Ribavirin should be started immediately (12).
- There is no approved vaccine available (13).

Guideline Link: <https://www.nih.org.pk/wp-content/uploads/2019/07/Advisory-CCHF-July-2019.pdf>

References: References are available in online version at www.nih.org.pk

DENGUE FEVER

Introduction: Dengue is a mosquito-borne viral disease (also known as break bone fever), causes flu-like illness, and occasionally develops into a potentially lethal complication called severe Dengue. The global incidence of Dengue has grown dramatically in recent decades and about half of the world's population is now at risk [1]. The first confirmed outbreak of Dengue fever in Pakistan was in 1994, but a sudden surge in Dengue cases and the annual epidemic trend in the provinces has been observed multiple times there after [2].

Clinical Picture:

Dengue fever: Dengue fever is defined by fever (for >3 days and < 10 days) as reported by the patient or healthcare provider and the presence of one or more of the following signs and symptoms i.e. nausea/vomiting, rash, aches and pains (e.g. headache, retro-orbital pain, joint pain, myalgia, arthralgia), tourniquet test positive, Leukopenia (Platelets count <150,000).

Dengue Hemorrhagic Fever: Defined as Dengue fever with any one or more of the warning signs i.e. severe abdominal pain or persistent vomiting, red spots or patches on the skin, bleeding from the nose or gums, blood in vomiting, black tarry stools (feces, excrement), drowsiness or irritability, pale, cold or

clammy skin, difficulty in breathing, a total white blood cells count of $<50,000/\text{mm}^3$ and Platelets count $<100,000$. **OR**

Dengue shock syndrome (DSS): Defined as a syndrome due to dengue virus with any one or more of the following scenarios:

- Severe plasma leakage evidenced by hypovolemic shock and/or extravascular fluid accumulation (e.g. pleural or pericardial effusion, ascites) with respiratory distress,
- Severe bleeding from the gastrointestinal tract and
- Vital organs involvement [3].

Note: In 1-3% of cases, the disease develops into the life-threatening Dengue Hemorrhagic Fever (DHF), sometimes progressing into Dengue shock syndrome (DSS) [4].

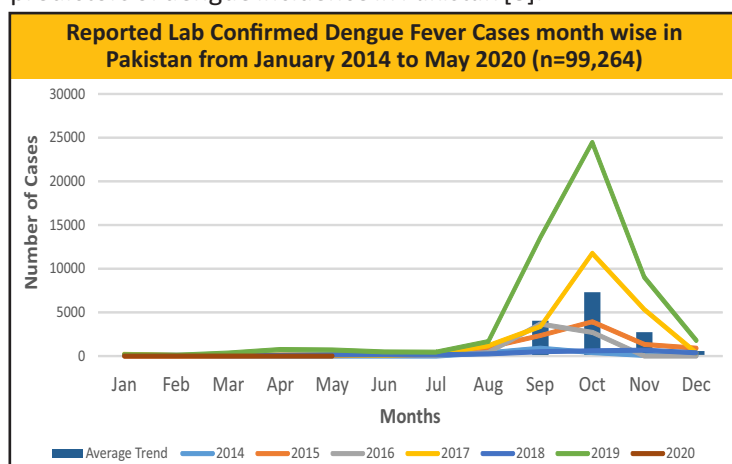
Infectious Agent: Belonging to Flavivirus group; four different Dengue viruses (serotypes) are known: *DEN1*, *DEN2*, *DEN3*, and *DEN4* [5].

Mode of transmission: Bite of infected mosquitoes, *Aedes Aegypti* and *Aedes Albopictus* [6].

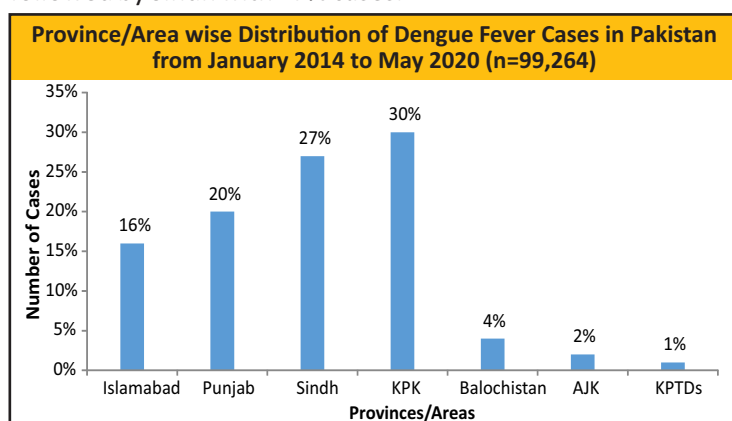
Incubation period: 3-14 days (average 4-7 days) after the infective bite [7].

Period of communicability: 2-7 days [7].

Seasonality: Cases are increased during and after rainy seasons as compared to winter and summer seasons. Relatively humidity, temperature and rain remained significant predictors of dengue incidence in Pakistan [8].



Geographical distribution: From January 2014 to May 2020, KPK remained the most affected province with 30% of cases followed by Sindh with 27% cases.



Alert threshold for Dengue fever: Cluster of 3 suspected cases with at least one confirmed case [10].

Alert threshold for Dengue hemorrhagic fever: One probable case is an alert and requires an immediate investigation to assess differential diagnosis with CCHF.

Outbreak threshold: Cluster of 6 suspected cases and one lab confirmed case is an outbreak [10].

Case Definitions:

Suspected Case: A clinically compatible case of Dengue fever, or Dengue hemorrhagic fever [11]

Probable Case: A clinically compatible case of Dengue fever, or Dengue hemorrhagic fever with an epidemiologic linkage and laboratory results indicative of probable infection [11].

Confirmed Case: A clinically compatible case of dengue fever, or Dengue hemorrhagic fever with confirmatory laboratory results [11].

Lab confirmation:

Probable: Detection of IgM anti-DENV by validated immunoassay in a serum specimen in those areas where multiple *flaviviruses* are circulating.

Confirmatory:

- Detection of DENV nucleic acid in serum, plasma, blood by Reverse Transcriptase-PCR,
- Detection in serum or plasma of DENV Non Structural Protein 1 (NS1) antigen by a validated immunoassay.

Timings:

- PCR: Initial 4-5 days of onset of illness
- NS1: One day post onset of symptoms (DPO) up to 18 DPO

- Serology:

- o IgM antibodies are detectable after 4th day of onset of illness (acute).
- o IgG is used for the detection of past Dengue infection and usually can be detected during 2nd week of illness [11].

Specimen Collection and Transportation: Collect 5 ml of blood, centrifuge, and separate serum for analysis, observing strict safety precautions. Transport serum specimens to the lab in triple container packing with ice packs or frozen with dry ice (for long distance) along with a prominent bio hazard label and complete lab request form with brief history of the patient [10].

Case Management

Febrile Phase: In the early febrile phase, it is not possible to distinguish DF from DHF. The treatment during febrile phase is symptomatic and mainly supportive, as follows:

- Paracetamol 10 mg/kg/dose in children and 500-1,000 mg/dose in adult. Maximum adult dose is 4 grams/day. Do not give Aspirin or other NSAID like Ibuprofen.
- Extra amounts of fluids Oral rehydration therapy/salt (ORT/ORS) is recommended for patients with moderate dehydration.
- Complete blood count (CBC/CP) with follow up is an important tool in the management of suspected Dengue patients.
- Provide brochure for families about the "warning signs" together with other recommendation.
- All Dengue patients must be carefully observed for the signs of shock at least for 24 hours after recovery from fever.
- The patient who does not have any evidence of circulatory disturbance and who has been afebrile for > 24 hours does not need further observation and may be discharged [10].

Protocol for management according to Phases of DHF

a. Dengue hemorrhagic fever (DHF) Grades I and II:

As in DF, during the afebrile phase of DHF Grades I and II, the patient has the same symptoms as during the febrile phase. The clinical signs plus thrombocytopenia and rise in hematocrit are sufficient to establish a clinical diagnosis of DHF. During this situation hospitalized the patient and treat accordingly.

b. DHF Grades III and IV (DSS):

- Common manifestations observed during the afebrile

phase of DHF Grade III are circulatory failure manifested by rapid and weak pulse, narrowing of the pulse pressure characterized by high diastolic pressure relative to systolic pressure, e.g. 90/80 mm of Hg (this is usually due to plasma leakage) or hypotension (possibly due to bleeding), the presence of cold clammy skin and restlessness or lethargy.

- Immediately shift the patient to Intensive care unit (ICU) and treat accordingly.
- The mortality is up to 30%, without treatment but less than 1%, providing adequate treatment by experienced physician in a dedicated facility [10].

Preventive measures:

- Identify and destroy mosquito larval habitats and indoor breeding sites.
- Community awareness sessions should be conducted in schools, through religious leaders, aiming to promote health education campaigns.
- Proper solid waste disposal and improved water storage practices, including covering containers to prevent access by egg-laying female mosquitoes.
- Protection against mosquitoes including use of screening, protective clothing and repellents [10].

Vaccination: In late 2015 and early 2016, the first Dengue vaccine, Dengvaxia (CYD-TDV) was registered in several countries for use in individuals aged 9-45 years with lab confirmed dengue infection and living in endemic areas [12]. WHO recommends that countries should consider introduction of the Dengue vaccine CYD-TDV only in geographic settings (national or subnational) where epidemiological data indicate a high burden of disease [13].

Guideline Link: <https://www.nih.org.pk/wp-content/uploads/2020/04/Advisory-on-Dengue-Fever.pdf>

References: References are available in online version at www.nih.org.pk

Leishmaniasis

Introduction: Leishmaniasis is a parasitic vector borne disease and is classified as a Neglected Tropical Disease (NTD). It can present as cutaneous, mucosal and visceral forms but the most common form is cutaneous Leishmaniasis (1).

Leishmaniasis is found in areas of more than 90 countries in the tropics, subtropics, and southern Europe. The annual incidence of new cases is estimated between 1.5 and 2 million. Geographical distribution of the disease depends on sand fly species acting as vectors (2).

Infectious agent: Leishmaniasis is caused by a protozoa parasite from over 20 Leishmania species (1).

Mode of transmission: Spread by the bite of the sand fly on the skin. If animals are the primary host reservoirs, it is called Zoonotic Leishmaniasis, if humans are the primary host reservoirs is called Anthroponotic Leishmaniasis. (Human-sand fly-human) (1).

Incubation period: Considered to be at least a week but may extend up to several months [4].

Clinical Features:

(A) Visceral Leishmaniasis (VL): Also known as kala-azar, is fatal if left untreated in over 95% of cases. It is characterized by irregular bouts of fever, weight loss, with anemia and enlargement of the spleen and liver.

(B) Cutaneous Leishmaniasis (CL)-Oriental sore: It is the most common form of Leishmaniasis and causes skin lesions without

involvement of the mucosa, mainly ulcers, on exposed parts of the body, leaving life-long scars and serious disability [4].

(C) Mucocutaneous Leishmaniasis (MCL): MCL is due to *L. braziliensis* and *L. Panamensis*. It has two stages: During the first stage, there is development of a primary cutaneous lesion, which eventually is followed by nasal mucosal involvement, later on destroying the nasal septum. During the second stage, disease can progress to lips, palate and larynx [4].

(D) Post Kala-Azar Dermal Leishmaniasis (PKDL): After a latent period of one year following kala-azar cure, skin lesions can appear in around 20% of cases [4].

Case Definition:

1. Visceral Leishmaniasis (VL)

Suspected case: A Person with prolonged irregular fever >2 weeks, weight loss, splenomegaly, hepatomegaly, ascites, diarrhea, cough, anemia and bleeding etc.

Confirmed case: A suspected/ probable case of Visceral Leishmaniasis with serological/parasitological confirmation [5].

2. Cutaneous Leishmaniasis (CL): Suspected Case: A person presenting with one or more lesions (skin or mucosal), skin lesions typically present on uncovered parts of the body; the face, neck, arms and legs which are the most common sites. The site of inoculation may present with a nodular appearance followed by indolent ulcer [5].

Probable case: A suspected case of VL with serological evidence of infection [5].

Confirmed case: A suspected/probable case confirmed by a positive smear or culture [5].

Diagnostic criteria:

(1) History of residence and travel to Leishmaniasis endemic areas

(2) Clinically compatible findings

(3) Laboratory confirmation

Note: In endemic malarious areas, visceral Leishmaniasis must be suspected when fever is not responding to anti-malarial drugs and persists for more than two weeks (assuming drug-resistant malaria has also been considered).

Specimen Collection:

Cutaneous Leishmaniasis: Skin biopsy is the standard dermatologic technique for obtaining specimen. No preservatives are required for examining LD bodies or for Leishmania culture [5].

Visceral Leishmaniasis: Collect 5ml of clotted blood or serum for serologic studies. Splenic or bone marrow aspirate collected in a tube with anticoagulant is required for the demonstration of amastigote. Specimen may be transported at room temperature without delay [5].

Lab diagnosis: Examination of slides (e.g. of biopsy specimens, impression smears, and dermal scrapings). Serologic testing for detection of antibodies against organisms useful primarily for visceral Leishmaniasis.

Culture: Aspirates of pertinent tissue/fluid (e.g., skin lesion, bone marrow, lymph node, blood/Buffy coat) [6].

Case Management: The treatment of Leishmaniasis depends on several factors including type of disease, concomitant pathologies, parasite species and geographic location. Leishmaniasis is a treatable and curable disease which requires an immunocompetent system because medicines will not help rid parasites from the body, thus risk of relapse may occur with

immunosuppression of the patient. All patients diagnosed with visceral Leishmaniasis require prompt and complete treatment. Detailed information on treatment of the various forms of the disease by geographic location is available in the WHO technical report series 949, "Control of Leishmaniasis" [7].

References: References are available in online version at www.nih.org.pk

MALARIA

Introduction: A vector borne parasitic disease transmitted by female Anopheles mosquito species. An estimated 98% of Pakistan population (185million) is at varying risk for Malaria while population at high risk is around 29% (54.6 million).

Clinical Picture: Fever, chills, sweats, headache, nausea and vomiting, body aches and malaise.

Infectious Agent:

- *Plasmodium falciparum*
- *Plasmodium vivax*
- *Plasmodium ovale*
- *Plasmodium malariae*
- *Plasmodium knowlesi* (rarely infect humans)

Note: First two of the above species are prevalent in Pakistan. Plasmodium falciparum is the most life threatening form of the disease, and other is P.vivax.

Mode of Transmission: Bite of an infective female Anopheles mosquito and rarely through blood transfusion from infected person.

Incubation period: P.falciparum 9-14 days, P.malariae 18-40 days, P.ovale and P.vivax 12-18 days

Reservoir: Humans are the only known reservoir

Infectivity: Humans may infect mosquitoes as long as infective gametocytes are present in the blood. Anopheles mosquitoes remain infective for life

Seasonality: Malaria in Pakistan is typically unstable and major transmission period is post monsoon i.e. from August to November

Alert threshold: Number of cases reaches two times the mean number of suspected cases of the previous 3 weeks for a given location.

Outbreak threshold: In endemic area: Slide positivity rate above 50% or falciparum rate above 40%; while in non-endemic area, evidence of indigenous transmission of falciparum.

Case Definitions:

Suspected Case: A case with clinical manifestations of uncomplicated/complicated Malaria

Probable Case: A suspected case with history of similar manifestations among other household members

Confirmed Case: Clinical case with laboratory confirmation

Lab Confirmation:

- Peripheral blood smear (gold standard for identification of malarial parasite, trophozoites and gametocytes, within RBCs)
- Rapid Diagnostic Test (Immunochromatography)
- PCR
- Serology (Indirect immunofluorescence and ELISA)

Specimen Collection & Transportation:

Peripheral Blood Film: Collect 3-5ml blood in a tube with anti-coagulant (EDTA). Immunodiagnostic test kit: Sample may also be used to demonstrate parasite antigen. Transport the specimen at room temperature preventing sample spillage or damage to the tubes.

Case Management:

Warning: Do not give Primaquine to pregnant women and children < 2 years of age and it is advisable to do a Glucose-6-phosphatedehydrogenase (G6PD) test before giving this drug. Give Primaquine preferably after the patient has recovered from the acute illness.

- Do not give undiluted Chloroquine or Quinine by I/M or I/V route, as it can cause sudden cardiac arrest, especially in children
- Do not give Sulfadoxine/ Pyrimethamine to children < 2 months of age or during first trimester of pregnancy
- Suspected/probable case of severe Malaria and high risk groups should be treated immediately.

Artemisinin-based combination therapies (ACTs) are the recommended treatments for uncomplicated P. falciparum Malaria. However Artemisinin and its derivatives should not be used as monotherapy. The following ACTs are recommended:

- Artesunate plus Sulfadoxine,
- Pyrimethamine Artemether plus lumefantrine,
- Artemether-lumefantrine is currently available as a fixed dose formulation with dispersible or standard tablets containing 20mg of Artemether and 120 mg of lumefantrine. The recommended treatment is a 6-dose regimen twice Daily (BD) over a 3-day period. The dosing is based on the number of tablets per dose according to reported cases by month in Pakistan, predefined weight bands (5–14 kg: 1 tablet; 15–24kg: 2 tablets; 25–34 kg: 3 tablets; and > 34 kg: 4 tablets),
- In case of pregnant women, during first trimester Quinine plus Clindamycin to be given for 7 days, (Artesunate plus Clindamycin for 7 days is indicated if this treatment fails).

Uncomplicated Vivax Infections: Chloroquine combined with Primaquine is the treatment of choice for Chloroquine-sensitive infections. Dosage is as given below:

- **Chloroquine:** 04 STAT, 02 after 6 hours, then 12 hourly for 02 days.
- **Primaquine:** 0.25mg/kg body weight daily for 14 days treatment is prescribed for radical treatment of Vivax.

Preventive Measures:

- Avoid being bitten by mosquitoes, especially between dusk and dawn.
- Use anti-malarial drugs (chemoprophylaxis) when appropriate, to prevent infection from developing into clinical disease.
- Immediately seek diagnosis and treatment if a fever develops 1 week or more after entering an area where there is a Malaria risk and up to 3 months (or, rarely, later) after departure from a risk area.
- Wear long sleeves and trousers outside the houses in the evening. Use repellent creams and sprays. Avoid night time outside activities
- Use mosquito coils or vaporizing mat containing a Pyrethrin.
- Use of Insecticide-treated mosquito nets (ITNs)
- Indoor spraying with residual insecticides (IRS)
- Reduce mosquito breeding sites
- Improve vector surveillance
- Optimize the use of resources for vector control through Integrated Vector Management (IVM)

Recommended chemoprophylaxis: Atovaquone-proguanil, Doxycycline or Mefloquine

References and guideline links:

References and guideline links are available at online version at www.nih.org.pk and <http://dmc.gov.pk/>

MEASLES (RUBEOLA)

Introduction: Measles is a highly contagious viral disease mostly affecting children. Caused by measles virus of genus *Morbillivirus*. Despite community vaccination coverage, Measles outbreaks can occur among under vaccinated children and remains an important cause of death among young children globally. The virus spreads via droplets from nose, mouth or throat of an infected person [1]. Pregnant women while infected are also at greater risk of having severe complications and the pregnancy may end in miscarriage or preterm delivery. Immunity after measles infection is life long, although there are few reports of measles re infection. The case-fatality rate may be as high as 25% [2].

Clinical Picture: Cough, coryza, conjunctivitis, fever, rash, photophobia, muscle pain, sore throat, tiny white spots inside the mouth (Koplik's spots) etc. [3]. The occurrence of fever beyond the 3rd - 4th day of rash onset, suggests a measles-associated complication. Severe measles is more likely among poorly nourished young children, especially those with insufficient vitamin A or whose immune systems have been weakened by other infections [5].

Incubation period: Averages 14 days with a maximum range of 7-21 days [6].

Infectivity period: It can be transmitted by an infected person from 4 days prior to the onset of the rash to 4 days after the rash erupts [6].

Alert threshold: One suspected case is an alert [7].

Outbreak threshold: Five or more clinical cases in a single location over a 30 days time period with at least one lab confirmed case is an outbreak . It requires an immediate investigation and prompt response [7].

Case Definitions:

Suspected Case: Any person in whom a clinician suspects measles infection, OR

Any person with fever, maculopapular rash (i.e. non-vesicular) and 3C's; cough, coryza (i.e. runny nose) or conjunctivitis (i.e. red eyes)

Probable Case: Any person with history of fever, rash and linked epidemiologically to a laboratory confirmed case of measles

Confirmed Case: A suspected case, which is laboratory-confirmed (positive IgM antibodies; 3 days after appearance of rash).

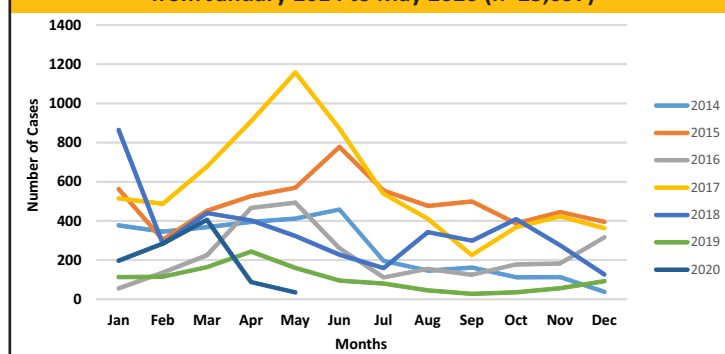
Discarded case: If an activate search in the community does not find evidence of measles transmission and there is no history of travelling to areas where measles virus is known to be circulating, the case should be discarded [8].

Note: Adequate blood specimen: while IgM ELISA tests are more sensitive between days 4 and 28 after the onset of rash, a single serum sample obtained at the first contact with the health care system within 28 days after onset is considered adequate for measles surveillance [8].

Seasonality: Peak incidence in Pakistan is usually during April and May.

Geographical Distribution in Pakistan: During 2014-2020, KPK (45%) and Sindh (30%) remained the most effected provinces in Pakistan [9].

Reported Lab Confirmed Measles Cases month wise in Pakistan from January 2014 to May 2020 (n=25,097)



Specimen Collection & Transportation: Collect throat /nasal/nasopharyngeal swabs for virus isolation, very early in the rash phase and preserve in Viral Transport Medium (VTM). Collect 5ml blood for serology. Do not freeze the whole blood. Transport the specimens in triple packaged with complete request form by maintaining cold chain at 4-8°C [8].

Laboratory diagnosis: WHO recommends ELISA as the gold standard for Measles diagnosis. Anti-measles IgM is detectable in 3 - 30 days after the appearance of the rashes. Anti-measles IgG is undetectable up to 7 days after rash onset and subsequently peaks about 14 days after the appearance of skin rashes [8].

Prevention and Control Measures: Immunize population at risk as soon as possible. Priority is to immunize children of age 6 months to 5 years, regardless of vaccination status or history of disease. Children who are vaccinated against measles before 9 months of age must receive a 2nd dose of measles vaccination at 15 months of age [6].

Treatment:

Uncomplicated cases: The treatment is mainly supportive which includes antipyretics, fluids and antibiotics for only bacterial super infection(s). The WHO recommend Vitamin- A supplementation for 2 days with the dose of 50,000IU in <6 months, 100,000 IU in 6-11 months, 200,000IU in >12 months and for children with ophthalmologic evidence of Vitamin- A deficiency, doses should be repeated on day 2 and 28.

Antibiotics should be prescribed to treat eye and ear infections, and pneumonia [10].

Complicated cases: Pneumonia complicated cases should be referred to the health care facility immediately after Vitamin- A supplementation [10].

References: References are available in online version at www.nih.org.pk

POLIOMYELITIS

Introduction: A potentially fatal viral infectious disease that can affect nerves and can lead to partial or full paralysis among a proportion of infected children; mainly under 5 years of age. Once affected, the paralysis has no cure, but it can be easily prevented through safe and effective vaccines administered orally (OPV) as well as through injections (IPV).

The disease is marked for global eradication through the World Health Assembly resolution in 1988. The efforts so far reduced endemic countries from 125 to only 03 including Pakistan, Afghanistan and Nigeria. Until poliovirus transmission is interrupted in these 03 countries, all countries remain at risk of importation of polio, especially vulnerable countries with weak public health and immunization services and travel or trade

links to endemic countries. The annual case count during the time has been reduced from over 350,000 to only 33 in 2018.

Year Wise Lab. Confirmed Polio Cases by Province/Area in Pakistan, 2012-2020

Province/Area	2012	2013	2014	2015	2016	2017	2018	2019	2020
Islamabad	0	0	0	0	0	0	0	0	0
Punjab	2	7	5	2	0	1	0	12	2
Sindh	4	10	30	12	8	2	1	30	17
Khyber Pakhtunkhwa	27	11	68	17	8	1	2	92	20
KPTDs	20	65	179	16	2	0	6		
Balochistan	4	0	25	7	2	3	3	12	11
GB	1	0	0	0	0	1	0	0	0
AJK	0	0	0	0	0	0	0	0	0
Total	58	93	307	54	20	8	12	146	50

Polio was declared a Public Health Emergency of International Concern (PHEIC) by WHO on 5th May, 2014 and continues to stay as such till date. Pakistan is classified by the International Health Regulations (IHR) as a state infected with WPV1, cVDPV1 or cVDPV3 with potential risk of international spread. Therefore the Government of Pakistan has also declared Polio as a national public health emergency and an annually updated National Emergency Action Plan (NEAP) is being implemented nationwide under the overall supervision of the National Task Force led by the Prime Minister of Pakistan and taking on board all provincial chief ministers as well as Prime Minister of AJK.

Clinical Picture: There are three basic phases of Polio virus infection: subclinical, non-paralytic, and paralytic. Mostly infection remains asymptomatic but Poliovirus may cause Acute Flaccid Paralysis (AFP); one in 200 infections. The onset of asymmetric paralysis is usually sudden coupled with fever. The severity of weakness also varies with the level of immunity among the affected child rendered through immunization. Weakness is ascending and may vary from one muscles or group of muscles, to quadriplegia, and respiratory failure. Proximal muscles usually are affected more than distal muscles and lower limbs more than the upper limbs. Reflexes are decreased or absent while sensory examination may be normal. (6).

Infectious agent: Poliovirus belong to genus Enterovirus subgroup, family Picornaviridae, having three serotypes of Poliovirus, labelled P1, P2, and P3 (7).

Reservoir: Humans are the only known reservoir (7).

Mode of transmission: Primarily person to person spread through the fecal-oral route. After initial infection with the poliovirus, the virus is shed intermittently in faeces for several weeks

Note: After initial infection with poliovirus, the virus is shed intermittently in faeces for several weeks

Incubation Period: 7-14 days for paralytic cases (range 3 - 35 days) (7)

Alert & outbreak threshold: One suspected case of polio is an alert/outbreak and requires an immediate notification and stools sample collection for confirmation (8)

Case Definition: This sensitive case definition will capture Poliomyelitis but also other diseases, including Guillain-Barre syndrome (GBS), Transverse Myelitis and Traumatic Neuritis, , such that each case with limping must be investigated carefully (9).

Suspected Case: Acute/Sudden onset of weakness and floppiness in a child aged <15 years; OR Paralytic illness in a person of any age whom Polio is suspected (9).

Polio-compatible AFP: A case in which one adequate stool specimen was not collected from a probable case within 2 weeks of the onset of paralysis, and there is either an acute paralytic illness with polio-compatible residual paralysis at 60 days, or death takes place within 60 days, or the case is lost to follow-up (9).

Vaccine-associated Paralytic Poliomyelitis case: A case with acute paralytic illness in which vaccine-like poliovirus is isolated from stool samples, and the vaccine derived virus is believed to be the cause of the paralysis (9).

Confirmed Polio case: A case with acute paralytic illness, with or without residual paralysis, and isolation of wild poliovirus from the stools of either the case or its contacts (9).

Discarded case: A case with acute paralytic illness for which one adequate stool specimen was obtained within 2 weeks after onset of paralysis and was negative for poliovirus (9).

Specimen Collection & Transportation: Collect 2 stool samples about 8 grams each (about the size of the tip of both thumbs) at an interval of 24 to 48 hours for virus isolation as soon as possible or within 14 days of onset of illness in a clean, leak proof, screw-capped container, preferably in a transport medium like Minimal Essential Medium or Eagle's Medium. Seal the container with tape and place samples immediately after collection in refrigerator at 2-8°C or in a cold box with frozen ice packs. Transport specimens to the lab maintaining cold chain with duly filled request form within 72 hours after collection. The set of specimens from a single patient should be placed in a single plastic bag just large enough to hold both the containers (10).

Public Health Measures: Four pillars of polio eradication as public health measures include:

1. Achieving a high level of coverage with at least 4 doses of the oral poliovirus vaccine (OPV) and one dose of IPV in routine.
2. Providing supplementary doses of OPV to all children < 5years old during NIDs and SNIDs, as well as the case response planned by the Polio Eradication Programme.
3. Active and Passive Surveillance for all cases of acute flaccid paralysis
4. House-to-house OPV campaigns, targeting areas in which transmission of wild Poliovirus persists, based on National Emergency Action Plan (NEAP 2018-19) (11).

References: References are available in online version at www.nih.org.pk

Extensively Drug Resistant (XDR) Typhoid Fever:

Salmonella enterica serovar typhi causes typhoid fever, a life-threatening illness that affects more than 21 million people in the developing world. The bacterium is transmitted by contaminated water and food and tends to spread in areas with poor sanitation. Antibiotic resistance to *Salmonella* typhi is a major public health threat. Multidrug-resistant (MDR) isolates are prevalent in parts of Asia and Africa and are associated with the dominant H58 haplotype. Reduced susceptibility to Fluoroquinolones is also widespread, and sporadic cases of resistance to third-generation Cephalosporin or Azithromycin have also been reported.

In Pakistan the first large-scale emergence and spread of a novel *S. typhi* clone harbouring resistance to three first-line drugs (Chloramphenicol, Ampicillin, and Trimethoprim-Sulfamethoxazole) as well as Fluoroquinolones and third-generation Cephalosporin has been identified in Sindh, which was classified as extensively drug resistant (XDR).

Reported XDR Typhoid Fever Cases in Sindh by Years (November 2016 to 31 May, 2020)				
Years	Karachi	Hyderabad	Other Districts	Sindh Total
2016	0	12	0	12
2017	175	485	4	664
2018	3712	891	207	4810
2019	7292	1645	998	9935
2020 (upto June)	ND	321	209	530
	11179	3354	1418	15951

(Source: FDSRU-NIH weekly Report Volume 2-- Issue 21, May 31 – June 6, 2020 Date: June 9, 2020)

Now cases are being reported from other parts of the country as well. Additionally, travel associated XDR typhoid cases have been identified abroad as well.

Clinical manifestations: Patient presents with high grade fever (103°F to 104°F), weakness, abdominal pain, headache and loss of appetite. In some cases, patients have a rash of rose-colored spots. Blood complete picture and blood/ stool/ urine cultures are performed to confirm the diagnosis of typhoid fever.

Preventive measures and control: Along with the appropriate treatment, preventive measures are urgently needed, including improved sanitation, food safety and vaccination. The antibiotic resistance strains have been treated with Azithromycin and Meropenem. Typbar-TCV® vaccine, a trivalent conjugate vaccine that was recently prequalified by the World Health Organization, is recommended. The vaccine has long-lasting immunity, requires only one dose, and can be given to children as young as 6 months.

References: References are available in online version at www.nih.org.pk

National Public Health Events

Primary Amebic Meningoencephalitis (*Naegleria fowleri*)

In Pakistan, according to the Lancet infectious disease, first case of PAM was reported in 2008, and up until May 2020, 148 cases have been reported from Karachi. Primary Amebic Meningoencephalitis (PAM) is caused by *parasite Naegleria fowleri*; a rare, with about 99% CFR. *Naegleria fowleri* "brain-eating amoeba" is a unicellular, free-living microscopic organism & grows best at higher temperature up to 46°C. It is naturally found in warm freshwater environments feeding on bacteria and other microbes. Extended summers and prolonged humid conditions due to climate change provide an ideal environment for amoebas to flourish in bodies of water. Transmission occurs primarily through inhalation of infested water during swimming or putting contaminated water in to the nose during ablution. Symptoms start 1-9 days (median 5 days) after nasal exposure to *Naegleria*-containing water. People may die 1-18 days (median 5 days) after symptoms begin.

Initial symptoms of PAM usually start from 1-7 days after infection which may include headache, fever, nausea or vomiting.

Clinical manifestations are similar to bacterial meningitis (severe frontal headache, fever, vomiting, meningeal signs, stiff neck, seizures and focal neurologic deficits) with increase chance of misdiagnosis. After the start of symptoms, the disease progresses rapidly and while death may occur in 1-12 days of illness, because of rapid progression, the diagnosis is usually made after death.

Prevention & Control: Both trophozoites and cysts forms are sensitive to adequate levels of chlorination. The municipality public health authorities, therefore must ensure that adequate levels of disinfectants like chlorine are maintained in the supplied tap water along with strict monitoring arrangements. Any of the suspected cases should immediately be reported to health authorities. Awareness and education in the affected areas must also be undertaken to educate and sensitize communities on preventive measures.

Advisory link: <https://www.nih.org.pk/wp-content/uploads/2019/05/Advisory-for-Naegleriasis-May-2019.pdf>

Heat stroke:

Introduction: Heat stroke is a medical emergency and is a form of hyperthermia in which the body temperature elevates dramatically and can be fatal if not promptly and properly treated. The body's temperature rises rapidly, the sweating mechanism fails and the body becomes unable to cool down consequently, the body temperature can rise to 104°F or higher within 10 to 15 minutes.

Signs & Symptoms: It include profuse sweating or the absence of sweating, with hot red or flushed dry skin, weakness/ lethargy, chills, throbbing headache, high body temperature, hallucinations, confusion/ dizziness and slurred speech. Heat stroke can cause death or permanent organ damage or disability if not properly treated in time. Infants, elder persons, athletes and outdoor workers are at high risk for heat stroke.

Treatment: Victims of heat stroke must receive immediate treatment. Monitor body temperature with a thermometer and continue cooling efforts until the body temperature drops to 101°F to 102°F. Antipyretics may be given once the body temperature drops to 101°F or below.

Preventive Measures: Heat/ sun stroke is a preventable condition. Public should be educated through awareness messages to drink plenty of water while limiting time in direct sunlight in hot/ humid weather or in places with high environmental temperatures, avoid becoming dehydrated and to refrain from vigorous physical activities in hot and humid weather. Public should be made aware of early signs/ symptoms of dehydration and subsequent evolving signs and symptoms of heat/ sun stroke such as muscle cramps, nausea, vomiting, light-headedness and even heart palpitations. Persons working under the sun should prevent dehydration and heat stroke by taking time out of the sun and drinking plenty of water/ fluids. The patients should avoid use of

alcohol and caffeine containing soft drinks and/or tea, which may exacerbate dehydration. Public should be encouraged to consume salty foods, wear hats and light-colored, lightweight and loose clothes during the hot/ humid environmental conditions.

Guidelines link: https://www.nih.org.pk/wp-content/uploads/2018/07/Heat-SunStroke_2.pdf

International Public Health Events

Ebola Virus Disease (EVD)

Ebola Virus Disease (EVD) or Ebola hemorrhagic fever (EHF) is the most virulent human viral hemorrhagic disease caused by the *Ebola virus*; with the average case fatality rate is around 50%. Symptoms may appear from 02 to 21 days (incubation period) after exposure which typically include fever, headache, joint and muscle aches, weakness, diarrhea, vomiting, stomach pain, lack of appetite and may follow by rash, red eyes, difficulty in breathing, difficulty in swallowing, and bleeding from different sites of the body. A person infected with Ebola virus is not contagious until symptoms appear.

The first Ebola virus disease outbreak occurred in remote villages in Central Africa, near tropical rainforests. The outbreaks of EVD in West Africa mainly affected Democratic Republic of the Congo (DRC), Uganda, Guinea, Liberia and Sierra Leone.

Risk assessment: The risk is low at global level due to the remoteness and inaccessibility of the area as well as the rapid response launched by the MoH of DRC, WHO, and all the other coordinating partners and agencies.

Public Health Measures: WHO recommends the implementation of proven strategies for the prevention and control of Ebola outbreaks. These strategies include (1) coordination of the response, (2) enhanced surveillance, (3) laboratory confirmation, (4) contact identification/tracing and follow-up, individuals are monitored for up to 21 days in the case of EVD, (5) case management, (6) infection prevention and control, (7) safe and dignified burials, the IFRC has called funerals "super-spreading events" as burial traditions include kissing and generally touching bodies. Safe burial teams formed by health workers are subject to suspicion (8) social mobilization and community engagement, (9) logistics, (10) risk communication, (11) vaccination, (12) partner engagement, (13) research and (14) resource mobilization.

Vaccination: On November 2019, the World Health Organization prequalified an Ebola vaccine, rVSV-ZEBOV, for the first time against EVD. WHO stated that the rVSV-ZEBOV-GP vaccine had been 97.5% effective at stopping Ebola transmission, relative to no vaccination. The ring vaccination strategy was effective at reducing EVD in contacts of contacts (tertiary cases), with only two such cases being reported.

Guidelines link: <https://www.nih.org.pk/wp-content/uploads/2018/03/Guidelines-for-Prevention-and-Control-of-Ebola-Virus-Disease-EVD-August-2014.pdf>

Middle East Respiratory Syndrome Coronavirus (MERS - CoV)

Introduction: First reported case of MERS-CoV was from Saudi Arabia in September 2012. MERS is a viral respiratory illness caused by corona virus from the same family which caused outbreak of Severe Acute Respiratory Syndrome (SARS) in 2003. Its Incubation period is 1-2 weeks. The clinical presentation of MERS ranges from asymptomatic to very severe pneumonia with acute respiratory distress syndrome, septic shock and multi-organ failure resulting in death and clinical course is more severe in immune-compromised patients and persons with underlying chronic co-morbidities. At the end of November 2019, a total of 2494 laboratory-confirmed cases of Middle East respiratory syndrome (MERS), including 858 associated deaths (case-fatality rate: 34.4%) were reported globally; the majority of these cases were reported from Saudi Arabia (2102 cases, including 780 related deaths with a case-fatality rate of 37.1%). From 1st December 2019 to 31st January 2020, Saudi Arabia has reported 19 additional cases of MERS-CoV (WHO).

Sample Collection and Transportation: Collection of lower respiratory specimens (sputum or broncho-alveolar lavage) is strongly recommended however, nasopharyngeal swab, oropharyngeal swab, sputum, serum, and stool/rectal swab may be collected. Repeat sequential sampling for PCR testing is strongly encouraged in the respiratory tract (upper and lower) and multiple other body compartments. Wear personal protective equipments (PPE) and adherence to infection control precautions is mandatory and notify to district health departments immediately if suspect MERS-CoV infection in a person.

Treatment and Prevention: No specific treatment/ drugs and vaccines are currently available. Treatment is mainly supportive and based on the clinical condition of the patient. Preventive measures include standard plus aerosol, droplet precautions and opting good hand hygiene practices.

Guidelines link: <https://www.nih.org.pk/wp-content/uploads/2018/03/Guidelines-for-the-Prevention-Control-and-Management-of-Middle-East-Respiratory-Syndrome-Coronavirus-MERS-CoV-updated-MAY-2014.pdf>



Mosquito Alert Pakistan

ماسکیٹو الرٹ پاکستان



Link of app: <https://maa.nih.org.pk/>



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