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38th Issue

March-May 2017

SEASONAL AWARENESS AND ALERT LETTER (SAAL)

For Epidemic-prone infectious diseases in Pakistan
Spring –Summer Season

OBJECTIVES OF SAAL

1. To alert concerned health authorities and professionals at all levels about the epidemic-prone infectious diseases in the Spring-Summer Season
2. 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 last six years (2012-2016) available national data collected by the Disease Early Warning System (DEWS), District Health Information System (DHIS), Provincial Health Departments, Provincial Disease Surveillance & Response Divisions (PDSRUs), Expanded Program on Immunization, Lab based Influenza surveillance program, Acute viral Hepatitis Sentinel Surveillance program, in collaboration with Field Epidemiology & Disease Surveillance Division, NIH has been analyzed to see the exhibited patterns of high priority communicable diseases.

The description of all priority diseases has been arranged in alphabetical order. Additionally, technical details on the following diseases have been shared under national and international potential public health events:

National Potential Public Health Events:

- Chikungunya
- Naegleria fowleri

International Potential Public Health Events:

- Zika Virus Infection
- Ebola Virus disease
- Middle East Respiratory Coronavirus (MERS-CoV)
- Yellow Fever
- Highly pathogenic A (H7N9)

Spring - Summer Season
March to May 2017

Outbreak-prone Diseases	High Alert	Medium Alert
Crimean Congo Hemorrhagic Fever (CCHF)	■	
Dengue Fever (DF)	■	
Diphtheria		■
Gastroenteritis (Acute)	■	
Leishmaniasis	■	
Malaria		■
Measles	■	
Meningococcal Meningitis		■
Poliomyelitis	■	
Pertussis	■	
Seasonal Influenza-A (H1N1, H5N1)		■
Typhoid Fever		■
Viral Hepatitis (Acute)		■

■ High alert - peak occurrence in the Spring - Summer Season

■ Medium alert - cases will be encountered and may show up as outbreak

CRIMEAN-CONGO HEMORRHAGIC FEVER (CCHF)

Crimean-Congo Hemorrhagic Fever (CCHF), caused by infection with a tick-borne virus *(Nairovirus)* in the family *Bunyaviridae*, is a zoonotic viral disease that is asymptomatic in infected animals, but a serious threat to humans [1]. Human infections begin with nonspecific febrile symptoms, but progress to a serious hemorrhagic syndrome with a high case fatality rate (10 – 40%) [2].

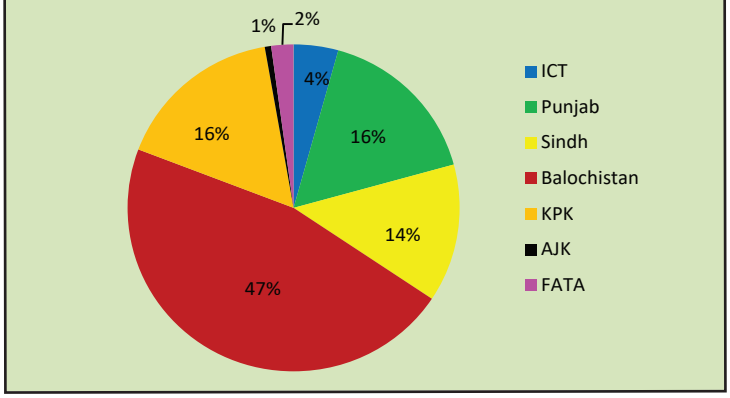
Most Fatalities occur 5 to 14 days after onset of symptoms. It is one of the most widely distributed viral hemorrhagic fevers occurring in parts of Africa, Middle East, Asia and Europe [3]. The occurrence of this virus is correlated with the distribution of *Hyalomma species*, the principal tick vector [4].

CCHF is endemic in Pakistan with sporadic out breaks. Since the diagnosis of first human case of CCHF in 1976, the sporadic cases have continued to occur across Pakistan [5]. From 2012-2016 a total of 323 cases were confirmed from NIH. Baluchistan remains the most affected province. Imported cases from Afghanistan are continuously being reported to the major hospitals of Peshawar, Quetta and Islamabad throughout the year [6].

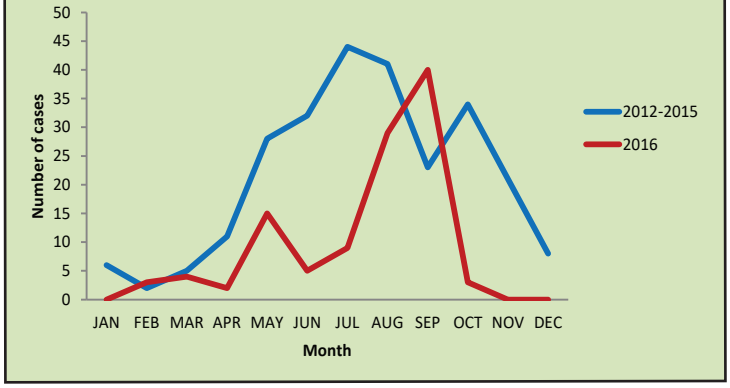
Seasonal Variation: Monthly reported CCHF cases from January 2012 to December 2016 showed varied trends [6].

Identified Transmitting Sources: Domestic animals cattle, goats, sheep etc. are the usual hosts for the adult ticks. It is transmitted to humans by the bite of a Hyalomma tick, crushing an infected tick with bare skin, exposure to blood or tissue of the infected animal during slaughtering, drinking unpasteurized milk, direct contact with blood or secretions of an infected person and in hospitals due to poor infection control practices [7].

Reported CCHF cases by Province/Area in Pakistan, 2012-2016 (323)



Reported CCHF cases by month in Pakistan, 2012-2016 (323)



Natural Process of CCHF

The onset is sudden, with initial signs and symptoms including headache, high fever, back pain, joint pain, stomach pain, vomiting and Jaundice. Red eyes, flushed face, red throat, and petechiae (red spots) spreading from chest and abdomen to the rest of the body and on the palate are common . As the illness progresses, large areas of severe bruising, severe nosebleeds, and uncontrolled bleeding at injection site occur [8].

Epidemiology of CCHF

Incubation Period: Incubation period is usually 3-7 days, with a range of 1-12 days [9].

Following contact with infected blood or tissues 5 to 6 days, with maximum of 13 days [10].

Alert threshold: One probable case is an alert requiring immediate investigation [10].

Outbreak threshold: One lab confirmed case is an Outbreak [10].

Case Definition

Suspected Case:

Patient with sudden onset of illness with high grade fever over 38.5°C for >72 hrs and <10 days, especially in CCHF endemic area - AND among those in contact with a confirmed patient, suspected sheep or other livestock (shepherds, butchers and animal handlers). Fever is usually associated with headache, muscle pains and bleeding manifestations not responding to antibiotic or anti-malarial treatment [10].

Probable case:

Suspected case with acute febrile illness lasting 10 days or less AND any two of these: Thrombocytopenia <50,000/mm3, petechial or purpuric rash, epistaxis, haematemesis, gum bleeding, haemoptysis, blood in stools, ecchymosis, other haemorrhagic symptom - AND no known predisposing factors for hemorrhagic manifestations [10].

Confirmed case:

Probable case diagnosed positive in an especially equipped high biosfatey level laboratory and through either of these techniques; Viral RNA sequence (RT-PCR) in blood or tissues and virus isolation during 1st week of illness. Confirmation of presence of IgM / IgG antibodies in serum by antigen-capture enzyme-linked immunosorbent assays (ELISA) from day 7 of illness [10].

Specimen Collection and Transportation

Collect 5 ml of blood observing strict bio-safety precautions and transport serum specimens to the lab in triple packing maintaining cold chain (4-8 °C), along with a prominent Bio-Hazard labels and other documents. A complete lab request form containing brief clinical, contact and travel history of the patient must invariably accompany the sample [10].

Guidelines link:

http://nih.org.pk/files/Guidelines/CCHF%20guidelines%20September%202013.pdf

Management

Treatment is primarily supportive. Care should include attention to fluid balance and correction of electrolyte abnormalities, oxygenation, hemodynamic support and appropriate treatment of secondary infections. If the patient meets the case definition for probable CCHF, oral Ribavirin treatment protocol needs to be initiated immediately with the consent of the patient/relatives and strictly in consultation with the attending physician.The recommended oral therapy of Ribavirin for Adults: loading dose of 2000mg orally once, followed by 1000mg orally every 6 hours for 4 days, followed by 500mg orally every 6 hours for 6 days .In Children: Loading dose of 30mg/kg orally once, followed by 15mg/kg every 6 hours for 4 days, followed by 7mg/kg every 6 hours for 6 days [11].

Pregnancy should be absolutely prevented (whether female or male partner is the patient) within six months of completing a course of Ribavirin.

Observed Pitfalls in Health Care Facilities of Pakistan

- In Pakistan, a number of hospital acquired infections have been reported in the past indicative of poor infection control practices
- At times, monitoring of exposed contacts for 2 weeks, is not practiced in health facilities
- Asymptomatic contacts are started Ribavirin & also advised unnecessary lab. testsSome healthcare providers do not rule out common bleeding causes before suspecting CCHF

Prevention and Control Measures of CCHF

At Healthcare Facility Patients with probable CCHF should be isolated under strict barrier nursing and health workers should ensure Personal protective equipments usage while attending the Patients. Bio-safety is the key to avoid Nosocomial infection. Patients with suspected or confirmed CCHF should be isolated and cared for using barrier-nursing techniques to prevent Nosocomial spread of infection. The patient should be treated in a separate room under strict barrier nursing. Only designated medical / Para-medical staff and attendants should attend the patient. Non-essential staff and attendants should not be allowed to enter the room. All secretions of the patient and hospital clothing in use of the patient should be treated as infectious and should be autoclaved before incinerating.

At community level: Family of CCHF case should be advised to practice standard and contact precautions while caring the patient.

Exposed HWs, family and contacts: Those with high risk exposures needle stick, sharps, blood or body fluids contact should be monitored for fever (morning and evening) for 14 days. Once fever develops, patient should be immediately shifted and managed in isolation room.

Treatment of animals: Reduce tick infestation on cows, sheep and goats. Acaricides may be useful on domestic animals if used 10 - 14 days prior to slaughter or to export.

Insect repellents: Acaricides to be used on animals to control ticks, keeping the animals free of ticks for 14 days before slaughter or export. DEET (N, N-diethyl-meta- toluamide) is effective. Wearing protective clothing when working with livestock and correct removal of ticks are also recommended [11].

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DENGUE FEVER

Dengue Fever, caused by any of the four distinct but closely related dengue virus (DENV) serotypes (called DENV-1, 2, 3, and -4), is a mosquito-borne viral disease that has increased many folds in various regions of the world during recent years. It is a febrile illness and symptoms appearing 3-14 days after the infective bite. Clinical

presentation can range from a mild nonspecific febrile syndrome, to classic dengue fever or "break-bone fever" or in the most severe forms like dengue hemorrhagic fever (DHF) and dengue shock syndrome (DSS)[1].

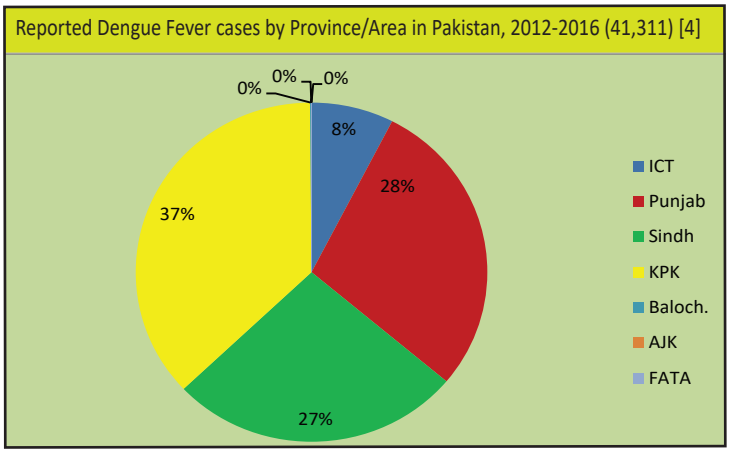
Sources of Transmission

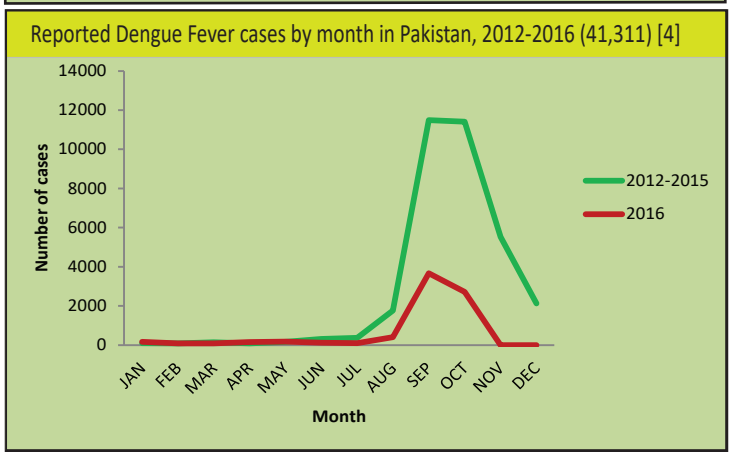
Dengue fever is transmitted by the bites of *Aedesaegypti* and sometimes *A. albopictus*. It can't spread directly from one person to another person. The vector mainly breeds on the surface of clean stagnant water, generally kept open in the buckets, water tanks or leftover in the plant saucers. It stays mainly in door, in cooler and darker places i.e. under the bed, behind curtains etc, and bites around dusk and dawn. Higher temperatures reduce the time required for the virus to replicate and disseminate in the mosquito as well[2].

Dengue Fever Surveillance

Dengue has emerged as a worldwide problem since 1950 and approximately 400 million people are infected yearly. Globally, the reported incidence of dengue has been increasing. More than one third of the world's population is living in dengue endemic areas and is the leading cause of illness and death in the tropics and subtropics[3]. During 2012-2016, 41,311 cases were reported in Pakistan[4].

Geographical distribution





Natural Process of Dengue Fever

The majority (~75%) of DENV infections are asymptomatic. In symptomatic cases, the incubation period ranges from 3 to 14 days, symptoms typically develop between 4-7 days after the bite of an infected mosquito. Dengue symptoms range from mild to incapacitating high grade fever, with severe headache, retro-orbital pain, muscle and joint pain, and rashes. Severe dengue hemorrhagic fever is characterized by fever, abdominal pain, persistent vomiting, bleeding and breathing difficulty this is a potentially lethal complication, affecting mainly children. The infection causes vascular leakage as well as platelet destruction, which in severe cases, results in thrombocytopenia, bleeding and death[5].

Epidemiology of Dengue Fever

Seasonal Variation

Cases are increased during and after rainy seasons as compared to winter and summer seasons. Relative humidity and rainy days remained significant predictors of dengue incidence in Pakistan[6].

Case Definitions

Suspected case

Any person with acute febrile illness of 2 - 7 days duration, occasionally biphasic and two or more of the symptoms like, headache, retro-orbital pain, myalgia, Arthralgia, rash, haemorrhagic manifestations and leucopoenia[7].

Suspected Dengue Haemorrhagic Fever

A probable or confirmed case of dengue AND any two of these; thrombocytopenia <100,000/mm3, petechial or purpuric rash, epistaxis, haematemesis, haemoptysis, blood in stools, ecchymosis, gum bleeding, other haemorrhagic symptom AND no known predisposing factors for haemorrhagic manifestations[7].

Confirmed Case

Any suspected case confirmed by laboratory isolation of virus by PCR or positive Non-structural Protein-1 (NS-1) on days 1 - 6 of illness. IgM sero-conversion in specimens collected >5 days after the onset of symptoms[7].

Laboratory Diagnosis

Laboratory diagnosis is best made during acute phase of the illness when virus circulates in blood through assays that detect viral RNA or antigens i.e. NS-1 antigen during the initial phase of illness. Anti-DENV IgM antibody becomes detectable by ELISA at days 3 - 5 after the onset of fever. The RT-PCR detects DENV serotypes 1, 2, 3 or 4 [7].

Management

- There is no specific treatment of a dengue infection. As such supportive management must be undertaken as required.
- Fever and myalgia should be managed with acetaminophen. Aspirin or Non steroidal anti-inflammatory agents should generally be avoided because of the risk of bleeding complications and the potential risk of Reye's syndrome in children.
- Maintain intake of oral fluid to avoid dehydration
- Platelet transfusions may be warranted in severe thrombocytopenia <20,000/mm and active bleeding. Prophylactic platelet transfusions without active bleeding are generally not recommended[8].

Guidelines link:

http://nih.org.pk/files/Guidelines/Guidelines%20for%20Dengue%20Fever%20and%20Dengue%20Haemorrhagic%20Fever.pdf

Prevention and Control Measures

Indoor residual spray in urban and peri-urban high-risk areas at least one month before transmission period is necessary. Health education campaign for improved water storage practices, removal of mosquito breeding sites and protecting families and individuals from mosquito bites, awareness sessions in schools focusing household control of breeding sites and avoidance of mosquito bites help in disease prevention and control. To reduce the mosquito population, get rid of breeding sites including old tyres, cans or flower pots that collect rain. Regularly change the water in outdoor bird baths and pets' water dishes[8].

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Cholera (Acute Watery Diarrhoea)

Introduction

Cholera is acute diarrhoeal diseases that can kill within hours if left untreated. About 80% of people infected with *V. cholera* do not develop

any symptoms, although the bacteria are present in their faeces after infection and are shed back into the environment, potentially infecting other people. Most of the cases can be successfully treated with oral rehydration salts. Severe cases will need rapid treatment with intravenous fluids and antibiotics.Provision of safe water and sanitation is critical to control cholera and other waterborne diseases [1].

Epidemiology

During the 19th century, cholera spread across the world from its original reservoir in the Ganges delta in India and now endemic in many countries. It is estimated that every year, there are roughly 1.3 to 4.0 million cases, and 21 000 to 143 000 deaths worldwide due to cholera. Cholera is most likely to be found and has spread in places with inadequate water treatment, poor sanitation, and inadequate hygiene. Cholera remains a public health problem in Pakistan. Seasonal variability, inadequate sanitation in and around houses, and faecal contamination of water are associated with increased frequency of cholera outbreaks[1].

Infectious agent

Cholera is an acute diarrhoeal infection caused by ingestion of food or water contaminated with the bacterium Vibrio cholerae, a Gram-negative bacillus that produces a powerful enterotoxin[2].

Mode of transmission

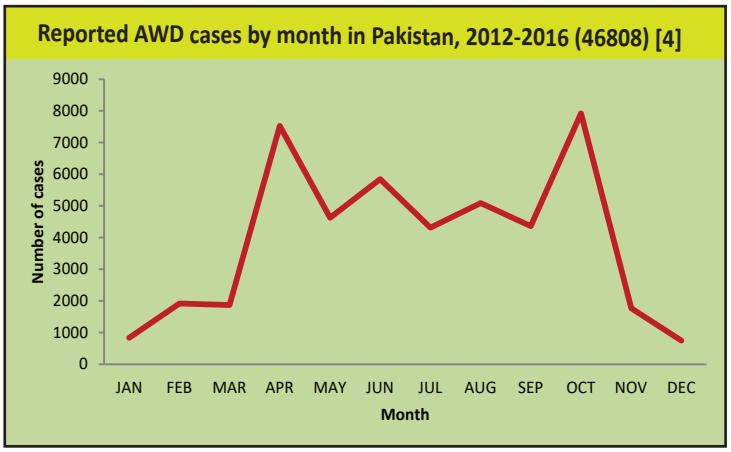
Infection results from ingestion of organisms in food and water or directly from person to person by the faecal–oral route[2].

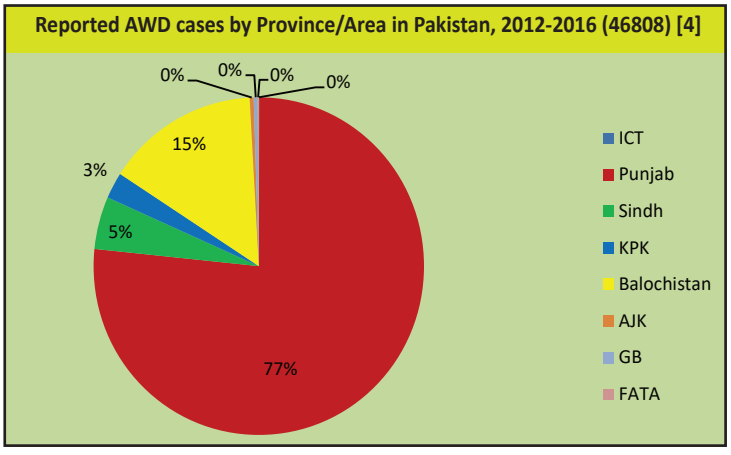
Incubation period

Few hours to 5 days, usually 2-3 days[3].

Seasonality

Throughout the year; higher incidence from April to October[4].





Alert threshold

Single case of AWD is an alert, and it must be investigated[5].

Outbreak threshold

One lab confirmed case, or cluster of 6 or more cases of AWD in one location, is an outbreak[2].

Clinical description

Abrupt onset of copious watery diarrhoea, classically rice-water stools, with or without vomiting. Fever is unusual, except in children. Loss of water and electrolytes can lead to rapid and profound dehydration, low serum potassium levels and acidosis. Severe dehydration leads to loss of skin turgor, sunken eyes, dry mouth, malaise, tachypnoea and hypotension[3].

Case definition

Acute watery diarrhea with or without vomiting in a patient aged five year or more, in endemic area two years or more[2].

The definition of "AWD" is the same as "suspected cholera", i.e. acute watery diarrhoea with severe dehydration. When there is no cholera epidemic, most cases of acute watery diarrhoea are mild and are not suspected cholera and are not reported as AWD. However, when cholera has been confirmed in a locality, all the cases of acute watery diarrhoea, whether having dehydration or not, are counted as cholera cases and managed as part of the outbreak[2].

Confirmed case

- Any suspected case confirmed by laboratory through isolation of Vibrio cholerae[2].

Specimen Collection and Transportation:

Collect a rectal swab or fresh stool sample during active diarrhoea period (preferably as soon as possible after onset of illness before the initiation of antibiotic therapy), and send to laboratory by overnight mail.

Rectal swab or Stool specimens should be transported at 4-8°C in Cary-Blair transport medium or alkaline peptone water. Bacterial yields may fall significantly if specimens are not processed within 1-2 days of collection.

A complete lab request form with brief history of the patient should accompany each specimen[2].

Guidelines link:

http://nih.org.pk/files/Guidelines/Advisory%20for%20prevention%20of%20GE.pdf

Case Management:

- In order to ensure timely access to treatment, cholera treatment centres (CTCs) should be set up within the affected communities. With proper treatment, the case fatality rate should remain below 1%.
- About 80% of patients can usually be adequately treated with ORS solution alone, without intravenous therapy. Low osmolar ORS, a pre-packaged mixture of sugar and salts should be mixed with water and 500 ml 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. Severe cholera patients started on intravenous therapy should be given ORS solution as soon as they can drink, even before initial intravenous therapy has been completed.
- Very severely dehydrated patients require administration of intravenous fluids. Ringer's Lactate Solution (Hartman's Solution for injection) is the preferred fluid for intravenous rehydration. Its composition is suitable for treating patients of all ages and with all types of diarrhoea. Normal saline solution is somewhat less effective for intravenous rehydration, but can be used if Ringer's Lactate Solution is unavailable. Plain glucose solutions are ineffective and should not be used.
- About 75% of people infected with *V. cholerae* do not develop any symptoms, although the bacteria are present in their faces for 7–14 days after infection and are shed back into the environment, potentially infecting other people.
- WHO recommends single dose 300 mg doxycycline; the sensitivity patterns in Pakistan show that *Vibrio cholera* O1 is sensitive to Ciprofloxacin and Doxycycline (more than 70%); Ampicillin, Chloramphenicol, Erythromycin, and Tetracycline (about 50%); and less than 1% sensitive to Co-trimoxazole[2].

Risk factors:

- Lack of safe water, inadequate quantity of water
- Poor personal hygiene, poor washing facilities, insufficient soap

Poor sanitation, inadequate cooking facilities

Overcrowding, population movement/displacement[2].

Prevention and control measures

a) Preventive measures

The only sure means of protection against severe diarrhoeal diseases including cholera epidemics is ensuring adequate safe drinking water

supply and proper sanitation. To make water safe for drinking, when the water source has been contaminated, either boil the water or chlorinate it[5].

Boiling

Bringing water to a vigorous, rolling boil and keep it boiling for one minute will kill Vibrio cholera O1 and most other organisms that cause diarrhoea[6].

Making water safe by chlorination:

To make water safe by chlorination, first make a stock solution of 33 gm of bleaching powder in one litre of water and store it in a brown bottle. Then put 3 drops (0.6 ml) of stock solution in one litre of water or 6 ml in 10 litres of water or 6 ml in 10 litres of water or 60 ml in 100 litres. Wait 30 minutes before drinking or using the water. Do not cover the container for first 30 minutes after adding stock solution in it. Alternatively, water disinfection tablets (e.g. Aqua tabs) can be added to the water according to manufacturer's instruction[6].

Sanitation

Good sanitation to avoid the contamination of clean water sources can markedly reduce the risk of transmission of intestinal pathogens, including *V. cholera*. High priority should be given to observing the basic principles of sanitary human waste disposal at appropriate distance from water source and supply. When large groups of people congregate for fairs, funerals, religious festivals, etc.; particular care must be taken to ensure the provision of safe drinking water in adequate quantity, safe disposal of human waste and the provision of adequate facilities for hand washing[7].

Hygiene and Food Safety

- Wash hands thoroughly with soap after defecating, or after contact with faecal matter, and before preparing or eating food, or feeding children.
- Handle and prepare food in a way that reduces the risk of contamination (e.g. cooked food and eating utensils should be kept separate from uncooked foods and potentially contaminated utensils and crockery).
- Avoid raw food, except those undamaged fruits and vegetables from which the peel can be removed in a hygienic manner.
- Cook food thoroughly.
- Eat food while it is still hot, or reheat thoroughly before eating[7].

Breast-feeding

Encourage and continue breast-feeding in all the children as it reduces the severity of gastroenteritis[8].

b) Control of patient and contacts

- Report epidemic to the local health authority.
- Manage the patient as per WHO criteria; ensure proper isolation and barrier nursing
- If necessary, establish DTC (diarrhoea treatment centres) and ORT (oral rehydration therapy) corners in the health facilities catering the high risk areas.
- Appoint a trained doctor specifically for each shift of DTC. Assign one staff nurse to look after 10 beds while one ward boy/ Aya along with one sanitary worker will be deputed/ appointed in each shift.
- Triage all patients reaching the centre and provide standardized care in accordance with WHO Standard Treatment Protocol for diarrhoeal disease and dehydration at both OPD and IPD levels.
- Admit and treat all severely dehydrated patients in isolation ward in accordance with WHO Standard Treatment Protocol.
- Establish strict infection control measures in the treatment centre for the patients and the attendants at the entry/exit point, during admission, during patient stay as well as during discharge as per the WHO Guidelines; e.g. washing and cleaning of patients' linen and bed with disinfectants or boiling water and proper disposal of patients' clinical waste (vomit and excreta).
- Set-up separate latrines for patients in the hospital.
- Implement proper personal hygiene measures for the health care providers (hand-washing with soap and washing of shoes with disinfectants).
- Educate families and attendants of the patients on preventive measures to be taken at the household level[2].

c) Epidemic measures

- Cholera can be predicted, prevented, and treated; and areas with limited access to health-care facilities, poor sanitation and access to safe water are considered at higher risk for cholera infection. In all contexts, prevention and preparedness, as well as timely detection through surveillance, will enable health authorities to allocate resources and implement adequate preventive and control measures.
- Key factors for effective surveillance include existence of a standard case definition, clear and simple data collection mechanisms, reporting procedures and analysis, rapid diagnosis of suspected cases and laboratory confirmation, routine feedback of surveillance data and appropriate coordination at all levels (i.e. community, health facility, district, national, and international levels)[9].
- Cholera surveillance should be part of an integrated disease surveillance system that includes feedback at the local level and information-sharing at the global level.
- Search for Index case and vehicles of transmission and source on epidemiological basis.
- Once an outbreak is detected, the usual intervention strategy is to reduce deaths by ensuring prompt access to treatment, and to control the spread of the disease by providing safe water, proper sanitation and health education for improved hygiene and safe food handling practices by the community[2].

d) Oral cholera vaccines

- Oral vaccine is currently available in the form of killed cholera vaccine (WC/rBS, two doses).
- WHO recommends that immunization with cholera vaccine be used in conjunction with the usually recommended control measures in areas where cholera is endemic as well as in areas at risk of outbreaks as the vaccines provide a short term control while longer term activities like improving water and sanitation are put in-place. Notably other water-borne illnesses are not prevented by the cholera vaccine[10].

e) Outbreak response

Cholera outbreak response generally focuses on medical aspects that are important for lowering mortality. However, a more comprehensive response is needed to limit the spread of the disease and future prevention. Standard outbreak investigation steps are used[11].

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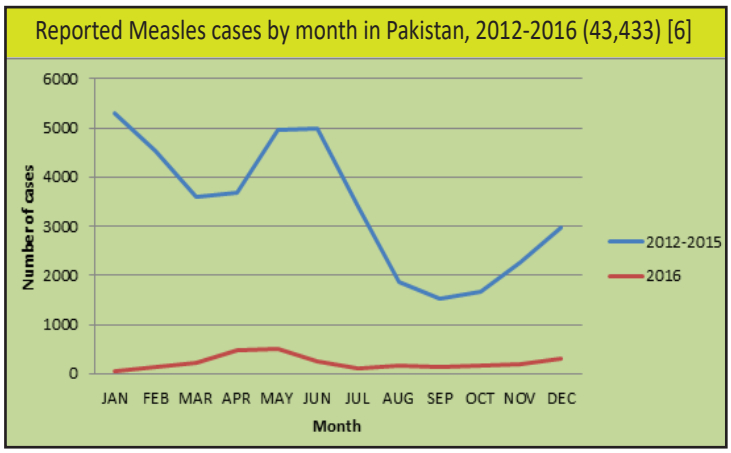
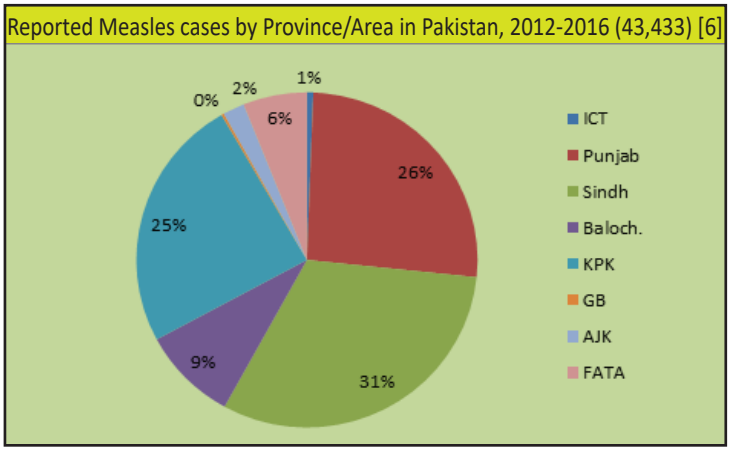
MEASLES (RUBEOLA)

Measles is a highly contagious viral disease mostly affecting children caused by *Paramyxoviridae, genus Morbillivirus*. Despite high community vaccination coverage, measles outbreaks can occur among under-vaccinated children and remains an important cause of death among young children globally. Its virus spreads via droplets from the nose, mouth or throat of the infected person[1].Immunity after measles infection is life long, although there are rare reports of measles re infection[2]. Symptoms may include: bloodshot eyes, cough, fever, rash, photophobia, muscle pain, conjunctivitis, runny nose, sore throat, tiny white spots inside the mouth (Koplik's spots) etc[3]. The occurrence of fever beyond the 3rd - 4th day of rash suggests a measles-associated complication. Measles can cause variety of clinical syndrome such as post measles infection(s) like pneumonia, lifelong brain damage/neurologic syndromes i.e. acute disseminated encephalomyelitis (ADEM) and Sub acute Sclerosing Pan Encephalitis (SSPE), deafness and death[4]. 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 diseases[5].





Incubation period

Averages 14 days with a maximum range of 7-21 days[7].

Alert threshold One suspected case is an alert[8].

Outbreak threshold

Five or more clinical cases in a single location over a 30 day time with at least one lab confirmed case constitute an outbreak requiring investigations and response[8].

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Five or more clinical cases in a single location over a 30 day time with at least one lab confirmed case constitute an outbreak requiring investigations and response[8].

Case Definition

Suspected Case

A patient presenting with fever, generalized maculopapular rash with one of these: cough, coryza and conjunctivitis (3Cs)[9].

Confirmed Case

A suspected case, which is laboratory-confirmed or linked epidemiologically to a laboratory- confirmed case (positive IgM antibodies)[9].

Specimen Collection

Collect throat swab for virus isolation and genotyping, very early in the rash phase and preserve in VTM. Five samples should be taken from fresh cases, less than five days from rash onset, in documented outbreaks. Collect 5ml blood for serology. Store serum at 4-8 (°C) and not for more than 48 hours. Do not freeze the whole blood. Transport the specimens in triple packaged with complete request form along with the cold chain 4-8 (°C) [9].

Laboratory diagnosis

WHO recommends serum IgM as the standard confirmatory test 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[9].

Management

Uncomplicated cases

The treatment is mainly supportive includes antipyretics, fluids and antibiotics for bacterial super infection(s). The WHO and UNICEF 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.

Complicated cases should be referred to the health facility after Vitamin- A supplementation[10].

Prevention and Control Measures

Immunize population at risk as soon as possible. Priority is to immunize children of 6 months to 5 years old, regardless of vaccination status or history of disease. Children who are vaccinated against measles before 9 months of age must receive a 2nd measles vaccination. All children aged 6 months – 5 years should also be administered prophylactic Vitamin- A supplementation[7].

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PERTUSSIS

Pertussis, also known as whooping cough, is a highly contagious, a toxin-mediated respiratory disease. Pertussis is known for uncontrollable, violent coughing which often makes it hard to breathe[1].It is caused by the *bacterium Bordetella Pertussis*, primarily transmitted by direct contact with secretions from respiratory mucous membrane of infected person or via airborne route. Human is the only host. It has three phases i.e. Catarrhal, Paroxysmal and Convalescent Phase[2]. Atypical presentation may occur in vaccinated children. Patients develop catarrhal symptoms including cough. In the course of 1-2 weeks, coughing paroxysms ending in the characteristic whoop may occur. Fatality is up to 1% in infants <6 months of age who have not yet completed the primary series of Pertussis vaccines[3].

Incubation Period: 09-10 days (range 6-20 days)[4].

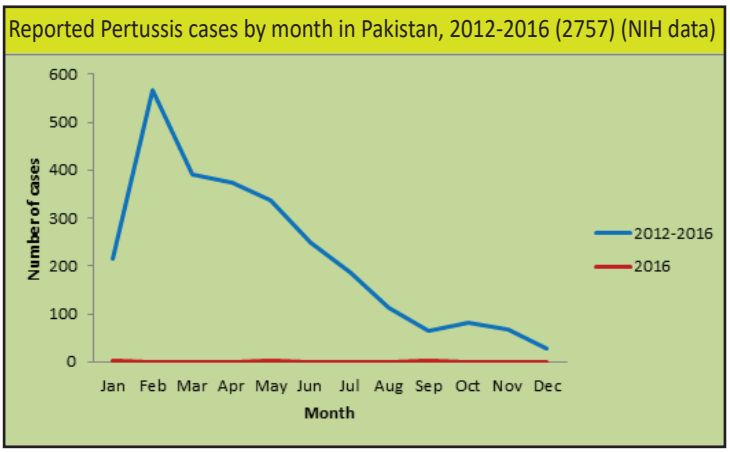
Alert threshold

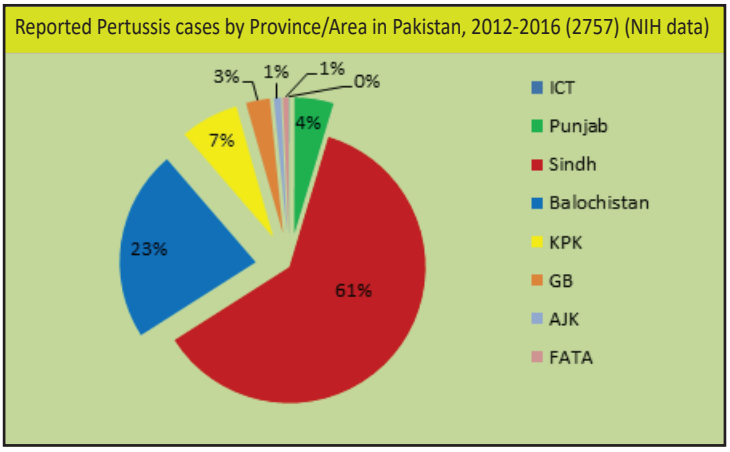
One suspected case is an alert and requires prompt action[5].

Outbreak Threshold: Five (5) cases in one locality[5].

Risk Factors

- Low DPT Coverage (<80%)
- Crowded conditions facilitate transmission And older sibling or a parent
- Usually brings the disease home





Period of Communicability

Pertussis is highly communicable with early catarrhal stage.

Communicability gradually decreases after the onset of paroxysmal cough. Untreated patient may be contagious for up to 3 weeks after the onset of paroxysmal cough in the absence of treatment or up to 5 days after onset of treatment[4].

Case Definition

Suspected Case

Any person with cough lasting at least 2 weeks with one of these paroxysms of cough OR inspiratory "whooping cough"; OR post-tussive vomiting (immediately after coughing) AND without other apparent cause[6].

Confirmed Case: A clinical case that is laboratory confirmed[6].

Specimen Collection:

Culture: culture is the standard for diagnosis and growth typically takes 7 to 10 days. Collect duplicate nasopharyngeal specimens using calcium alginate swabs on fine flexible wire. Wherever possible, bronchial or nasopharyngeal secretions/aspirates provide superior specimens for analysis. Direct plating at bedside of the patients on a freshly prepared Bordet Gangue (BG) medium is the most reliable method for culturing.

In the absence of direct plating, appropriate bacterial transport medium may be used for sample transportation.

Serology

IgA and IgG are most specific for the diagnosis of B.pertussis infection.

Blood Picture

Marked leukocytosis (>60,000/µL) with absolute lymphocyte count 10,000/ µL[7].

Management

Antibiotic treatment should be initiated in all suspected cases. Treatment options include Erythromycin, Azithromycin and Trimethoprim Sulfamethoxozole[8].

Symptomatic Treatment and Supportive Case Management:

- Young infants particularly those <6 months of age should be hospitalized and mild cases require only supportive treatment
- Methadone (cough suppressant) may be helpful in controlling the severity of paroxysms.
- When the illness is of long duration and vomiting is frequent, skilled nursing will be required to maintain nutrition, especially in infants and young children.
- Seriously ill infants should be kept in a darkened, quiet room and disturbed as little as possible, since any disturbance can precipitate serous paroxysmal spells with anoxia.
- Specific attention must be devoted to the maintenance of proper water and electrolyte balance, adequate nutrition and sufficient oxygenation [8].

Prevention

All household and close contacts, irrespective of age or immunization status, should receive chemoprophylaxis with erythromycin 40-50 mg/kg per day in four divided doses for 14 days[8].

Immunization

Active primary immunization against *B. Pertussis* infection with the whole cell vaccine (WP) is recommended in association with the administration of diphtheria and tetanus toxoid (DTP). Children who have received at least 3 doses are estimated to be protected especially against severe disease. However, protection begins to wane after about 3 years[9].Booster dose of DPT in Children less than 5 years is recommended[10].

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Leishmaniasis

Introduction

Leishmaniasis is a parasitic disease and is classified as a Neglected Tropical Disease (NTD). It can present as Cutaneous, mucosal, and visceral forms but the most common forms are Cutaneous Leishmaniasis, which causes skin sores, and visceral Leishmaniasis, which affects several internal organs (usually spleen, liver, and bone marrow[1].

Leishmaniasis is found in people in focal 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 diseases depends on sand fly species acting as vectors[2].

Infectious agent

Protozoan parasites of the family *Trypanasomatidae*, genus *Leishmanania*: *L. donovani* and *L. infantum* may cause visceral Leishmaniasis while L. tropica and L. major may cause Cutaneous Leishmaniasis[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, while in case of humans 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[3].

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, enlargement of the spleen and liver, and anemia[4].

(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* occasionally. It has two stages. The first one is a primary cutaneous lesion, which eventually is followed by mucosal involvement which starts with the nasal mucosa later on destroying the nasal septum. The buccal mucosa is involved at later stages and the 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. Located initially on the face they can extend to the whole body

Persons with chronic PKDL can serve as important reservoir hosts of infection[4].

Case Definition:

1. Visceral Leishmaniasis (VL)

Person with clinical signs of prolonged (>2 weeks); irregular fever, splenomegaly and weight loss, with serological and/or parasitological confirmation of the diagnosis[5].

2. Cutaneous Leishmaniasis (CL)

A probable case of Cutaneous Leishmaniasis is a person with skin or mucosal lesions without parasitological confirmation of the diagnosis and/or, for mucocutaneous Leishmaniasis only and serological diagnosis[6].

Confirmed case: a confirmed case of Cutaneous Leishmaniasis is a person with skin or mucosal lesions confirmed by a positive smear or culture[6].

Diagnostic criteria:

(1) History of residence and travel to Leishmaniasis endemic areas
(2) Clinically compatible physical finding
(3) Laboratory finding

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 clotted blood or serum for serologic studies. Splenic or bone marrow aspirate collected in a tube with anticoagulant is required for the demonstration of amastigotes. Specimen can 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:

Intra-lesional Treatment

Intra-lesional treatment means carefully infiltrating the area around the lesion and the base, with a fine gauge (25g) needle and injecting the Glucantime / pentostampentavalent antimony under pressure as the needle advances. Treatments are every week up to five times.

Systemic (intra-muscular) treatment:

Injections should be given daily (with a break of one day for a week-end) for 14 days into the upper, outer quadrant of the buttock, alternating sides. If the response is poor by the 14th day, the treatment can be continued for 7 more days. Table showing the correct doses for Glucantime and Pentostam on a scale based on a simplified formula relating body weight to surface area whereby a 20 Kg child receives 20 mg/kg of antimony[5].

Prevention:

- The majority of the recommended precautionary measures aim at reducing the contact with phlebotomes.
- Prevention of ACL is very similar to malaria, as sand flies bite at night and indoors, permethrin treated bed nets, etc. Sand flies are generally more sensitive than mosquitoes to insecticide, i.e. residual spraying of indoor rooms (vector control).
- Use of insecticide is unlikely to work in prevention of Zoonotic Cutaneous, as the sand fly vector tends to bite outdoors, so the most effective strategy is to poison or dig up the burrows of reservoir rodents[5].

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POLIOMYELITIS

Introduction

Poliomyelitis is a crippling and potentially fatal viral infectious disease that can affect nerves and can lead to partial or full paralysis[1]. It is an infection with an Enterovirus subgroup, family *Picornaviridae*, having three serotypes P1, P2 and P3, each capable of causing paralysis and infection with one does not confer protection against the other two strains[2]. Humans are the only known reservoir and the disease is transmitted person-to-person mostly through the Orofecal route[1]. Cases are most infectious from 7-10 days before and after paralysis onset[3]. There are three basic patterns of polio infection: sub clinical infections, non-paralytic, and paralytic. Clinical poliomyelitis affects the CNS and is divided into non paralytic and paralytic forms[4].

Reported Polio cases by Province/Area in Pakistan, 2012- 21st Feb 2017						
	2012	2013	2014	2015	2016	2017
Punjab	2	7	5	2	0	01
Sindh	4	10	30	12	4	0
KPK	27	11	68	17	7	0
FATA	20	65	179	16	2	0
Balochistan	4	0	25	7	1	0
GB	1	0	0	0	0	0
AJK	0	0	0	0	0	0
Total	58	93	306	54	14	01

There is no cure, but there are safe and effective vaccines. The strategy to eradicate polio is therefore based on preventing infection by immunizing every child until transmission stops and the world is polio-free. Global public health efforts are ongoing to eradicate polio by immunizing every child and focusing on pockets of missed children until transmission stops and the world is polio-free[5].

Polio was declared a Public Health Emergency of International Concern (PHEIC) by WHO on 5th May 2014[6].

Government of Pakistan has also declared Polio as an Emergency Program. The total number of WPV1 cases for 2017 remains one. The most recent case had onset of paralysis on 28 January 2017, from Lodhran district, Punjab. The year 2016 saw the lowest ever annual number of polio cases in the country but poliovirus continues to be isolated through environmental surveillance over a significant geographical range[7].

Incubation Period: 7 -14 days for paralytic cases (range 3 - 35 days)[8].

Seasonality

The ability of the polio virus to infect children increases in high temperature due to which most of the cases are reported from May to September. The period is called the HTS. In low temperature, from October to April, the virus remains less active[9].

Alert Threshold

One case is an alert requires an immediate notification and sample for confirmation[10].

Outbreak threshold

one lab confirmed case is an outbreak[10].

Case Definition

Suspected

Recent onset of floppy weakness in a child below 15 years of age due to any cause, including Guillain-Barre Syndrome OR any other paralytic illness in a person of any age when Polio is suspected by a medical doctor.

Polio-compatible AFP

Clinically compatible with poliomyelitis, but without adequate virological investigation[11].

Confirmed AFP

Laboratory-confirmed wild poliovirus in stool sample[11].

Discarded case Discarded case is an AFP case, which is neither diagnosed as confirmed nor compatible with a polio case definition[11].

Specimen Collection

Collect 2 stool samples about 8 grams each (about the size of the tip of thumb) 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 reverse 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[12].

Prevention and Control

Four pillars of polio eradication

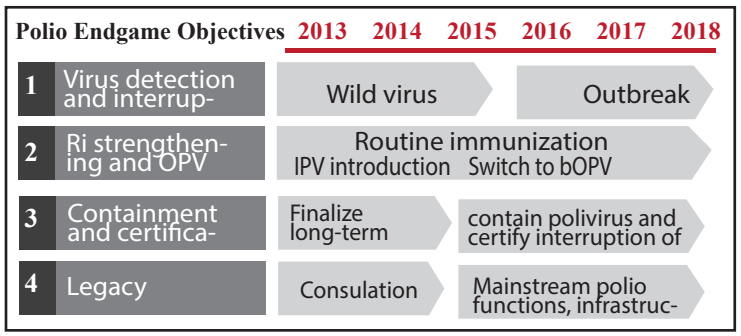
1. Achieving a high level of coverage with at least 3 doses of the oral poliovirus vaccine (OPV)
2. Providing supplementary doses of OPV to all children<5years old during NIDs
3. Surveillance for all cases of acute flaccid paralysis
4. House-to-house OPV campaigns, targeting areas in which transmission of wild poliovirus persists, based on surveillance studies[13].

Polio Eradication and Endgame Strategic Plan 2013-2018

The Polio Eradication and Endgame Strategic Plan 2013–2018 is a comprehensive, long-term strategy that addresses what is needed to deliver a polio-free world by 2018. This addresses the eradication of all polio disease, whether caused by wild poliovirus or circulating vaccine-derived poliovirus[14].

IPV Introduction and OPV Withdrawl

Since July 2015 IPV has been icluded in the rutine immunization. Following the polio edggame strategy the OPV will be excluded from routine immunicztion in 2020 and after that only IPV will be use to immunize the children against the polio.



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National Potential Public Health Events

Chikungunya

Chikungunya is a mosquito-borne viral disease first described in Tanzania in 1952. It is caused by RNA virus that belongs to the *alphavirus* genus of the family *Togaviridae*.The name Chikungunya mean "to become contorted", the stooped appearance due to joint pain (arthralgia).It causes fever and severe joint pain. The joint pain is often very debilitating, but usually lasts for a few days or may be prolonged to weeks.Other symptoms include muscle pain, headache, nausea, fatigue and rash. The disease shares some clinical signs with dengue, and can be misdiagnosed with dengue.Most patients recover fully, but in some cases joint pain may persist for several months, or even years. Occasional cases of eye, neurological and heart complications have been reported, as well as gastrointestinal complaints. Serious complications are not common, but in older people, the disease can contribute to the cause of death.

Epidemiology

Situation in Pakistan

In December 2016, an unusually increase in the number of suspected cases reported from Government Hospital Saudabad, Malir, Karachi. From 19th December 2016 to 24th February 2017, a total of 816 suspected cases of Chikungunya were reported. The cases are being reported from Malir district Korangi, districts North and South Karachi also. All suspected cases were recovered and no mortality has been reported till yet. Out of these suspected cases, 114 samples were received by NIH and 77 were found positive for Chikungunya virus.

Transmission

The virus is transmitted from human to human by the bites of infected female *Aedesaegypti* and *Aedesalbopictus* mosquitoes.

Incubation Period

After the bite of an infected mosquito, onset of illness occurs usually between 4 and 8 days but can range from 2 to 12 days.

Diagnosis

Serological tests, such as enzyme-linked immunosorbent assays (ELISA), may confirm the presence of IgM and IgG anti-Chikungunya antibodies. IgM antibody levels are highest 3 to 5 weeks after the onset of illness and persist for about 2 months. Samples collected during the first week after the onset of symptoms should be tested by both serological and virological methods (RT-PCR).

Treatment

There is no specific antiviral drug treatment for Chikungunya. Treatment is primarily symptomatic and supportive including the joint pain using anti-pyretics, optimal analgesics and fluids.

Transmission

The virus is transmitted from human to human by the bites of infected female Aedesaegypti and Aedesalbopictus mosquitoes.

Incubation Period

After the bite of an infected mosquito, onset of illness occurs usually between 4 and 8 days but can range from 2 to 12 days.

Diagnosis

Serological tests, such as enzyme-linked immunosorbent assays (ELISA), may confirm the presence of IgM and IgG anti-Chikungunya antibodies. IgM antibody levels are highest 3 to 5 weeks after the onset of illness and persist for about 2 months. Samples collected during the first week after the onset of symptoms should be tested by both serological and virological methods (RT-PCR).

Treatment

There is no specific antiviral drug treatment for Chikungunya. Treatment is primarily symptomatic and supportive including the joint pain using anti-pyretics, optimal analgesics and fluids.

Prevention

There is no commercial Chikungunya vaccine. The proximity of mosquito vector breeding sites to human habitation is a significant risk factor for Chikungunya as well as for other diseases that these species transmit. Prevention and control relies heavily on reducing the number of natural and artificial water-filled container habitats that support breeding of the mosquitoes. This requires mobilization of affected communities. During outbreaks, insecticides may be sprayed to kill flying mosquitoes, applied to surfaces in and around containers where the mosquitoes land, and used to treat water in containers to kill the immature larvae. Clothing which minimizes skin exposure to the day-biting vectors is advised. Repellents can be applied to exposed skin or to clothing in strict accordance with product label instructions. Insecticide-treated mosquito nets afford good protection. Mosquito coils or other insecticide vaporizers may also reduce indoor biting.

Advisory link

http://nih.org.pk/files/Advisory%20for%20the%20Prevention%20and%20Control%20of%20Acute%20Febrile%20Viral%20Illness%20 (Suspected%20Chikungunya%20Virus)%20Infection%20.pdf

Primary *Amebic* Meningoencephalitis (PAM)

Since detection of first case in Australia during 1965; about 300 cases have so far been reported from 16 countries. In Pakistan since 2012, a total of 39 fatal cases were reported from different tertiary care hospitals of Karachi (1 fatal case during 2015). One case was reported in June 2016.

Primary Amebic Meningoencephalitis (PAM) is caused by parasite Naegleriafowleri; a rare, with about 99% CFR. *Naegleriafowleri* "brain-eating amoeba" is a unicellular, free-living microscopic & grows best at higher temp. Up to 46°C & is naturally found in warm freshwater environments feeding on bacteria and other microbes. 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.

Transmission does not occur by drinking contaminated water or by swimming in sea. 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) that increases chances of misdiagnosing. 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 people

on requisite preventive measures.

Advisory link

http://nih.org.pk/files/Newsletter/Advisory%20on%20Detection%20Prevention%20and%20Control%20of%20Amebic%20Meningoencephalitis%20(PAM)%202016.pdf

Prevention

No vaccine available. The only preventive strategy is the control of mosquito vectors and limiting person-mosquito contact. Mosquito surveillance is a key component. Beside other preventive measures like insecticidal sprays, Public mosquito education campaigns focusing on reducing or eliminating larval habitats is also recommended.

Human Infections with Ebola Virus Disease (EVD)

Introduction

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 2 to 21 days after exposure which typically include fever, headache, joint and muscle aches, weakness, diarrhea, vomiting, stomach pain and lack of appetite and may be followed by rash, red eyes, difficulty breathing, difficulty swallowing, bleeding from different sites of the body. A person infected with Ebola virus is not contagious until symptoms appear. Ebola is not spread through the air or by food or water. The virus can spread through direct contact with the bodily fluids of an infected person, or with contaminated objects. No specific drug available however early supportive clinical treatment and management are essential and can improve the chances of recovery.

The outbreak of Ebola virus disease began in West Africa mainly affecting Guinea, Liberia and Sierra Leone in December 2013 and declared as Public Health Emergency of International Concern (PHEIC) by WHO. The outbreakhas now ended but small additional outbreaks or sporadic cases remain a risk.The WHO declared the end of the most recent outbreak of Ebola virus disease in Liberia on 9th June 2016 and on 1st June 2016 in the Republic of Guinea.

Public Health Measures

Ensure preparedness, contact tracing, raising awareness and sensitizing healthcare workers, supporting them with resources, information and communication to travelers and surveillance.Ensure implementation of infection control measures, Isolation rooms with dedicated bathroom, availability of personal protective equipment and trained Personnel.

Guidelines link

http://nih.org.pk/files/Guidelines/Recommended%20Standard.pdf

International Potential Public Health Events

Zika Virus

Zika virus disease (Zika) is a disease caused by the Zika virus, which is spread to people primarily through the bite of an infected *Aedes* species mosquito. The most common symptoms of Zika are fever, rash, joint pain, and conjunctivitis (red eyes). The illness is usually mild with symptoms lasting for several days to a week after being bitten by an infected mosquito. WHO declared ZVD as Public Health Emergency of International Concern (PHEIC)on 1 February 2016 and in November 2016, the Zika declaration as no more a public health emergency of international concern.WHO updated its Interim guidance regarding the possible sexual transmission and more common than previously assumed and advised to couples to adopt safer sex practices or consider abstinence for at least 8 weeks upon return from endemic areas and in case of disease, men should use condoms or consider abstinence for at least 6 months.

Diagnosis

Preliminary diagnosis is based on the patient's clinical features, places and dates of travel, and activities. Laboratory diagnosis by testing serum or plasma to detect virus, viral nucleic acid, or virus-specific immunoglobulin-M and neutralizing antibodies.

Reporting

Healthcare providers are encouraged to report suspected cases to their district health departments to facilitate diagnosis and mitigate the risk of local transmission.

Differential Diagnosis

Patients with suspected Zika virus infections also should be evaluated for possible dengue, Yellow fever or Chikungunya virus infection.

Treatment

No specific antiviral treatment is available. Treatment is generally supportive. Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided until dengue can be ruled out.

Human Infections with Middle East Respiratory Syndrome Coronavirus Reported in Arabian Peninsula

Introduction

First reported case was from Saudi Arabia, September 2012. So far, all cases of MERS have been linked through travel to or residence in countries in and near the Arabian Peninsula. MERS is viral respiratory illness caused by corona virus from the same family as 2003 outbreak of Severe Acute Respiratory Syndrome (SARS). The source of the virus remains unknown but Virological studies point towards dromedary camels. MERS-CoV has spread from ill people to others through close contact, such as caring for or living with an infected person.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. The clinical course is more severe in immune-compromised patients and persons with underlying chronic co-morbidities. So far, the observed human-to-human transmission has occurred mainly in health care settings.

Since April 2012 and as of 18 May 2016, a total of 1751 cases of MERS, including 680 deaths have been reported by health authorities worldwide. Mass gathering events such as the Hajj provide a basis for communicable diseases to spread easily. Several cases detected outside of Saudi Arabia were in pilgrims returning from the minor Umrah pilgrimage, but not from the Hajj.

WHO recommends that probable and confirmed cases should be admitted to adequately ventilate single rooms or rooms with airborne transmission precautions. Healthcare workers caring for probable or confirmed cases of MERS should use personal protective equipments (PPEs) appropriate for the exposure.

Sample Collection and Transportation:

Collection of lower respiratory specimens (sputum or bronchoalveolar lavage) is strongly recommended however, nasopharyngeal swab, oropharyngeal swab, sputum, serum, and stool/rectal swab may be collected.

- Wear personal protective equipment and adhere to infection control precautions.
- Notify to district health departments 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 practicing good hand hygiene.

Travel Recommendations

There are currently no travel restrictions in place however travelers are advised to avoid unnecessary contact with camels, consumption of raw milk and should practice good general hygiene especially regular hand washing. Returning travelers must report to health department in case of severe respiratory symptoms.

Guidelines link:

http://nih.org.pk/files/Newsletter/Advisory%20on%20MERS-CoV%20during%20upcoming%20Umrah%20Hajj%202016.pdf

Yellow Fever

Introduction

Yellow fever is caused by a virus (*Flavivirus*) which is transmitted to humans by the bites of infected *Aedes* and *haemogogus* mosquitoes. Occasionally, infected travelers from areas where yellow fever occurs have exported cases to other countries.

Sign & Symptoms

The first symptoms of the disease usually appear 3–6 days after infection. The first, or "acute", phase is characterized by fever, muscle pain, headache, shivers, loss of appetite, nausea and vomiting. After 3–4 days, most patients improve and symptoms disappear. However, in a few cases, the disease enters a "toxic" phase: fever reappears, and the patient develops jaundice and sometimes bleeding, with blood appearing in the vomit. About 50% of patients who enter the toxic phase die within 10–14 days.

Disease Burden

According to the recent analysis, there are an estimated 84,000–170,000 cases and up to 60,000 deaths due to yellow fever per year. The virus is endemic in tropical areas of Africa and Latin America.

Yellow fever has never been reported from Pakistan but there are vulnerabilities for importation and its transmission through presence of vector mosquito (*Aedes Aegypti*), warm humid environment, susceptible hosts and movements of ships, containers, aircrafts and international travelers. Unvaccinated travelers heading to areas with active yellow fever outbreaks pose a risk of introducing the virus into areas where yellow fever risk factors (human susceptibility, prevalence of competent vector, and animal reservoirs) are present.

An outbreak of yellow fever in Angola started in December 2015 in the municipality of Viana, Luanda province and spread to all the 18 provinces of Angola.

As of 15 May 2016, the Angolan has reported 2420 suspected and 736 confirmed cases including 298 deaths while 49 cases from CDR and 60 cases of which 7 are laboratory confirmed from Uganda.

An Emergency Committee (EC) meeting on19 May 2016 decided that it does not yet constitute a Public Health Emergency of International Concern (PHEIC).

Recommendations:

Ensuring the acceleration of surveillance, vaccination for travelers, risk communications, community mobilization, vector control, quickly developing diagnostic capacity and case management measures must be in place.

Blood tests to detect yellow fever-specific IgM antibodies or virus genome by PCR must be conducted by a highly trained laboratory staff with specialized equipment and materials.

There is no specific treatment for yellow fever except supportive care. Yellow fever can be prevented through vaccination and mosquito control. WHO recommends vaccination for all travelers older than 9 months of age in areas where there is evidence of persistent or periodic yellow fever virus transmission.

Highly Pathogenic Influenza-A(H7N9) virus

Introduction

In February 2017, a new A (H7N9) virus - indicating high pathogenicity in poultry - was detected in three patients connected to Guangdong, China, as well as in environmental and poultry samples. This new virus has been detected in only three out of 460 human cases confirmed in the current epidemic wave and in one province only. It is unclear at the moment if the newly-emerged, highly-pathogenic avian influenza (HPAI) virus A (H7N9) will replace the low pathogenic virus or if both will co-circulate in the bird population.This is an important development to be monitored; however, there is no evidence of sustained human-to-human transmission. To date, there is no evidence of increased transmissibility to humans or sustainable human-to-human transmission.

Since the notification of novel re-assortant influenza A (H7N9) virus on 31 March 2013, 1258 laboratory confirmed cases of human infection with avian influenza A (H7N9) virus have been reported. This is the fifth winter season in the northern hemisphere with human cases caused by A (H7N9) infections. During this wave, the number of human cases has been higher than in previous waves and accounts for 37% of the human cases reported so far. This is most likely due to greater environmental contamination in live bird markets and increased circulation of the virus among poultry.

The continued transmission of A (H7N9) to humans in China poses the risk that sporadic imported cases may be detected in other countries. The following options for prevention and control of the infection should be considered:

- People travelling to China should avoid direct exposure to poultry and refrain from visiting live poultry markets or backyard farms
- Travelers who have visited affected areas and develop respiratory symptoms and fever upon their return should consult a physician and mention their recent travel history to enable early diagnosis and treatment.

European Centre for Disease Prevention and Control. Genetic evolution of A (H7N9) virus in China – implications for public health. Sixth update, 9 March 2017. Stockholm: ECDC; 2017 Available From: http://ecdc.europa.eu/en/press/news/_layouts/forms/News_DispForm.aspx?ID=1560&List=8db7286c-fe2d-476c-9133-18ff4cb1b568&

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