

# 352a Infectious Diseases - Acute

## Definition/Cut-off Value

A disease which is characterized by a single or repeated episode of relatively rapid onset and short duration. Infectious diseases come from bacteria, viruses, parasites, or fungi and spread directly or indirectly from person to person (1). Infectious diseases may also be zoonotic, which are transmitted from animals to humans, or vector-borne, which are transmitted from mosquitoes, ticks, and fleas to humans (1, 2). These diseases and/or conditions include, but are not limited to (an extensive listing of infectious diseases can be found at: <http://www.nlm.nih.gov/medlineplus/infections.html>):

Most Common Acute Infectious Diseases	
Hepatitis A	Listeriosis
Hepatitis E	Pneumonia
Meningitis (Bacterial/Viral)	Bronchitis (3 episodes in last 6 months)
Parasitic Infections	

The infectious disease must be present within the past six months, and diagnosed, documented, or reported by a physician or someone working under a physician's orders, or as self-reported by applicant/participant/caregiver. See Clarification for more information about self-reporting a diagnosis.

## Participant Category and Priority Level

Category	Priority
Pregnant Women	I
Breastfeeding Women	I
Non-Breastfeeding Women	III, IV, V, or VI
Infants	I
Children	III

## Justification

Both chronic and acute infectious diseases can lead to: 1) poor appetite, 2) low nutrient absorption, 3) accelerated nutrient utilization, and/or 4) rapid nutrient loss, depending on the individual's nutritional state before becoming infected and the individual's diet during the improvement period (3). The following information pertains to some of the more prevalent and/or serious acute infectious diseases.

### VIRAL HEPATITIS

Hepatitis is inflammation of the liver. It is most often caused by viruses, but can also be caused by excessive alcohol consumption, toxins, and medicines such as acetaminophen, as well as other medical conditions

linked to liver inflammation (4). Viral hepatitis is caused by a series of viruses labeled A, B, C, D, and E – with A, B, and C being the most common forms in the United States. Viral hepatitis A and E are the only forms that are acute and do not become chronic, whereas B, C, and D can both be acute and chronic in nature (5). (For more information on chronic infectious diseases see Risk #352b Infectious Diseases – Chronic.) Regardless of the type of hepatitis, infected individuals with signs of the infection will typically experience anorexia, nausea, vomiting, diarrhea, jaundice, epigastria pain, tiredness, and weakness, all of which affect one’s diet and health (5). In addition, darker urine and pale stools may be present in infected individuals. It is important to note that viral hepatitis is the leading cause of liver cancer and the most frequent need for liver transplants in the United States (6).

**Hepatitis A:** Hepatitis A is an acute infection caused by exposure to the Hepatitis A virus. It is transmitted through the fecal-oral route, with transmission most commonly spread through close contact with an infected household member or sexual partner. Outbreaks can also be caused by fecal-contaminated food or water. Because the symptoms of all types of acute hepatitis infections are the same, suspected diagnosis must be confirmed through either positive laboratory testing, or epidemiologic link to a confirmed case. (7)

A large majority of those infected with Hepatitis A are asymptomatic, with 70% showing no clinical signs of infection. Hepatitis A does not progress to a chronic disease, and symptoms typically resolve without treatment in two months, however in 10-15% of cases periodic relapses can occur for up to six months. (8)

The Hepatitis A virus can survive for months outside of the body, therefore proper hygiene and food safety are important preventative measures. However, the most effective method of preventing infection is through vaccination, which has reduced the incidence of Hepatitis A by 95% since its introduction. Emphasis should be placed on preventing an unvaccinated child from close personal contact with someone who is at high risk, or suspected of Hepatitis A infection. (7)

**Hepatitis E:** Hepatitis E is an acute infection caused by exposure to the Hepatitis E virus. It is transmitted through the fecal-oral route, most commonly through ingestion of contaminated drinking water. However recent cases have been linked to uncooked/undercooked meat and shellfish, indicating the potential for foodborne exposure. While Hepatitis E is believed to be uncommon in the United States, those who frequently travel to developing countries with poor water and environmental sanitation are at risk of becoming infected. Diagnosis for Hepatitis E can be confirmed only by testing for the presence of antibodies to the virus or viral RNA. There are currently no serological tests approved for use in the United States. (9)

Hepatitis E symptoms typically resolve on their own, and there is currently no therapeutic treatment or approved vaccine for the disease. Supportive therapy should be offered and hospitalization recommended for severe cases. The predominant forms of prevention are good sanitation and only relying on clean drinking water when in areas at high risk for infection. (10)

Pregnant women are especially at risk when infected with Hepatitis E. While in general most people will recover completely and the death rate among confirmed cases is about 1%, the mortality rate can reach 10-30% for women in their third trimester. (9)

## **MENINGITIS**

Characterized by an inflammation of the protective membranes known as the meninges, meningitis is typically caused by an infection of the fluid surrounding the brain and the spinal cord. Most commonly meningitis is caused by a bacterial or viral infection, but it can also result as a response to physical injury, cancer, or certain drugs. Due to the severity of meningitis and resulting treatment differing depending on the cause, it is important to correctly diagnose the agent responsible for the disease. (11)

**Bacterial Meningitis:** While most people with meningitis typically recover, bacterial meningitis is typically severe and can result in serious complications, including brain damage, hearing loss, or learning disabilities. The leading causes of bacterial meningitis in the United States include *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Listeria monocytogenes*, and *Neisseria meningitidis*. The causes of meningitis vary by age group. In adults, including pregnant women, it is most commonly caused by *Streptococcus pneumoniae*, *Neisseria meningitidis*, and *Listeria monocytogenes*. The cause in newborns is most typically Group B *Streptococcus*, *E. coli*, and *Listeria*. Infants and children most commonly develop meningitis in response to *Streptococcus pneumoniae*, *Neisseria meningitidis*, and *Haemophilus influenzae* type b. (12)

In addition, *Cronobacter* may cause severe meningitis in infants. Although *Cronobacter* infection is rare (the Centers for Disease Control and Prevention reports 4-6 infections in infants per year), meningitis due to *Cronobacter* occurs almost exclusively among infants in the first 2 months of life. *Cronobacter* infections have been associated with consumption of reconstituted powdered infant formula. In several outbreak investigations, *Cronobacter* has been found in powdered infant formula that had been contaminated in the factory. In other cases, the powdered infant formula might have been contaminated with *Cronobacter* after it was opened at home or elsewhere. It is recommended that manufacturer's preparation instructions be adhered to in order to prevent *Cronobacter* infection in infants consuming reconstituted powdered infant formula. (13)

Risk factors for bacterial meningitis include, but are not limited to, age, with infants at higher risk than other age groups; congregate living settings, with groups such as military personnel and college students at increased risk; medical conditions that weaken the immune system; and travel to the meningitis belt in sub-Saharan Africa. Transmission from an infected person usually requires prolonged, close, contact. Additionally, healthy people may carry the bacteria in their nose and throat without developing an illness and most healthy people who carry the disease never become sick. Pregnant women infected with any of the bacteria responsible for causing meningitis are capable of passing the bacteria to their baby, putting them at increased risk of developing meningitis. (12)

Meningitis symptoms are characterized by a sudden onset of fever, headache, and stiff neck. Other symptoms are also often present, including nausea, vomiting, sensitivity to light, and confusion. Diagnosis must be confirmed through laboratory testing of the blood or cerebrospinal fluid. Bacterial meningitis is effectively treated with antibiotics, though it is important to begin treatment as early as possible. (12)

The most effective method of preventing meningitis is vaccination. There are currently vaccines available for three types of meningitis causing bacteria - *Neisseria meningitidis* (meningococcus), *Streptococcus pneumoniae* (pneumococcus), and *Haemophilus influenzae* type b (Hib). Additionally for individuals in close contact with those with the disease, antibiotics may be recommended as a preventative measure. The risk of meningitis resulting from *Listeria* can be prevented by properly preparing and refrigerating food as well as avoiding certain foods. Women diagnosed with group B strep are also given antibiotics during labor to prevent transmission to their newborn. (12)

**Viral Meningitis:** Viral meningitis is the most common type of meningitis and is often less severe than bacterial caused cases. In the United States it is most commonly caused by non-polio enteroviruses, as well as others including the mumps, herpes, measles, influenza, and arboviruses. While few people infected with these viruses develop meningitis, the risk is especially high from summer to fall. Children younger than five and people with weakened immune systems are at higher risk of developing the disease, with infants younger than one month old and people with weakened immune systems more likely to develop severe illness. (14)

Transmission of a virus that can lead to meningitis may occur due to close contact with a person who has viral meningitis, however it is unlikely meningitis will develop. Symptoms in infants include fever, irritability, poor eating, sleepiness or trouble waking, and lethargy. Adults most commonly experience fever, headache, stiff neck, light sensitivity, sleepiness or trouble waking, nausea, vomiting, lack of appetite, and lethargy. As with bacterial meningitis, diagnosis requires lab tests to confirm the illness. (14)

Typically viral meningitis resolves without treatment in 7-10 days. However those with meningitis caused by the herpes virus or influenza may benefit from antiviral medication. While there are no vaccines available for the non-polio enteroviruses that can cause meningitis, the following steps can be taken to reduce the risk of infection:

- Washing hands often with soap and water, especially after changing diapers, using the toilet, or coughing or blowing your nose.
- Avoiding face touching with unwashed hands.
- Avoiding close contact with infected persons.
- Cleaning and disinfecting frequently touched household surfaces.
- Staying home when sick.

Additionally children should be vaccinated against the other viruses that can cause meningitis, including measles, mumps, chickenpox, and influenza. (14)

### **LISTERIOSIS**

Listeriosis is a serious infection caused by the bacteria *Listeria monocytogenes*. It is most commonly transmitted through contaminated food; however it is also naturally present in the soil, water, and animals, including poultry and cattle (15). *Listeria* is especially dangerous due to its ability to grow in cold temperatures, unlike many other pathogens (16). Common food sources include ready-to-eat deli meats and hot dogs, unpasteurized milk and dairy products, raw sprouts and others. Symptoms include fever, stiff neck, confusion, weakness, vomiting, and diarrhea (17).

Pregnant women and newborns are at exceptionally high risk for listeriosis, with pregnant women 10-20 times as likely as the general population to become infected (18). It can lead to miscarriage, stillbirth, or lifelong health issues for the child (19). Additionally, those with weakened immune systems are also at heightened risk. Listeriosis is treated with antibiotics and for severe cases referral to a medical facility may be necessary. The best methods of prevention are associated with proper food safety, handling, and storage. Additionally, raw milk and raw dairy products should be avoided. There is currently no vaccine available. (17)

### **PNEUMONIA**

Pneumonia is an infection of the lungs that can cause mild to severe illness. It can be caused by viruses, bacteria, and fungi. In the United States the most common causes of viral and bacterial pneumonia are respiratory syncytial virus (RSV) and *Streptococcus pneumoniae* (pneumococcus), respectively, however Human Parainfluenza Viruses are the leading cause of pneumonia in infants and children. Symptoms include fever, muscle aches, fatigue, enlarged lymph nodes in the neck, chest pain, sore throat, coughing, shortness of breath, and rapid breathing. (20)

Children younger than five years of age are considered at especially high risk of pneumonia. Additionally, pneumonia contracted during pregnancy has been associated with increased morbidity and mortality when compared with non-pregnant women. It can lead to negative outcomes including low birth weight, increased risk of pre-term birth, and serious complications for the mother including respiratory failure.

Treatment includes administering antimicrobial and antiviral drugs depending on the pathogen responsible for the infection. (21)

Vaccination is an effective way to prevent pneumonia, with several vaccinations available for both bacteria and viruses including pneumococcal, Haemophilus influenzae type b (Hib), pertussis (whooping cough), varicella (chickenpox), measles, and influenza vaccines. Good hygiene is also another effective method of prevention, including regular hand-washing and disinfecting frequently touched surfaces. (20)

### **BRONCHITIS**

Acute bronchitis is diagnosed by a healthcare provider based on the signs and symptoms present in the patient. It is a condition that occurs when the airways in the lungs swell and produce mucus, resulting in a cough. Bronchitis typically occurs after a chest cold and is usually caused by a virus, with the most common being: Respiratory syncytial virus (RSV), Adenovirus, Influenza viruses, and parainfluenza. Symptoms include, but are not limited to coughing that produces mucus; soreness in the chest; fatigue; headache; body aches; fever; and sore throat. Most symptoms of acute bronchitis resolve on their own after two weeks, but the cough may last up to eight weeks in some cases. In severe cases, such as a fever above 100.4 degrees Fahrenheit, patients should seek assistance from a health care provider. (22)

Since bronchitis is almost never caused by bacteria, antibiotics are not needed or recommended. Furthermore, antibiotic treatment may cause harm in both children and adults (20). The best course of action is to provide symptom relief through rest, over-the-counter medicines, and other self-care methods. It is important to use pain relievers appropriate for the age of the child, and only acetaminophen for babies six months of age and younger (23). Bronchitis may be prevented by avoiding smoking, practicing good hygiene, and remaining current on all immunizations (22).

### **PARASITIC INFECTIONS**

Parasites are organisms that live on or in a host organism and survive by getting their food at the detriment of the host. Pregnant women and children are most at risk from certain types of parasites including *Toxoplasma gondii* – found in uncooked meat; *Giardia intestinalis*; *Cryptosporidium*; lice; and pinworms (24). Toxoplasmosis, caused by *Toxoplasma gondii*, is considered to be the leading cause of death attributed to foodborne illness in the United States (25). To reduce the risk of parasitic infection, prevention includes good food safety and general good hygiene. Additionally environmental risk can be reduced by wearing gloves when coming into contact with soil, covering sandboxes, and teaching children the importance of hand washing (26).

Most healthy people will recover from parasites without treatment. However for pregnant women, newborns, and infants with toxoplasmosis, treatment can be administered as a combination of drugs such as pyrimethamine and sulfadiazine, plus folinic acid (27). This treatment will reduce the parasitic burden, but will not eliminate it completely as parasites can remain in tissues, which makes it hard for the medication to reach them. Lice and other dermal parasites can be treated with topical drugs, such as medicated shampoo (24).

### **Implications for WIC Nutrition Services**

WIC can improve the management of acute infectious diseases through WIC foods, nutrition education, counseling, and referrals to community resources. The table below provides additional WIC nutrition services recommendations specific to the disease state that can help improve the health outcomes of participants with acute infectious diseases:

	WIC Nutrition Services Recommendations for Acute Infectious Diseases (9,10)
All Types of Infections	<ul style="list-style-type: none"> <li>• Encourage sufficient calorie intake to ameliorate accelerated nutrient utilization.</li> <li>• Recommend the <i>Dietary Guidelines</i> to ensure healthy eating patterns.</li> <li>• Provide suggestions to address poor appetite.</li> <li>• Provide education on safe food handling and storage practices.</li> </ul>
All Types of Hepatitis	<ul style="list-style-type: none"> <li>• Recommend testing to pregnant women and high risk individuals.</li> <li>• Encourage abstinence from alcohol.</li> <li>• Provide information on high calorie, high protein and moderate fat diets.</li> <li>• Recommend high calorie consumption at breakfast as nausea is less common in the morning.</li> <li>• Recommend, in consultation with health care provider, consumption of high calorie and protein liquid formula between meals to boost calorie intake.</li> <li>• Encourage a bland diet with extra fluids depending on the severity of nausea and vomiting.</li> </ul>
Hepatitis A	<ul style="list-style-type: none"> <li>• Encourage the Hepatitis A vaccine for all children, previously unvaccinated adolescents through the age of 18, and high-risk adults.</li> <li>• Promote breastfeeding as being safe, but to avoid breastfeeding when nipples are cracked and bleeding – at which time, mothers should pump and discard milk to maintain supply.</li> <li>• Discourage the practice of pre-chewing food for infants, as blood may be present.</li> </ul>
Hepatitis E	<ul style="list-style-type: none"> <li>• Avoid contaminated water.</li> </ul>
Meningitis	<ul style="list-style-type: none"> <li>• Encourage vaccinations for both bacteria and viruses known to cause meningitis.</li> <li>• Provide education on proper food handling and storage practices.</li> <li>• Recommend use of manufacturer’s instruction for the preparation of infant formula.</li> <li>• Provide education on good hygiene practices.</li> </ul>
Listeriosis	<ul style="list-style-type: none"> <li>• Recommend alternatives to raw milk and dairy products.</li> <li>• Emphasize importance of safe food handling, preparation and storage practices.</li> </ul>
Pneumonia	<ul style="list-style-type: none"> <li>• Recommend referral to a healthcare provider to administer appropriate antimicrobial or antiviral treatment.</li> </ul>
Bronchitis	<ul style="list-style-type: none"> <li>• Provide education on symptom relief and proper pain-medication practices for children.</li> <li>• Recommend smoking cessation.</li> <li>• Provide education on good hygiene practices.</li> <li>• Encourage appropriate vaccinations.</li> </ul>
Parasitic Infections	<ul style="list-style-type: none"> <li>• Recommend appropriate measures be taken when coming into contact with potential environmental contaminants, e.g., use of gloves when working with soil and covering sandboxes when not in use.</li> <li>• Provide education on proper food handling and storage practices.</li> <li>• Provide education on good hygiene practices.</li> </ul>

## References

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### Clarification

Self-reporting of a diagnosis by a medical professional should not be confused with self-diagnosis, where a person simply claims to have or to have had a medical condition without any reference to professional diagnosis. A self-reported medical diagnosis (“My doctor says that I have/my son or daughter has...”) should prompt the CPA to validate the presence of the condition by asking more pointed questions related to that diagnosis.