

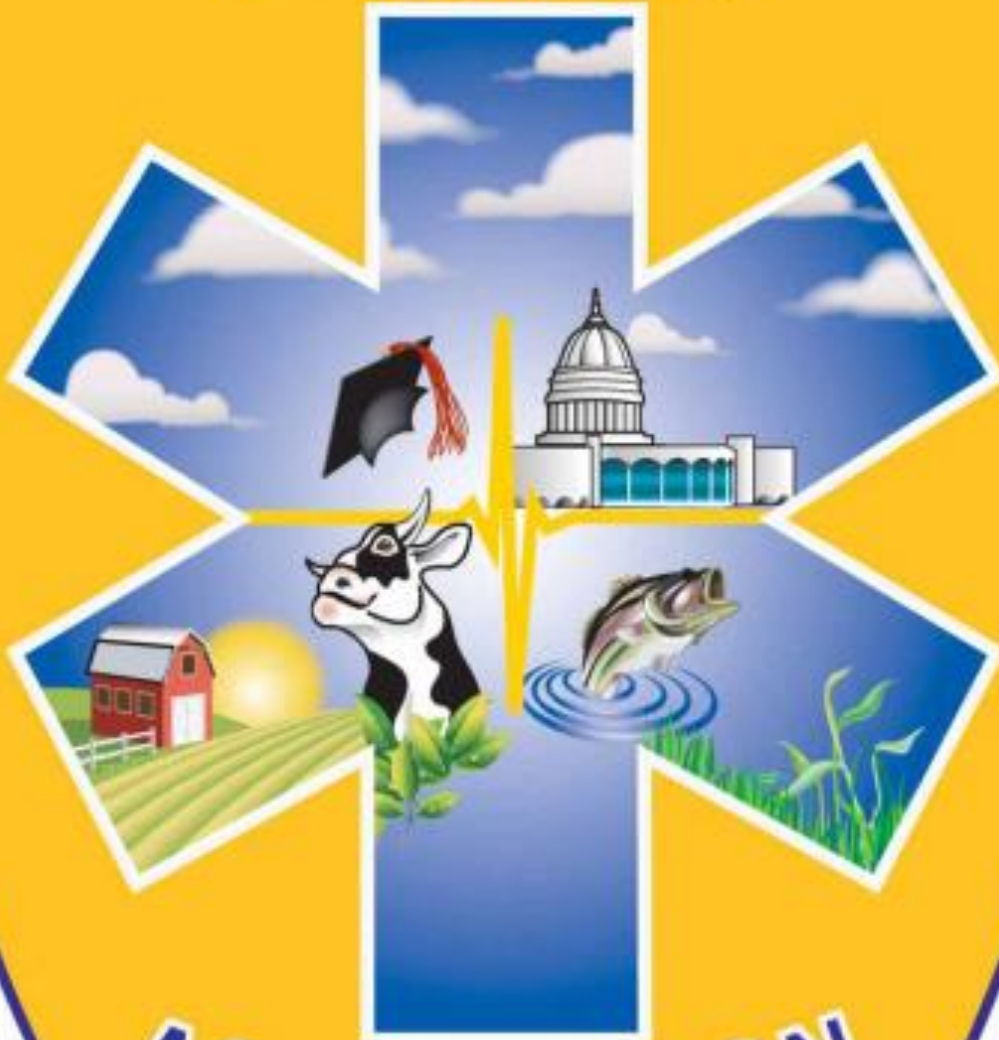
# **Dane County EMS**



**EMS Primer On Infectious Diseases**

Approved June, 2019

# DANE COUNTY EMS



# ASSOCIATION

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**Authorization:**

In accordance with Wisconsin Statute 256 and Chapter 110 of the Wisconsin Administrative Code, effective August 1<sup>st</sup>, 2019 the following document is authorized by the Dane County EMS Medical Director for use in the County. Changes to this document can be made only with the authorization of the Medical Director.



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Dane County Medical Director



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Dane County Associate Medical Director

**Introduction:**

The Purpose of this section is to serve as an informational supplement to the Dane County EMS Protocols, and to provide a brief description of some commonly encountered infectious diseases in the Dane County EMS System. **This document in no way replaces the good medical judgement and sound reasoning of the affected healthcare provider rendering field care.** It is expected that strict Body Substance Isolation (BSI) practices be performed and all appropriate Personal Protective Equipment (PPE) correctly used as per EMS Agency requirements. Any contact with potentially hazardous substances should be reported to the Infection Control Officer for your EMS Agency, and Employee Health follow up arranged as necessary. The comprehensive information about these disease processes should come from Infectious Disease specialists as well as comprehensive resources like the Centers for Disease Control.

The list of infectious agents in this document was taken from the list of reportable diseases on the State of Wisconsin DHS website<sup>1</sup> and the US Army Medical Research Institute on Infectious Diseases (USAMRIID) “Medical Management of Biological Casualties Handbook”<sup>2</sup>. The information related to patient isolation and management was taken from the USAMRIID Handbook as well as the Centers for Disease Control website<sup>3</sup>. Additionally, information and several algorithms were taken from the ASPR EMS Infectious Disease Playbook<sup>4</sup>. It is the most current and up-to-date information available at the time of publication of this document.

**Acknowledgements:**

The information contained within this document has been extensively reviewed not only by the Dane County EMS Office, but by representatives from Infectious Diseases, Public Health, the Dane County Medical Advisory Subcommittee and the local medical community. They are intended to provide information to the field EMS Provider, and to help guide exposed persons through a system that can be overwhelming and confusing. While it may not be perfect, it is our sincere hope that this document serves to help integrate EMS providers into the healthcare team and advocates for their health and well-being. The Office would like to specifically acknowledge the following individuals and groups for their contributions to this document.

Dane County EMS Commission  
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1. <http://www.dhs.wisconsin.gov/disease/diseasereporting.htm>  
2. <http://www.usamriid.army.mil/education/bluebookpdf/USAMRIID%20BlueBook%207th%20Edition%20-%20Sep%202011.pdf>  
3. <http://www.cdc.gov>  
4. <https://www.ems.gov/pdf/ASPR-EMS-Infectious-Disease-Playbook-June-2017.pdf>



### Guidelines for Use of This Document:

In recognition that out-of-hospital EMS providers are members of the healthcare team and acting as agents of **ALL** Dane County hospitals, this Primer on Infectious Diseases was developed to serve as a roadmap and coordinate the care of field providers after potential exposures. This plan was developed by the Dane County EMS Office and reviewed and approved by the Dane County Medical Advisory Subcommittee and all interested parties in Dane County.

This document is a distilled version of the US Army's "Medical Management of Biological Casualties Handbook", information from the Centers for Disease Control, the Wisconsin Department of Health Services (DHS), the ASPR EMS Infectious Disease Playbook and local Emergency Medicine and Infectious Disease specialists. The intent is to provide succinct and focused information to the field provider regarding responses after potential exposures to biological hazards. It has been formatted to make information easily recognized and accessible, with general guidelines regarding when to seek medical attention. For high-risk and/or significant exposures, there are included guidelines and principles to help direct the EMS provider through the process of evaluation and treatment in the Dane County hospitals.

It should be noted that these guidelines in no way replace or supersede the systems put into place by each individual EMS, Fire or Law Enforcement Agency. Furthermore, the perceived or actual level of threat should **never** be considered when making decisions regarding incident reporting to an Employee Health, Occupational Medicine Agency or an Infection Control Officer. It is imperative that **ALL** out-of-hospital providers adhere to a culture of safety, and **ANY** exposure or potential exposure be reported through the appropriate channels. **It is only through honest and transparent communications that we can advocate for safety and improve the health and well-being of all providers.**

The diseases listed in this Primer were taken from the list of reportable diseases on the Wisconsin DHS website, and supplemented with potentially weaponized biologic agents listed in the USAMIID Handbook. In many instances, information has been taken directly from these sources or the CDC website, and they should be viewed by the EMS field provider as the first line resource for information regarding a potential exposure. The infectious diseases have been grouped for ease of reference; Section 1 is highly contagious and likely encountered pathogens, Section 2 is weaponized agents and Section 3 comprises organisms that are important to know, but generally not tested for in the acute (Emergency Department) setting or are rarely encountered.

### Red, Yellow, Green

The background color for each of the diseases listed has been grouped into one of three categories: **RED, YELLOW or GREEN.**

Pages with a **RED background** should be evaluated in the Emergency Department *as soon as possible*. Diseases in this category either have a high rate of virulence or require time-sensitive evaluation and treatment. Every effort should be made for the exposed field provider to present to the same Emergency Department as the source patient, so that appropriate screening of the source may be considered and rapidly completed when necessary. In these cases, the EMS provider should be evaluated by a hospital Infectious Disease representative (most commonly an Emergency Physician), who will determine the likelihood of disease exposure and the most appropriate course of management. It is expected that the evaluating provider will give guidance and exposure management to cover the EMS provider for the next 48 hours, or until follow up with the EMS Agency Employee Health may be completed.

Pages with a **YELLOW background** should be evaluated by an Employee Health or Primary Care Provider within the next 24-48 hours for evaluation and determination of need for treatment. Diseases in this category generally have a lower rate of transmission or do not have a recommended time-sensitive treatment. Generally, exposures in this category are managed with symptom control and close observation.

Pages with a **GREEN background** can be evaluated by an Employee Health or Primary Care Provider if/when symptoms of illness develop. Diseases in this category generally do not require action *unless symptoms develop*. Although these exposures are felt to be lower-risk and less likely to cause significant morbidity, it is still expected that the EMS provider will complete an exposure form and report the incident to their Infection Control Officer and Employee Health Agency as required by their employing EMS, Fire or Law Enforcement Agency.

**Guidelines for Use of This Document (cont.):**

**Mode of Transmission**

The upper left corner of each data sheet contains a “Mode of Transmission” for the listed communicable disease. This is intended to help the EMS provider review the level and type of contact with the potential biohazard, and perform a self-assessment of their likely exposure. For example, a source patient with a bloodborne pathogen that did not have an IV placed and was not actively bleeding would have a very low likelihood for successful transmission to the EMS Provider. Conversely, deployment of a biologic weapon without the use of adequate Personal Protective Equipment (PPE) would have a very high likelihood of successful inoculation.

If you are aware or suspect a patient may have one of the infectious diseases listed in this document, use the key in the upper left corner to help determine the mode of transmission and appropriate level of PPE needed to maintain your safety. As a general principle, if there is any uncertainty it is best practice to employ a higher level of PPE and patient isolation. Please refer to the Patient Isolation Precautions on the following two pages.

**Airborne:**

Exercise Airborne precautions.

**Droplet:**

Exercise Droplet precautions.

**Bloodborne:**

Exercise Droplet precautions.

**Contact:**

Exercise Contact precautions.

**Vomit:**

Exercise Droplet precautions.

**Feces:**

Exercise Droplet precautions.









**Zoonotic:**





Exercise Contact precautions

Ensure that the vector has been successfully reduced or eliminated from the area.





**Biologic Weapon:**

Exercise Airborne precautions.

Mode of Transmission	
	Airborne
	Droplet
	Bloodborne
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	Zoonotic
	Biologic Weapon

Mode of Transmission	
	Airborne
	Droplet
	Bloodborne
	Contact

# EMS Primer on Infectious Diseases

Mode of Transmission	
	Vomit
	Feces
	Zoonotic
	Biologic Weapon

## PATIENT ISOLATION PRECAUTIONS

(Adapted from Appendix B of the USAMRIID BlueBook, 7<sup>th</sup> ed.)

### Standard Precautions

Standard Precautions should be applied to all patients in a healthcare setting regardless of the suspected or confirmed presence of an infectious agent.

- Wash hands with soap and water or use alcohol-based sanitizer before and after patient contact, and between patients.
- Wear gloves when touching blood, body fluids, secretions, excretions and contaminated linens.
- Wear a mask and eye protection, or a face shield during procedures likely to generate splashes or sprays of blood, body fluids, secretions or excretions.
- Handle used patient-care equipment and linen in a manner that prevents the transfer of microorganisms to people or equipment.
- Use safe injection practices.
- Use respiratory hygiene / cough etiquette.
- Use a mouthpiece or other ventilation device as an alternative to mouth-to-mouth resuscitation when practical.

Standard precautions are employed in the care of ALL patients.

### Transmission-Based Precautions

The following transmission-based precautions are used in combination with standard precautions when prolonged viability of a specific organism or toxin is known or suspected or when dealing with an unknown agent. Multiple transmission-based precautions may be used related to the agent if multiple routes of transmission may occur.

#### Contact Precautions



##### Standard Precautions PLUS

- Attempt to isolate the patient from other potential subjects as much as possible; >3 feet of spatial separation at a minimum.
- Wear a gown and gloves when engaging in care if contact with patient is anticipated or other surfaces patient has touched *especially* if patient has diarrhea, a colostomy or wound drainage not covered by a dressing.
- Don personal protective equipment (PPE) before engaging in patient care and discard PPE before exiting the area suspected to contain pathogens. Change gloves after contact with infective material.
- Limit nonessential movement of the patient, and if needed lightly cover open wounds prior to transport.
- Ensure that patient-care items, patient care equipment and frequently touched surfaces receive cleaning as soon as possible after patient contact.
- Use single use / disposable equipment when possible. If not feasible, adequate disinfection between patients is essential (i.e. stethoscopes).

*Conventional diseases requiring Contact Precautions:* MRSA, VRE, Clostridium difficile, RSV, Enteroviruses, enteric infections in the incontinent host, skin infections (HSV, Impetigo, Lice, Scabies), Hemorrhagic Conjunctivitis.

*Biothreat diseases requiring Contact Precautions:* Viral Hemorrhagic Fevers, Smallpox

#### Droplet Precautions







##### Standard Precautions PLUS

- Attempt to isolate the patient from other potential subjects as much as possible; >3 feet of spatial separation at a minimum.
- Wear a surgical mask when working within 3 feet of the patient.
- Limit nonessential movement of the patient, and place a surgical mask (as tolerated) on the patient prior to transport.





*Conventional diseases requiring Droplet Precautions:* Invasive Haemophilus Influenzae and Meningococcal disease, drug-resistant Pneumococcal Disease, Diphtheria, Pertussis, Mycoplasma, GABHS, Influenza, Mumps, Rubella, Parvovirus.

*Biothreat Diseases requiring Droplet Precautions:* Pneumonic Plague.



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# EMS Primer on Infectious Diseases

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- Wear a mask and eye protection, or a face shield during procedures likely to generate splashes or sprays of blood, body fluids, secretions or excretions.
- Handle used patient-care equipment and linen in a manner that prevents the transfer of microorganisms to people or equipment.
- Use safe injection practices.
- Use respiratory hygiene / cough etiquette.
- Use a mouthpiece or other ventilation device as an alternative to mouth-to-mouth resuscitation when practical.

Standard precautions are employed in the care of ALL patients.

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The following transmission-based precautions are used in combination with standard precautions when prolonged viability of a specific organism or toxin is known or suspected on unknown agent. Multiple transmission-based precautions may be used related to the agent if multiple routes of transmission may occur.

#### Airborne Precautions



#### Standard Precautions PLUS





- Wear respiratory protection prior to engaging in patient care. N95 or higher masks are effective against particulates 1-5 micrometers in size.
- Limit nonessential movement of the patient, and place a surgical mask (as tolerated) on the patient before transport. DO NOT place N95 mask or higher on patient who has trouble inhaling.
- Utilize a standard surgical mask.
- Conventional diseases requiring Airborne Precautions:* Measles, Varicella, Pulmonary TB.
- Biothreat diseases requiring Airborne Precautions:* Smallpox.

#### Discontinuation of Transmission Based Precautions





- One or more transmission-based precautions can be discontinued when patient is not infectious and no longer requires them or the related disease is ruled out as a diagnosis. Each disease differs on when to specifically discontinue use. Standard Precautions will be used, however, even after all related transmission-based precautions have been removed.

For additional information regarding Healthcare Infection Control Practices, see the HIC Practices Advisory Committee section on the CDC website at <http://www.cdc.gov/hicpac/pubs.html>.

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# EMS Primer on Infectious Diseases

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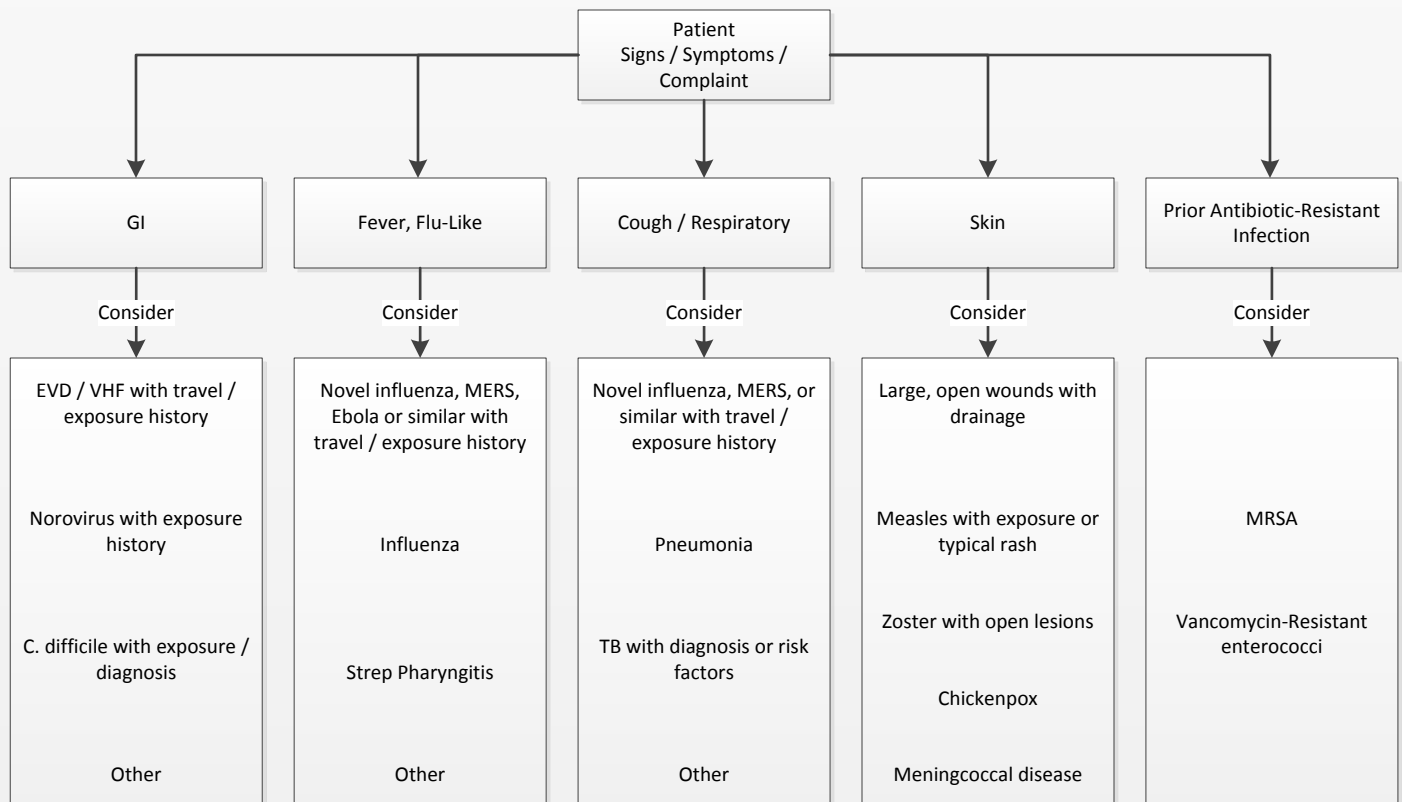
## RECOMMENDED DISPATCH / RESPONDER ACTIONS (Taken from the ASPR EMS Infectious Disease Playbook)

### First Responders and Ambulance Personnel





- Responders should have access to relevant information via radio or computer aided dispatch (CAD) to assure alerting of potential risks
- Ask dispatch / the Dane County 9-1-1 Communications Center for additional information as needed
- Identify patients who may be infected with a serious communicable disease by verbal screening of symptoms and recognize the potential hazards
- First responders recognizing a potentially infectious patient should notify dispatch / the Dane County 9-1-1 Communications Center to assure any en route ambulance personnel are prepared to implement appropriate infection prevention and control measures
- Apply PPE appropriate for the patient's condition prior to making direct patient contact
- Patients with respiratory illnesses: interview conducted at least 6 (six) feet away from the patient may provide some protection from infectious droplets
- Ask any patient with respiratory symptoms to wear a surgical mask if they can tolerate it
- Limit the number of EMS providers making patient contact to the minimum required to perform tasks safely. Consider the strategy of one provider putting on PPE and managing the patient while the other provider does not engage in patient care, but provides the "doorway evaluation" and communications / charting. The second provider should be prepared to quickly don the appropriate PPE should the first provider require assistance
- Avoid unnecessary contact with the patient
- Use caution when approaching the disoriented or delirious patient, as erratic behavior can place EMS providers at additional risk of exposure
- Keep nonessential equipment away from the patient, so as to minimize contamination on the scene and in the ambulance

Recommended Actions





Recommended Actions



ASPR TRACIE EMS Infectious Disease Playbook, p. 1-7 – 1-8. <https://asprtracie.s3.amazonaws.com/documents/aspr-tracie-transport-playbook-508.pdf>

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## HAND HYGIENE

- During the delivery of healthcare, avoid unnecessary touching of surfaces in close proximity to the patient to prevent both contamination of clean hands from environmental surfaces and transmission of pathogens from contaminated hands to surfaces.
- When hands are visibly dirty, contaminated with proteinaceous material, or visibly soiled with blood or body fluids, wash hands with either standard soap and water or (preferably) an antimicrobial soap and water.
- If hands are not visibly soiled, or after removing visible material with soap and water, the preferred method of hand decontamination is with ABHR.
- Wash hands with non-antimicrobial soap or with antimicrobial soap and water if contact with spores (e.g., *C. difficile* or *Bacillus anthracis*) is likely to have occurred. The physical action of washing and rinsing hands under such circumstances is recommended because alcohols, chlorhexidine, iodophors, and other antiseptic agents have poor activity against spores.
- Do not wear artificial fingernails or extenders if duties include direct contact with patients at high risk for infections with associated adverse outcomes.





## PANDEMIC INFLUENZA

- PPE guidance for novel influenza and pandemic influenza may change rapidly. EMS agencies should monitor information from CDC and regulatory organizations at the state and federal level and have established contacts with infection prevention and control professionals.
- Novel influenza strains are usually initially managed according to Special Respiratory (Airborne + Contact + Standard) Precautions. If in doubt, the service should apply Special Respiratory Precautions until disease-specific guidance is available.
- Dispatch should update questions to reflect any screening needed for international, domestic, or local cases.
- Responding personnel should have a low threshold to mask the patient and wear appropriate PPE as influenza is transmissible prior to the onset of significant symptoms.
- Pandemics can place enormous strain on EMS services due to high call volumes and provider illness. Crisis standard of care plans may need to be implemented, including but not limited to:
  - Adjusted resource assignments based on availability (e.g., police only on reported vehicle crash until non-ambulatory injuries confirmed)
  - Auto-answer and caller deferral to information/prescribing lines for non-emergency situations
  - Recommending private transport when appropriate
  - Changing to “closest hospital” transportation or “batch” transports
  - Deferral of selected 911 requests for service
  - Expanding “left at scene” discretion/guidelines
  - Non-hospital destinations for appropriate patients
  - Changes in staffing, crew configuration, and use of novel response structures (“jump cars”, community paramedic response, etc.)
  - Adoption of N95 respirator conservation or re-use strategies
- If EPA-registered hospital disinfectants become unavailable or are in short supply during a pandemic, consider dilute bleach solution as per CDC and WHO guidance listed below under Resources.
- Changes to 911 communications center protocols and EMS responses will require medical director and service director policy development and approval and may require local ordinance and state statutory relief. These policies and supporting governmental actions should be planned prior to an event that overwhelms EMS resources.

ASPR TRACIE EMS Infectious Disease Playbook, p. 8-65 – 8-66. <https://asprtracie.s3.amazonaws.com/documents/aspr-tracie-transport-playbook-508.pdf>

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


## PEDIATRIC ISSUES

- Children may be very fearful of caregivers in high-level PPE. Assure the ability to communicate with the child and explain what is happening and why in an age-appropriate manner.
- Caregivers who follow infectious precautions may be kept with the child if they wear appropriate PPE and have been providing care for the child during the current illness and there is no substantial risk of body fluid exposure during transport.
- Pediatric intravenous access can be difficult and the need for access must be balanced against the potential risk for needlesticks in the setting of potential blood-borne pathogens.
- Appropriate sizes of surgical masks should be available for children.
- Consider nasal/oral routes for analgesia and anxiolysis if intravenous access is not obtained.
- Assure that comfort objects (blanket, stuffed animal, etc.) can accompany the patient during transport.
- Do not avoid indicated procedures and medications for children simply because of a perceived risk of distress.
- Children are able to compensate for hypovolemia much better than adults by increasing their heart rate. However, hypotension and cardiovascular collapse can occur with little warning. Elevated heart rates can also be seen with fever, anxiety, and pain, making a determination of origin difficult. Assess perfusion, history, and other signs before assuming tachycardia is not related to early shock/sepsis.
- When possible, specialized Ebola Virus Disease (EVD)/Viral Hemorrhagic Fever (VHF) transport units should include agencies that routinely provide pediatric critical care interfacility transport.
- Ebola Virus Disease (EVD) commonly induces miscarriage. Providers should be aware of this issue and potential exposures and complications.
- Portable pediatric isolation transport units are available, but should only be used by personnel trained in their operation and limitations. The use of these units may significantly increase the patient's anxiety during transport.





Special Considerations

Special Considerations

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## AEROMEDICAL TRANSPORT





*Note: This section refers to domestic air medical transport providers only.*

- Policies on rotor-wing and fixed-wing transport of potentially infectious patients should be in place in each agency including questions at the dispatch level and process to provide information to the crews. Careful consideration should be given to whether aeromedical transport is appropriate for the specific patient. This may include consultation with the service medical director.
- Assure dispatch provides sufficient information to anticipate potential infectious risks.
- Provide as much known information to Aeromedical personnel as possible including level of PPE used during patient care, equipment used, and medications administered.
- Contact destination hospital to assure appropriate reception planning including isolation room (if required) staff, cart, PPE, and traffic/patient movement plan.
- For flights involving interface with ground transport units, assure communications plan and confirm appropriately trained and equipped providers (define needs and role – driver only vs. assuming medical care) as well as special ambulance preparation if suspect EVD/VHF case. Maintain communications to verify arrival times.
- Provide information for ground unit or receiving hospital briefing as required.
- Assure records transfer occurs safely and that records are not contaminated (e.g., seal in zippered clear plastic bag which can be wiped with disinfectant prior to hand-off).
- See general patient care considerations for the specific infectious precautions above.
- Spill kit, alcohol-based hand disinfectant, suction, disposable rags, biohazard bags, and medical supplies should be organized similar to ground unit recommendations above for suspect EVD/VHF transports.
- For long duration flights, consider a chemical toilet for ambulatory patients.
- Aeromedical clinical personnel should carefully plan and use PPE similar to ground units.
- Aeromedical clinical personnel should carefully plan in-flight medical contingencies and have appropriate medications and equipment available to reduce contamination of non-required materials.
- Intubation should be performed at the hospital of origin if there is any concern about existing or potential respiratory insufficiency. Rapid sequence techniques should be used (as opposed to sedation-only techniques) to mitigate possible generation of infectious aerosols.
- Intubated cases with suspected airborne, droplet, special respiratory, and EVD/VHF diseases should have a HEPA inline filter on the ventilator exhaust.
- Providers should anticipate altitude-dependent changes in pulmonary mechanics as well as oxygen delivery. If a patient is not able to maintain oxygenation prior to transport despite intubation, positioning, paralysis, and 100% oxygen delivery, medical control consultation should be obtained.
- Movement of known EVD patients must be reported to CDC/Federal Aviation Administration (FAA) due to Federal quarantine and isolation laws.
- Transports of suspect or confirmed EVD/VHF patients are typically performed by ground units, but air ambulance should be considered for long distances. To contain infected materials and minimize contamination of the aircraft, a portable isolation unit is recommended for air ambulance transport. Coordination with the public health authority may help to identify qualified air ambulances through HHS.
- Pilots in rotor-wing aircraft transporting non-intubated airborne or special respiratory precautions patients should wear an appropriately fitted N95 respirator.
- Aeromedical services should assure availability of medical control consultation during transport.





Special Considerations

Special Considerations

ASPR TRACIE EMS Infectious Disease Playbook, p. 8-69 – 8-70. <https://asprtracie.s3.amazonaws.com/documents/aspr-tracie-transport-playbook-508.pdf>

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## OCCUPATIONAL HEALTH / EXPOSURES

- Initial and ongoing training in the types of available PPE and demonstrated proficiency in donning and doffing of PPE is critical to worker safety.
- EMS personnel – both dispatch and responders – should be provided awareness and education about evolving diseases and known outbreaks in the community (e.g., high prevalence of active TB in shelter population, known norovirus outbreak in local nursing home population) and appropriate PPE to protect workers from these risks as part of usual operational processes.
- Significant blood and body fluid exposures should be reported immediately to a supervisor and medical evaluation ensured. Significant exposures for EMS include blood, bloody saliva or urine, amniotic fluid exposure to eyes, mucous membranes, non-intact skin or by needlestick or bites. Any contact with blood or body fluids of EVD/VHF patient may be significant and should prompt decontamination and appropriate reporting.
- Appropriate HIV and hepatitis screening/Hepatitis B antibody serology should be available whenever indicated.
- Anti-HIV prophylaxis should be available whenever indicated.
- An infection prevention and control provider should be available for consultation by the agency as needed.
- Contaminated clothing should be washed or discarded in accordance with disease-specific guidelines, generally with hot water, usual detergent, and the addition of household bleach. Discarding contaminated clothing is preferred when dealing with special pathogens.
- Higher levels of PPE cause increased heat stress as well as increased motor limitations that may lead to injury. These factors should be considered when determining the duties and duration of work while wearing the PPE ensemble.
- Responders should be fit and free of acute illness.
- HCWs should be medically monitored after providing care to a confirmed special pathogen case, even in the absence of a recognized exposure, for subjective illness and fever for the duration of the incubation period to ensure that any developing illness is recognized and swiftly evaluated. TB, hepatitis, and other exposures may require interval employee testing.
- EMS agencies should consider policies ensuring twice daily contact with exposed personnel to discuss potential symptoms and document fever checks for special pathogens.
- Any HCW who develops signs of illness should not report to work or should immediately stop working and notify their supervisor. Prompt medical evaluation should be arranged and notification of local and state health departments.
- HCW should be assessed regarding possibility of post-exposure prophylaxis or treatment depending on the agent and exposure. Post-exposure prophylaxis is seldom indicated with the exception of direct contact with patients confirmed to have *Neisseria meningitidis* or after a needlestick or other high risk exposure to an HIV positive source patient. Prophylaxis may be considered in unprotected exposures to a novel influenza virus. In selected situations vaccination may be indicated after a viral exposure (e.g., smallpox, EVD).
- EMS agencies should consider standardizing pre-exposure immunization requirements for personnel in accordance with public health vaccination recommendations.
- Behavioral health effects on responders exposed to or caring for a patient with a rare and highly infectious disease are likely substantial. Provision of support, resources, and appropriate follow up is required to improve resiliency. Repeated exposures or a prolonged incident will increase risks of behavioral health consequences.
- Patients suspected of having a contagious disease, particularly one associated with high mortality or stigma, will have significant behavioral health consequences that must be addressed through reassurance, provision of support, timely and accurate information about their condition as well as normal responses to isolation and stress, and access to more specialized and culturally-specific behavioral health follow-up and resources.

Special Considerations

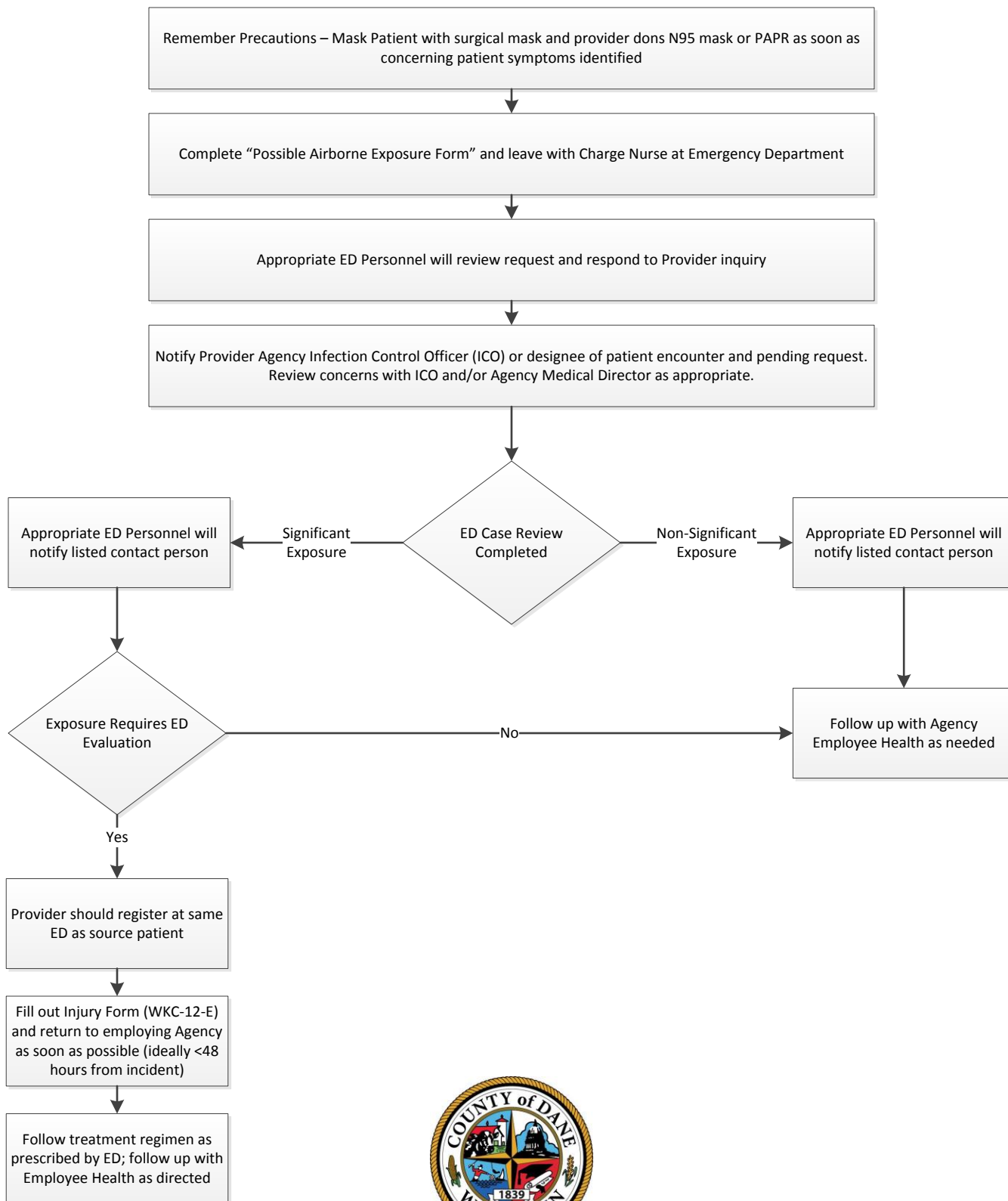
Special Considerations

ASPR TRACIE EMS Infectious Disease Playbook, p. 8-71 – 8-72. <https://asprtracie.s3.amazonaws.com/documents/aspr-tracie-transport-playbook-508.pdf>



# Possible Airborne, Droplet or Contact Exposure


**Purpose:** Guidance for Public Safety Responder (EMT, Paramedic, Law Enforcement Officer, Firefighter or other Emergency Response Personnel) with concern for possible exposure to a communicable disease through airborne exposure



**Possible Airborne Exposure – Request for Follow Up**

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Incident Date:	Incident #:
Agency:	
Name and Phone (contact):	
Supervisor Name and Phone:	
Any Additional Responders on Scene:	
Name: _____	Phone: _____
Name: _____	Phone: _____
Name: _____	Phone: _____
Name: _____	Phone: _____



**Form to be given to Charge Nurse**

Nurse completing request:

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Name(s) Contacted: \_\_\_\_\_

Method of Contact (phone/in person/etc): \_\_\_\_\_

Follow Up Needed by EMS Liaison: YES NO

White copy – public safety provider


Yellow copy – Emergency Dept.

Pink copy – Hospital EMS Liaison

**Possible Airborne Exposure – Request for Follow Up**

Date: \_\_\_\_\_ Time: \_\_\_\_\_

Incident Date:	Incident #:
Agency:	
Name and Phone (contact):	
Supervisor Name and Phone:	
Any Additional Responders on Scene:	
Name: _____	Phone: _____
Name: _____	Phone: _____
Name: _____	Phone: _____
Name: _____	Phone: _____



**Form to be given to Charge Nurse**

Nurse completing request:

Date: \_\_\_\_\_

Time: \_\_\_\_\_

Name(s) Contacted: \_\_\_\_\_

Method of Contact (phone/in person/etc): \_\_\_\_\_

Follow Up Needed by EMS Liaison: YES NO

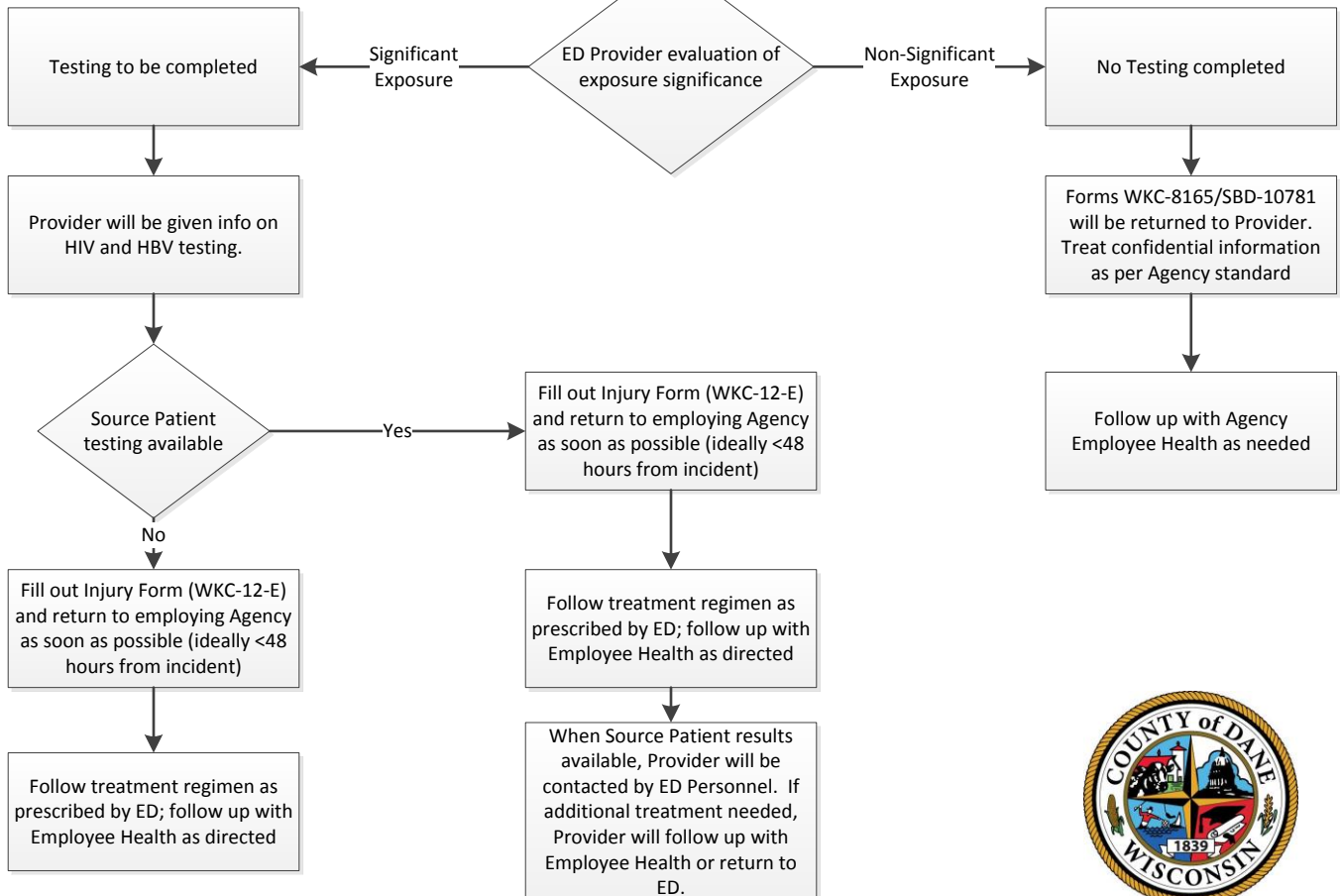
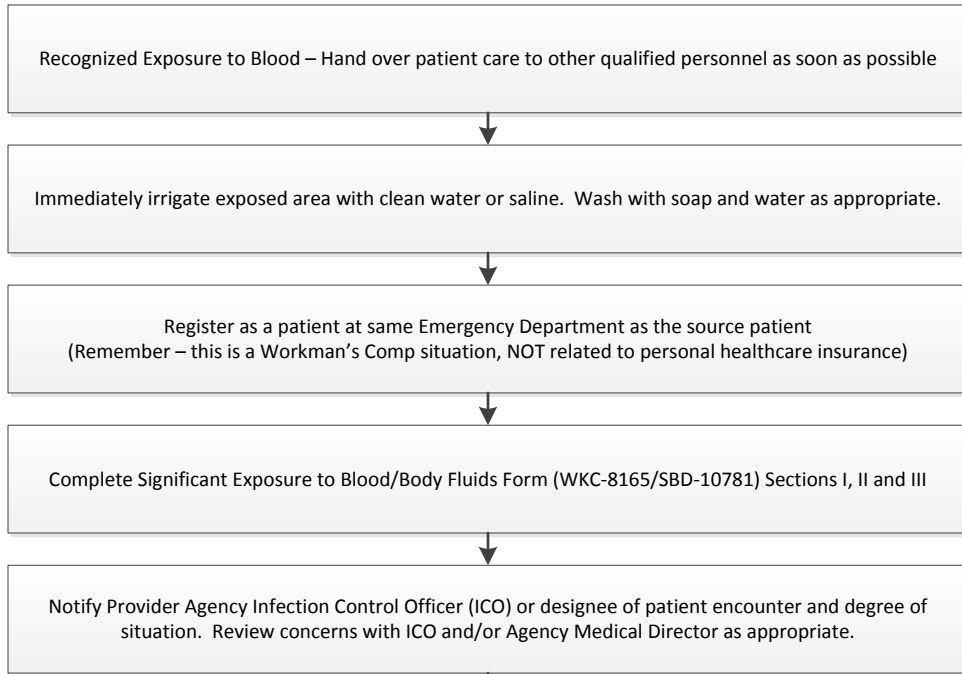
White copy – public safety provider

Yellow copy – Emergency Dept.

Pink copy – Hospital EMS Liaison

# Possible Bloodborne Exposure

**Purpose: Guidance for Public Safety Responder (EMT, Paramedic, Law Enforcement Officer, Firefighter or other Emergency Response Personnel) with concern for possible exposure to a communicable disease through bloodborne exposure**



Exposure Response

Exposure Response



## DETERMINATION OF EXPOSURE TO BLOOD/BODY FLUIDS

EXPOSED PERSON COMPLETES PARTS I AND III ONLY

### I. EXPOSED PERSON

Your Name	Date of Birth
Street Address	
City, State, Zip Code	
Your Employer (and station name, if applicable)	
Telephone Number Work (    )	Home (    )
Personal Physician or Clinic	

**REMEMBER – WHEN YOU ARE INFORMED OF AN HIV TEST RESULT BY USING THIS FORM, IT IS A VIOLATION OF THE LAW FOR YOU TO REVEAL TO ANYONE ELSE THE IDENTITY OF THE PERSON WHO IS THE SUBJECT OF THAT TEST RESULT.**

**(PENALTY: POSSIBLE JAIL AND UP TO \$10,000.00 FINE)**

### III. DESCRIPTION OF INCIDENT RESULTING IN EXPOSURE

Date of Incident (month/day/year):	Time of Incident: A.M. or P.M. (circle one)
Specific Description of Incident in detail:	
Type of Incident And Body Fluid Exchanged (check all that apply):	
<b>BODY FLUID</b> <input type="checkbox"/> Blood <input type="checkbox"/> Sputum/Saliva <input type="checkbox"/> Urine <input type="checkbox"/> Feces <input type="checkbox"/> Semen <input type="checkbox"/> Vaginal Secretions <input type="checkbox"/> Vomitus	<b>ACTION</b> <input type="checkbox"/> Needlestick <input type="checkbox"/> Bite That Breaks Skin <input type="checkbox"/> Impaled Object <input type="checkbox"/> Splash/Splatter <input type="checkbox"/> Mouth-To-Mouth CPR <input type="checkbox"/> Cut Or Wound <input type="checkbox"/> Other
<b>LOCATION OF EXPOSURE (EXPOSED PERSON)</b> <input type="checkbox"/> Eye <input type="checkbox"/> Nose <input type="checkbox"/> Mouth <input type="checkbox"/> Open Wound/Break in Skin <input type="checkbox"/> Dermatitis	
Have you been vaccinated against Hepatitis B? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unsure    If yes, what year? _____	
The above information accurately describes the exposure. I request disclosure of the source person's body fluid/bloodborne pathogen(s) test results.	
Exposed Person's Signature: _____ Date signed: _____	

**IV. SIGNIFICANT EXPOSURE CERTIFICATION BY PHYSICIAN: I certify that the exposure described above meets the statutory definition of significant exposure to HIV [Wis. Stats, s. 252.15(1)(em)],**     Yes     No

**or carries the potential for exposure to other body fluid/bloodborne pathogen(s) not covered by statutory definition.**

Yes     No

Physician's Name (print)	Physician's Signature	Date Signed
Business Telephone	Physician License Number	
Physician's Business Address – Street, City, State, Zip Code		
Receiving Facility Name		Telephone Number (    )
Receiving Facility Address – Street and City		

### V. SOURCE PATIENT'S TEST RESULTS (completed by Infection Control/Occupational Health staff)

HIV	HEPATITIS B	HEPATITIS C
EIA <input type="checkbox"/> Positive <input type="checkbox"/> Negative	HBsAg: <input type="checkbox"/> Positive <input type="checkbox"/> Negative	EIA <input type="checkbox"/> Positive <input type="checkbox"/> Negative
Western blot <input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Indeterminate		RIBA <input type="checkbox"/> Positive <input type="checkbox"/> Negative
HIV DNA PCR <input type="checkbox"/> Positive <input type="checkbox"/> Negative		HCV RNA PCR <input type="checkbox"/> Positive <input type="checkbox"/> Negative
Other (specify):		







# EMPLOYER'S FIRST REPORT OF INJURY OR DISEASE

**Fatal Injuries:** Employers subject to ch. 102, Wis. Stats., must report injuries resulting in death to the Department and to their insurance carrier, if insured, within one day after the death of the employee.  
**Non-Fatal Injuries:** If the injury or occupational illness results in disability beyond the three-day waiting period, the employer, if insured, must notify its insurance carrier within 7 days after the injury or beginning of disability. Medical-only claims are to be reported to the insurance carrier only, not the Department.  
**Electronic Reporting Requirement:** All work-related injuries and illnesses resulting in compensable lost time, with the exception of fatalities, must be reported electronically to the Department via EDI or Internet by the insurance carrier or self-insured employer within 14 days of the date of injury or beginning of disability. Employer may fax claims for fatal injuries to (608) 267-0394.





**Department of Workforce Development  
 Worker's Compensation Division**  
 201 E. Washington Ave., Rm. C100  
 P.O. Box 7901  
 Madison, WI 53707  
 Imaging Server Fax: (608) 260-2503  
 Telephone: (608) 266-1340  
<http://www.dwd.wisconsin.gov/wc>  
 e-mail: DWDDWC@dwd.wisconsin.gov

\*Provision of your Social Security Number (SSN) is voluntary. Failure to provide it may result in an information processing delay. Personal information you provide may be used for secondary purposes [Privacy Law, s. 15.04 (1)(m), Wisconsin Statutes].

<b>EMPLOYEE</b>	Employee Name (First, Middle, Last)		Social Security Number*		Sex <input type="checkbox"/> M <input type="checkbox"/> F	Employee Home Telephone No. ( ) -		
	Employee Street Address			City	State	Zip Code	Occupation	
	Birthdate	Date of Hire	County and State Where Accident or Exposure Occurred?					
<b>EMPLOYER</b>	Employer Name		WI Unemployment Ins. Acct No.		Self-Insured? <input type="checkbox"/> Yes <input type="checkbox"/> No		Nature of Business (Specific Product)	
	Employer Mailing Address			City	State	Zip Code	Employer FEIN	
	Name of Worker's Compensation Insurance Co. or Self-Insured Employer						Insurer FEIN	
	Name and Address of Third Party Administrator (TPA) Used by the Insurance Company or Self-Insured Employer						TPA FEIN	
<b>WAGE INFORMATION</b>	Wage at Time of Injury	Specify per hr., wk., mo., yr., etc. Per:	In Addition to Wages, Check Box(es) if Employee Received:		<input type="checkbox"/> Meals <input type="checkbox"/> Room <input type="checkbox"/> Tips	No. of Meals/wk. No. of Days/wk. Avg. Weekly Amt. \$		
	Is Worker Paid for Overtime? <input type="checkbox"/> Yes <input type="checkbox"/> No If Yes, After How Many Hours of Work Per Week?							
	For the 52 Week Period Prior to the Week the Injury Occurred, Report Below the Number of Weeks Worked in the Same Kind of Work, and the Total Wages, Salary, Commission and Bonus or Premium Earned for Such Weeks.							
	No. of Weeks:	Gross Amount Excluding Tips: \$		If Piece-Work, No. of Hrs. Excluding Overtime:				
	Employee's Usual Work Schedule When Injured:		Start Time : <input type="checkbox"/> AM <input type="checkbox"/> PM		Hours Per Day	Hours Per Week	Days Per Week	
	Employer's Usual Full-Time Schedule for This Type of Work at Time of Employee's Injury:							
	Part-Time Employment	Are there Other Part-Time Workers Doing the Same Work With the Same Schedule?			Number of Full-Time Employees Doing The Same Type Of Work:			
	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes, how many:							
	Injury Date	Time of Injury : AM : PM	Last Day Worked	Date Employer Notified	<input type="checkbox"/> Date Returned to Work <input type="checkbox"/> Estimated Date of Return			
	Did Injury Cause Death? <input type="checkbox"/> Yes <input type="checkbox"/> No	Date of Death	Was This a Lost Time or Other Compensable Injury? <input type="checkbox"/> Yes <input type="checkbox"/> No		Did Injury Occur Because of:			
				<input type="checkbox"/> Substance Abuse	<input type="checkbox"/> Failure to Use Safety Devices	<input type="checkbox"/> Failure to Obey Rules		
Was Employee Treated in an Emergency Room? <input type="checkbox"/> Yes <input type="checkbox"/> No Was Employee Hospitalized Overnight as an In-Patient? <input type="checkbox"/> Yes <input type="checkbox"/> No								
Name and Address of Treating Practitioner and Hospital: Case Number from the OSHA Log:								
Injury Description - Describe Activities of Employee When Injury or Illness Occurred and What Tools, Machinery, Objects, Chemicals, Etc. Were Involved.								
What Happened to Cause This Injury or Illness? (Describe How The Injury Occurred)								
What Was The Injury or Illness? (State the Part of Body Affected and How It Was Affected)								
Report Prepared By		Work Phone Number ( ) -		Position		Date Signed		

Mode of Transmission	
	Airborne
	Droplet
	Bloodborne
	Contact

# EMS Primer on Infectious Diseases



Mode of Transmission	
	Vomit
	Feces
	Zoonotic
	Biologic Weapon

Common Infectious Pathogens

Common Infectious Pathogens

## Section 1. Commonly Encountered Infectious Pathogens



Mode of Transmission	
	Droplet
	Contact

# Bacterial Meningitis

## What is it?

Meningitis is an inflammatory disease of the protective tissue covering the brain and spinal cord. It is caused by either a viral or bacterial infection of CSF, the fluid that surrounds the brain and spinal cord. There are about 1.2 million cases of bacterial meningitis worldwide each year, resulting in approximately 135,000 deaths. This is a serious infection, and left untreated can cause seizures, brain damage, coma, and death.

## What causes it?

Frequent organisms causing community acquired bacterial meningitis are: *Streptococcus pneumoniae* (60-70% of cases in the US), *Neisseria meningitidis* (12%), *Listeria monocytogenes* (4%) and *Haemophilus influenzae B* (6%).

## How is it spread?

Bacterial meningitis is usually spread through close contact with an infected person, through respiratory droplets or saliva. Casual contact is usually not enough to spread bacterial meningitis. Close contacts include: household members, child care center contacts, and anyone exposed to oral secretions (i.e. kissing, mouth-to-mouth resuscitation, endotracheal intubation or ET Tube management). Casual contact <8 hours and >3 feet is generally not enough to spread bacterial meningitis. The attack rate for close contacts of patients with meningococcal disease is estimated to be 2-4 in 1,000 persons exposed (500-800 times greater than the general population).

## What are the signs?

The classic triad of symptoms in acute bacterial meningitis are fever, nuchal rigidity (neck stiffness) and a change in mental status, although not all patients will have all three. Additional common complaints are severe headache, light sensitivity, body aches and seizures. *N. meningitidis* can cause a characteristic skin rash, prominent on the lower extremities. The average incubation period after exposure is 3-5 days, after which symptoms develop. Symptoms usually progress quickly, over 12-48 hours.

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask. Patients suspected of having bacterial meningitis should be placed on droplet precautions (p. 4). Providers in close contact as well as the patient should wear a mask to prevent spread of respiratory droplets.

## What do I need to do if I am exposed?

If you have close contact with a patient suspected to have bacterial meningitis, you should present to the same Emergency Department as the source patient and be evaluated. The physician will examine you to determine your level of exposure and risk, and review the source patient's records to decide if post-exposure antibiotics are appropriate.

If you develop symptoms of bacterial meningitis, you should present to the Emergency Department as soon as possible for diagnosis and treatment. Your close contacts should also be evaluated to determine the need for prophylactic treatment.

## Diagnosis

Diagnosis is made through a detailed history and physical exam with analysis of the cerebrospinal fluid (CSF).

## Treatment

Empiric therapy of the patient with suspected bacterial meningitis with broad-spectrum antibiotics should be started promptly after appropriate labs and cultures have been obtained.

## Prophylaxis



Chemoprophylaxis should be administered to people with close contact to the patient during the 7 days prior to symptom onset. Antibiotics should be given as soon as possible, ideally <24 hours after identification of the index patient. Treatment more than 14 days after the onset of illness in the index patient is probably of no value. Vaccines are available for *S. pneumoniae*, *N. meningitidis*, and *H. influenzae*.

Rifampin, Ciprofloxacin and Ceftriaxone are 90-95% effective and all acceptable in chemoprophylaxis of *N. meningitidis*.

Preventative antibiotics are not useful following exposure to meningitis caused by *Haemophilus influenzae*, *Streptococcus pneumoniae*, *Listeria monocytogenes*, Cryptococcal meningitis, viral (aseptic) meningitis or West Nile Fever.

## Additional Information

[cdc.gov/meningitis/bacterial.html](http://cdc.gov/meningitis/bacterial.html)

Mode of Transmission	
	Droplet
	Contact

# Haemophilus Influenzae

## What is it?

*Haemophilus influenzae* is a kind of bacteria that can cause several different kinds of disease, including pneumonia, bloodstream infections, and meningitis. It does **NOT** cause influenza or "the flu," which is caused by a virus. Infections with *H. influenzae* can be mild or can be very dangerous.

## What causes it?

Infection with *H. influenzae* results from the bacteria invading cells of the affected parts of the body, including the lungs, throat, blood, and/or spinal fluid. The type of *H. influenzae* that most commonly caused meningitis is called type B, or Hib. There is a vaccine given to children that prevents infection with this type of *H. influenzae*. And has led to a dramatic decline in the incidence of invasive Hib in children. Other strains of *H. influenzae*, particularly nontypeable *H. influenzae* (NTHi), cause mucosal and respiratory infections throughout life.

## How is it spread?

Colonization of the upper respiratory tract can persist for months, and recurrent upper respiratory infection may allow the bacteria to become invasive as well as enhance spread amongst close contacts. *H. influenzae* is spread through airborne respiratory droplets and direct contact with respiratory secretions.

## What are the signs?

The signs of *H. influenzae* infection depend on the kind of infection. In pneumonia, patients usually have fever, cough, shortness of breath, fatigue, body aches, and chest pain. Patients with bloodstream infections have high fevers, body aches, malaise, and fatigue. In meningitis, patients often have fevers, aches, neck stiffness, and altered mental status.

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask.

Children should be vaccinated against Hib to prevent very dangerous meningitis infections. If you have a patient with any of the symptoms above, use full PPE and place a mask over the patient to prevent the spread of respiratory droplets. Wash your hands thoroughly after patient care.

## What do I need to do if I am exposed?

If you have close contact with a patient who is suspected to have an *H. influenzae* infection, you should be seen by your primary care physician for evaluation. Your doctor will examine you and determine your level of exposure and risk, and review the source patient's records to decide if post-exposure antibiotics are appropriate. Close family members may also need treatment if you develop *H. influenzae* Type B.

## Diagnosis

Diagnosis is made through a detailed history and physical exam. Definitive diagnosis requires blood, sputum, or spinal fluid cultures.

## Treatment

Known or suspected exposures are generally treated with antibiotics for 10 days

## Isolation and Decontamination

*H. influenzae* patients are usually kept in isolation until they are no longer contagious, usually about 24 hours after starting antibiotics.

## Prophylaxis

A household or close contact is defined as a person who resides with the index patient or who spent >4 hours with the index patient for at least five of the seven days before hospital admission of the index case. Provision of chemoprophylaxis to household and close contacts can eradicate carrier status of Hib and reduce the risk of developing invasive disease, thereby interrupting transmission.

Usual treatment is Rifampin once per day for 4 days for close contacts of patients with Hib; none for contacts of non-type b or nontypeable H. flu.

## Additional Information

<http://www.cdc.gov/hidisease/index.html>

# Hepatitis B

## What is it?

Hepatitis B is a viral infection of the liver that causes both acute and chronic inflammation of the liver. In the acute phase, patients may have abnormal liver tests, scleral icterus (yellow eyes) and occasionally fulminant liver failure. In the chronic phase, patients may range from asymptomatic carriers to chronic hepatitis, cirrhosis and hepatocellular carcinoma.

## What causes it?

Hepatitis B is caused by the hepatitis B virus (HBV), a member of the family of hepadnaviruses. It is a bloodborne pathogen that is spread by percutaneous inoculation (needle stick), sexual transmission, blood transfusion, breastfeeding and mother-to-child transmission. It is estimated that there are 248 million HBV carriers in the world, and approximately 600,000 die annually from HBV-related liver disease.

## How is it spread?

It is a bloodborne pathogen that is spread by percutaneous inoculation, sexual transmission, blood transfusions, breastfeeding and mother-to-child transmission. This document will primarily focus on exposures related to contaminated medical instruments or accidental needle sticks. Infections among healthcare providers has decreased significantly, due to efforts to immunize all providers against HBV and using postexposure prophylaxis for nonimmune persons (unvaccinated or vaccine nonresponders). The risk of transmission depends on the HBsAg, HBeAG and HBV DNA status of the source.

## What are the signs?

There is generally an incubation period of 1-4 months before symptoms develop. Clinical manifestations include anorexia, nausea, jaundice and right-upper-quadrant abdominal pain. Symptoms and jaundice generally disappear after 1-3 months but some patients have prolonged fatigue even after normalization of liver tests. Approximately 70% of patients with acute infection have subclinical signs, while 30% have scleral icterus (yellow eyes). Fulminant liver failure is rare and occurs in approximately 0.1-0.5% of patients.

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask.

The best way to prevent Hepatitis B is to get vaccinated. In the United States, universal vaccination for hepatitis B is recommended, and should be considered for individuals at high risk of exposure or a poor disease outcome.

## What do I need to do if I am exposed?

If you have a needle stick or exposure to contaminated medical instruments with a patient suspected to have HBV, you should present to the same Emergency Department as the source patient and be evaluated. The physician will examine you to determine your level of exposure and risk, and review the source patient's records to decide if post-exposure treatment is appropriate.

If you develop symptoms of Hepatitis B, you should present to the Emergency Department as soon as possible for diagnosis and treatment. Any contacts that may have been exposed to your blood or infected body fluids should also be evaluated to determine the need for prophylactic treatment.

## Diagnosis

Diagnosis is made through detailed history and physical exam, with blood tests to look for antibodies to the Hepatitis B Virus. There is a human vaccine available. Prevention focuses on vaccination and exercising standard bloodborne pathogen isolation.

## Treatment

The decision to initiate treatment with antivirals is primarily based upon the presence or absence of cirrhosis, the ALT level, and the HBV DNA level. However, there are additional indications for patients with certain concurrent conditions, such as malignancy and pregnancy.

## Prophylaxis

Post exposure prophylaxis should be considered for individuals who have had an exposure that may potentially transmit HBV from a patient who is HBsAg-positive, or whose HBsAg status is unknown. The need and type of prophylaxis depends on the vaccination history and hepatitis B surface antibody (anti-HBs) state of the exposed patient and the HBsAg status of the source patient.

In providers who have been vaccinated and adequately responded to the three doses of vaccine, no post-exposure management is required.

In providers who have unknown vaccine response or who are not vaccinated, the source patient should be tested for HBsAg first. If positive, the exposed person should receive one dose of Hepatitis B immunoglobulin (HBIG) and a dose of the Hep B vaccine. The exposed person should then complete the vaccination series as per usual.

## Additional Information

<https://www.cdc.gov/hepatitis/HBV/index.htm>

Mode of Transmission	Bloodborne
----------------------	------------

# Human Immunodeficiency Virus (HIV)

## What is it?

Human Immunodeficiency Virus (HIV) is a virus that affects the body's immune system, which is responsible for fighting infections. People with HIV can get sick more easily than other people, because their immune system cannot fight off infections or cancer.

## What causes it?

HIV is caused by two strains of the virus, HIV-1 and HIV-2. HIV-1 causes almost all of the cases of AIDS worldwide. HIV-2 causes an AIDS-like illness, and is uncommon in North America.

## How is it spread?

In the United States, HIV is spread mainly by:

- Having anal or vaginal sex with someone who has HIV without using a condom or taking medicines to prevent or treat HIV.
- Sharing needles or syringes, rinse water, or other equipment (works) used to prepare drugs for injection with someone who has HIV. HIV can live in a used needle up to 42 days depending on temperature and other factors.

Less commonly, HIV may be spread:

- From mother to child during pregnancy, birth, or breastfeeding. Although the risk can be high if a mother is living with HIV and not taking medicine, recommendations to test all pregnant women for HIV and start HIV treatment immediately have lowered the number of babies who are born with HIV.
- By being stuck with an HIV-contaminated needle or other sharp object. This is a risk mainly for health care workers.

In extremely rare cases, HIV has been transmitted by:

- Receiving blood transfusions, blood products, or organ/tissue transplants that are contaminated with HIV. This was more common in the early years of HIV, but now the risk is extremely small because of rigorous testing of the US blood supply and donated organs and tissues.
- Being bitten by a person with HIV. Each of the very small number of documented cases has involved severe trauma with extensive tissue damage and the presence of blood. There is no risk of transmission if the skin is not broken.
- Contact between broken skin, wounds, or mucous membranes and HIV-infected blood or blood-contaminated body fluids.
- Deep, open-mouth kissing if both partners have sores or bleeding gums and blood from the HIV-positive partner gets into the bloodstream of the HIV-negative partner. HIV is not spread through saliva.

Once someone has acquired HIV, they are considered to be contagious immediately. People are often highly infectious within a few weeks of acquiring the virus, and this is particularly dangerous because tests are not always able to detect infection yet.

## What are the signs?

Acute HIV infection may present as a mononucleosis type of syndrome with a constellation of nonspecific symptoms. The "classic" retroviral syndrome is fever, lymphadenopathy, sore throat, rash, myalgia/arthralgia, diarrhea, weight loss and headache. Without a high degree of suspicion, the diagnosis can frequently be missed by clinicians. In some cases, early HIV infection may be asymptomatic.

In patients with acute symptomatic infection, the usual time from HIV exposure to the development of symptoms is 2-4 weeks, although incubation periods as long as 10 months have been reported. Most symptoms associated with acute HIV infection are self-resolving; however, the severity and duration of symptoms vary widely from patient to patient.

## Prevention

Providers should use standard PPE and exercise universal bloodborne precautions, and wear a mask.

## What do I need to do if I am exposed?

If you have a needle stick or exposure to contaminated medical instruments with a patient suspected to have HIV, you should present to the same Emergency Department as the source patient to be evaluated. The physician will examine you to determine your level of exposure and risk, and review the source patient's records to decide if post-exposure treatment is appropriate.

If you develop symptoms of acute HIV infection, you should present to the Emergency Department as soon as possible for diagnosis and treatment. Any contacts that may have been exposed to your blood or infected body fluids should also be evaluated to determine the need for prophylactic treatment.

## Diagnosis

Diagnosis is made through detailed history and physical exam, with blood tests to look for the HIV virus. There is currently no human vaccine available. Prevention focuses on vaccination and exercising standard bloodborne pathogen isolation.

## Treatment




The decision to initiate treatment with antivirals is primarily based upon the type of exposure and the risk of transmission. Occupational transmission of HIV to healthcare workers is extremely rare, and the use of safety devices and barriers can help minimize the risk of exposure.

## Prophylaxis

Post exposure prophylaxis (PEP) should be considered for individuals who have had an exposure that may potentially transmit HIV from a patient who is HIV positive, or whose HIV status is unknown. PEP must be started within 72 hours after a possible exposure. The sooner, the better.

## Additional Information

<https://www.cdc.gov/actagainstaids/basics/transmission.html>

Mode of Transmission	
	Airborne
	Droplet
	Contact

# Influenza

## What is it?

Influenza is a respiratory illness caused by influenza A or B viruses that occurs in outbreaks and epidemics worldwide, primarily during the winter season. It is a self-limited infection in the general population, but can be associated with increased severity in certain high-risk populations.

## What causes it?

Influenza is caused by viruses in the influenza family. The two main types that cause illness in humans are Influenza A and Influenza B. Influenza A has several subtypes, which are named by the types of surface proteins (“H” and “N”) on the outside layer of the virus. Influenza pandemics are typically caused by the Influenza A virus, and scientists refer to by their subgroup names during outbreaks (for example, “H1N1”).

## How is it spread?

Influenza is spread through respiratory droplets. Patients are contagious ~1 day before they start to experience symptoms until about a week after developing symptoms.

## What are the signs?

Fever, body aches, cough, shortness of breath, and fatigue.

## Prevention

There is an annual vaccination recommended for everyone, especially important for healthcare providers. If you have a patient you suspect of having influenza or who has respiratory symptoms, you should place a mask on the patient to prevent spread of respiratory droplets, use appropriate PPI, and practice good hand hygiene.

## What do I need to do if I am exposed?

If you are otherwise healthy, you do not need prophylaxis, and do not need to see your doctor unless you develop symptoms. If you do develop flu-like symptoms, you can consider seeing your doctor for a prescription for antiviral medication which can help lessen the length of illness.

Persons with another underlying medical condition such as asthma, diabetes, heart disease, lung disease, morbid obesity, or people under 5 years old, over 65 years old, or pregnant: seek care and start treatment as soon as possible after developing symptoms.

Everyone over 6 months old should get the flu vaccine unless they have an allergy to the vaccine itself.

## Diagnosis

The common forms of Influenza virus that cause illness can be detected with a swab or sputum test.

## Treatment

Oseltamivir (Tamiflu) for 5 days

## Isolation and Decontamination




Most people with influenza have a mild illness and do not need medical care or antiviral drugs. The CDC recommends people who have influenza stay home for at least 24 hours after the fever is gone (without the need for fever-reducing medications) except to get medical care or other necessities. Infected people should stay away from others as much as possible to prevent infecting them. If you must leave home, wear a facemask if you have one, or cover coughs and sneezes with a tissue. Wash your hands often to prevent spreading influenza to others.

## Prophylaxis

Everyone over 6 months old should get the flu vaccine unless they have an allergy to the vaccine itself.

## Additional Information

[www.cdc.gov/flu](http://www.cdc.gov/flu)

Mode of Transmission	
	Airborne
	Droplet
	Contact

# Measles

## What is it?

Measles is characterized by fever, cough, coryza, conjunctivitis, an exanthem (Koplik spots) on the oral mucosa, and a maculopapular rash that spreads cephalocaudally (head downward toward toes).

## What causes it?

It's caused by a kind of virus called paramyxovirus.

## How is it spread?

Transmission is typically by large respiratory droplets from cough and remain airborne for short distances. The measles virus is thought to survive for only short times on dry surfaces. Measles is a highly contagious viral infection that is most common among children.

## What are the signs?

Incubation period is 7-14 days. Symptoms begin with fever, coryza, hacking cough and conjunctivitis. Koplik spots appear during the prodrome, before the start of the rash on the oral mucosa, opposite the 1st and 2<sup>nd</sup> symptom onset, usually 12 days after the Koplik spots appear. Rash starts on the face, behind the ears and on the side of the neck. Within 24-48 hours, the rash spreads to the trunk and extremities as they fade on the face.

## Prevention

Physical measures – keep patients in respiratory isolation. Put a mask on the patient, providers should use gloves, masks, eye protection and gowns when possible

Vaccination – part of the MMR vaccination given to children in developed countries.

Chemoprophylaxis – Susceptible contacts, unvaccinated individuals can get the vaccine within 3 days of exposure. If vaccine deferred, immune globulin can be given immediately (within 6 days) with vaccination given 56 months later. If exposed during a known outbreak and cannot receive the vaccine, quarantine x 21 days after last exposure.

## What do I need to do if I am exposed?

Report exposure to your infectious disease coordinator and then present follow up with your PCP.

## Diagnosis

Diagnosis is usually clinical. Treatment is supportive. Supportive care, children may need Vitamin A supplementation.

## Treatment

There is no specific antiviral therapy for measles. Medical care is supportive and to help relieve symptoms and address complications such as bacterial infections. Severe measles cases among children, such as those who are hospitalized, should be treated with vitamin A. Vitamin A should be administered immediately on diagnosis and repeated the next day.

## Isolation and Decontamination

Infected people should be isolated for four days after they develop a rash; airborne precautions should be followed in healthcare settings. Regardless of presumptive immunity status, all healthcare staff entering the room should use respiratory protection consistent with airborne infection control precautions (use of an N95 respirator or a respirator with similar effectiveness in preventing airborne transmission). Because of the possibility, albeit low, of MMR vaccine failure in healthcare providers exposed to infected patients, they should all observe airborne precautions in caring for patients with measles. The preferred placement for patients who require airborne precautions is in a single-patient airborne infection isolation room (AIIR).

People without evidence of immunity who have been exempted from measles vaccination for medical, religious, or other reasons and who do not receive appropriate PEP within the appropriate timeframe should be excluded from affected institutions in the outbreak area until 21 days after the onset of rash in the last case of measles.

## Prophylaxis




People exposed to measles who cannot readily show that they have evidence of immunity against measles should be offered post-exposure prophylaxis (PEP) or be excluded from the setting (school, hospital, childcare). To potentially provide protection or modify the clinical course of disease among susceptible persons, either administer MMR vaccine within 72 hours of initial measles exposure, or immunoglobulin (IG) within six days of exposure. Do **not** administer MMR vaccine and IG simultaneously, as this practice invalidates the vaccine.

If a healthcare provider without evidence of immunity is exposed to measles, MMR vaccine should be given within 72 hours, or IG should be given within 6 days when available. Exclude healthcare personnel without evidence of immunity from duty from day 5 after first exposure to day 21 after last exposure, regardless of post-exposure vaccine.

## Additional Information

<https://www.cdc.gov/measles/>



Mode of Transmission	
	Airborne
	Droplet
	Contact

# Mumps

## What is it?

Mumps is a contagious disease caused by a virus. It typically starts with a few days of fever, headache, muscle aches, tiredness, and loss of appetite, followed by swollen salivary glands. You can protect yourself and your family against mumps with vaccination.

## What causes it?

Mumps is a viral illness caused by a paramyxovirus, a member of the Rubulavirus family. The average incubation period for mumps is 16 to 18 days, with a range of 12 to 25 days. It spreads through saliva or mucus from the mouth, nose, or throat.

## How is it spread?

Mumps is spread through the saliva, secretions, or droplets. It can survive on surfaces that have been contaminated by droplets.

## What are the signs?

There is an incubation period of 2-3 weeks, after which patients develop fevers, fatigue, headaches, body aches, and later, swelling of the parotid glands. Most people recover, but it can rarely cause swelling of the testicles, meningitis, or encephalitis, all of which can lead to serious complications.

## Prevention

Mumps is preventable with a vaccine given in childhood. As with anyone with infectious symptoms, proper PPE is a must. If you have a patient with known mumps, droplet isolation should be implemented. Patients are contagious as long as they have symptoms, starting several days before swelling.

## What do I need to do if I am exposed?

During mumps outbreaks in highly vaccinated communities, the proportion of cases that occur among people who have been vaccinated may be high. This should not be interpreted as meaning that the vaccine is not effective. The effectiveness of the vaccine is assessed by comparing the attack rate in people who are vaccinated with the attack rate in those who have not been vaccinated. In outbreaks in highly vaccinated populations, people who have not been vaccinated against mumps usually have a much greater mumps attack rate than those who have been fully vaccinated.

## Diagnosis

Diagnosis is with a blood test, though this can take a long time to finalize. Typically, diagnosis is made clinically. Mumps usually involves pain, tenderness, and swelling in one or both parotid salivary glands (cheek and jaw area). Swelling is first visible in front of the lower part of the ear. It then extends downward and forward as fluid builds up in the skin and soft tissue of the face and neck. Swelling usually peaks in 1 to 3 days and then subsides during the next week. The swollen tissue pushes the angle of the ear up and out. As swelling worsens, the angle of the jawbone below the ear is no longer visible. Often, the jawbone cannot be felt because of swelling of the parotid. One parotid may swell before the other, and in 25% of patients, only one side swells. Other salivary glands (submandibular and sublingual) under the floor of the mouth also may swell but do so less frequently (10%).

## Treatment

Treatment is supportive.

## Isolation and Decontamination




When a person is ill with mumps, he or she should avoid contact with others from the time of diagnosis until at least 5 days after the onset of parotitis by staying home from work or school and staying in a separate room if possible.

## Prophylaxis

Vaccination is the best way to prevent mumps. This vaccine is included in the combination measles-mumps-rubella (MMR) and measles-mumps-rubella-varicella (MMRV) vaccines. Two doses of mumps vaccine are 88% (range 31% to 95%) effective at preventing the disease; one dose is 78% (range 49% to 91%) effective. The first vaccine against mumps was licensed in the United States in 1967, and by 2005, high two-dose childhood vaccination coverage reduced disease rates by 99%. Studies have demonstrated that blood sera from vaccinated persons cross-neutralizes currently circulating mumps strains.

## Additional Information

<https://www.cdc.gov/mumps/>

Mode of Transmission	
	Airborne
	Droplet
	Contact

# Pertussis

## What is it?

Pertussis, also known as whooping cough, is a highly contagious respiratory disease. Pertussis is known for uncontrollable, violent coughing which often makes it hard to breathe. After fits of many coughs, someone with pertussis often needs to take deep breaths which result in a "whooping" sound. Pertussis can affect people of all ages, but can be very serious, even deadly, for babies less than a year old.

## What causes it?

Pertussis, a respiratory illness commonly known as whooping cough, is a very contagious disease caused by a type of bacteria called *Bordetella pertussis*. These bacteria attach to the cilia (tiny, hair-like extensions) that line part of the upper respiratory system. The bacteria release toxins (poisons), which damage the cilia and cause airways to swell.

## How is it spread?

Pertussis is a very contagious disease only found in humans. Pertussis spreads from person to person. People with pertussis usually spread the disease to another person by coughing or sneezing or when spending a lot of time near one another where you share breathing space. Many babies who get pertussis are infected by older siblings, parents, or caregivers who might not even know they have the disease. Infected people are most contagious up to about 2 weeks after the cough begins. Antibiotics may shorten the amount of time someone is contagious. While pertussis vaccines are the most effective tool to prevent this disease, no vaccine is 100% effective. When pertussis circulates in the community, there is a chance that a fully vaccinated person, of any age, can catch this disease. If you have gotten the pertussis vaccine but still get sick, the infection is usually not as bad.

## What are the signs?

Early symptoms can last for 1 to 2 weeks and usually include: Runny nose, Low-grade fever (generally minimal throughout the course of the disease), mild, occasional cough, and apnea – a pause in breathing (in babies). After 1 to 2 weeks and as the disease progresses, the traditional symptoms of pertussis may appear and include: Paroxysms (fits) of many, rapid coughs followed by a high-pitched "whoop", vomiting (throwing up) during or after coughing fits, exhaustion (very tired) after coughing fits.

## Prevention

The best way to prevent pertussis (whooping cough) among babies, children, teens, and adults is to get vaccinated. In the United States, the recommended pertussis vaccine for babies and children is called "Diphtheria, Tetanus and Pertussis" (DTaP). Research shows that pertussis can spread in various healthcare settings. These include hospitals and emergency departments serving pediatric and adult patients, outpatient clinics, nursing homes, and long-term care facilities. Healthcare personnel who have direct patient contact should receive a single dose of Tdap (Tetanus, Diphtheria and Pertussis) if they have not previously received one. Tdap has a reduced dose of the diphtheria and pertussis vaccines is approved for adolescents starting at age 11 and adults ages 19-64. It is often called a "booster" dose because it boosts the immunity that wanes from vaccines given at ages 4-6. Tdap can be administered regardless of interval since the previous Tetanus dose. However, shorter intervals between Tdap and last Tetanus may increase the risk of mild local reactogenicity.

## What do I need to do if I am exposed?

CDC supports targeting postexposure antibiotic use to persons at high risk of developing severe pertussis and to persons who will have close contact with those at high risk of developing severe pertussis.

## Diagnosis

Healthcare providers diagnose pertussis (whooping cough) by considering if you have been exposed to pertussis and by doing a:

- History of typical signs and symptoms
- Physical examination
- Laboratory test which involves taking a sample of mucus (with a swab or syringe filled with saline) from the back of the throat through the nose
- Blood test

## Treatment

Healthcare providers generally treat pertussis with antibiotics and early treatment is very important. Treatment may make your infection less serious if you start it early, before coughing fits begin. Treatment can also help prevent spreading the disease to close contacts (people who have spent a lot of time around the infected person). Treatment after three weeks of illness is unlikely to help. The bacteria are gone from your body by then, even though you usually will still have symptoms. This is because the bacteria have already done damage to your body.

## Isolation and Decontamination

Like many respiratory illnesses, pertussis spreads by coughing and sneezing while in close contact with others, who then breathe in the bacteria. CDC recommends practicing good hygiene to prevent the spread of respiratory illnesses. To encourage good hygiene and prevention, mask patients with a cough to help cover their mouth and nose. Wash your hands often with soap and water for at least 20 seconds, and encourage your patient to do so as well.



## Prophylaxis

The best way to protect against pertussis is with vaccines. Clinicians can also use preventive antibiotics to protect people who have been exposed and are at high risk of developing severe pertussis.

The CDC recommends pertussis vaccines for infants, children, adolescents, and adults. Clinicians should give five doses of DTaP to children 2 months through 6 years of age. CDC recommends one dose of Tdap for those 11 years or older, with a preferred administration at 11 or 12 years of age. CDC also recommends Tdap for pregnant women during **each pregnancy**, with a preferred administration during the early part of gestational weeks 27 through 36.

## Additional Information

<https://www.cdc.gov/pertussis/>

Mode of Transmission	
	Airborne
	Droplet

# Tuberculosis (TB)

## What is it?

TB refers to disease caused by the bacteria *Mycobacterium tuberculosis*, and humans are the main reservoir. It is estimated that 1/3 of the world's population is infected, and ~15 million have active disease at any one time. Tuberculosis is a chronic, progressive infection, often with a period of latency following initial infection. TB most commonly affects the lungs.

**Pathophysiology** – *M. tuberculosis* bacilli initially cause a primary infection, which uncommonly causes acute illness. Most (~95%) of primary infections are asymptomatic and followed by a latent (dormant) phase. A variable percentage of latent infections reactivate with signs and symptoms of the disease. Infection is usually not transmissible in the primary stage and is never contagious in the latent stage. Active TB is more likely in patients with impaired immunity, particularly those infected with HIV.

## What causes it?

*Mycobacterium tuberculosis*

## How is it spread?

Respiratory droplets

## What are the signs?

Symptoms include productive cough, fever, weight loss and malaise. In active pulmonary TB, patients may have no symptoms except, "not feeling well", anorexia, fatigue and weight loss which develop gradually over weeks. Cough is the most common symptom. Becomes productive of yellow or green sputum, usually upon awakening in the morning but becomes more productive as the disease progresses. Drenching night sweats are a classic symptom but are neither common nor specific for TB.

## Prevention

Keep patients in respiratory isolation. Put a mask on the patient, providers should use gloves, masks, eye protection and gowns when possible

## What do I need to do if I am exposed?

If you think you have been exposed to someone with TB disease, you should contact your doctor or local health department about getting a TB skin test or a special TB blood test. Be sure to tell the doctor or nurse when you spent time with the person who has TB disease.

It is important to know that a person who is exposed to TB bacteria is not able to spread the bacteria to other people right away. Only persons with active TB disease can spread TB bacteria to others. Before you would be able to spread TB to others, you would have to breathe in TB bacteria and become infected. Then the active bacteria would have to multiply in your body and cause active TB disease. At this point, you could possibly spread TB bacteria to others. People with TB disease are most likely to spread the bacteria to people they spend time with every day, such as family members, friends, coworkers, or schoolmates.

## Diagnosis

Sputum smear and culture or molecular based diagnostic tests.

## Treatment

It is very important that people who have TB disease are treated, finish the medicine, and take the drugs exactly as prescribed. If they stop taking the drugs too soon, they can become sick again; if they do not take the drugs correctly, the TB bacteria that are still alive may become resistant to those drugs. TB that is resistant to drugs is harder and more expensive to treat.

TB disease can be treated by taking several drugs for 6 to 9 months. There are 10 drugs currently approved by the U.S. Food and Drug Administration (FDA) for treating TB.

## Isolation and Decontamination




Avoid close contact or prolonged time with known TB patients in crowded, enclosed environments such as clinics, hospitals, prisons or homeless shelters. Travelers who anticipate possible prolonged exposure to people with TB should have a TB skin test or a TB blood test before leaving the US. If their reaction is negative, they should have a repeat test 8-10 weeks after returning to the US.

## Prophylaxis

Medical prophylaxis is generally not recommended. The Bacille Calmette-Guerin (BCG) vaccine is often given to infants and small children in other countries where TB is common. It does not always protect people from getting TB.

## Additional Information

<https://www.cdc.gov/tb/>

Mode of Transmission	
	Airborne
	Droplet
	Contact

# Varicella (Chicken Pox, Shingles)

## What is it?

Varicella is the scientific name for chicken pox, a very contagious itchy rash.

## What causes it?

It is caused by the Varicella Zoster Virus, which initially causes chicken pox and later, after initial illness, can cause Zoster, a.k.a. Shingles.

## How is it spread?

Varicella is highly contagious. The virus can be spread from person to person by direct contact, inhalation of aerosols from vesicular fluid of skin lesions of acute varicella or zoster, and possibly through infected respiratory secretions that also may be aerosolized. A person with varicella is contagious beginning 1 to 2 days before rash onset until all the chickenpox lesions have crusted. Vaccinated people may develop lesions that do not crust. These people are considered contagious until no new lesions have appeared for 24 hours. It takes from 10 to 21 days after exposure to the virus for someone to develop varicella. Based on studies of transmission among household members, about 90% of susceptible close contacts will get varicella after exposure to a person with disease. Although limited data is available to assess the risk of VZV transmission from zoster, one household study found that the risk for VZV transmission from herpes zoster was approximately 20% of the risk for transmission from varicella.

## What are the signs?

There is an incubation period of several days to a week. Then the patient develops fevers, fatigue, and body aches, after which they develop a rash consisting of very itchy blisters that form over the course of a week. It gets better on its own, but sometimes can cause severe illness including pneumonia or encephalitis.

## Prevention

There is a vaccine for chicken pox that is part of the routine vaccines for children. If you have had chicken pox in the past, you are likely still immune. If you have not had chicken pox and have not been vaccinated, then full contact and respiratory isolation should be used for patients.

## What do I need to do if I am exposed?

If you are at risk and are exposed, you should contact your doctor as soon as you can as you may be able to receive the vaccine or antiviral medications.

## Diagnosis

Diagnosis is usually clinical, though tests can be run on the blisters or the blood.

## Treatment

Treatment is usually supportive, though patients at risk, especially immunocompromised patients or pregnant patients, may receive antivirals.

## Isolation and Decontamination



In the past, some parents participated in “chickenpox parties” to intentionally expose their unvaccinated children to a child with chickenpox in hopes that they would get the disease. CDC strongly recommends against hosting or participating in these events. Chickenpox can be serious and can lead to severe complications and death, even in healthy children. There is no way to tell in advance how severe your child’s symptoms will be. So it is not worth taking the chance of exposing your child to someone with the disease. The best way to protect infants and children against chickenpox is to get them vaccinated.

## Prophylaxis

For people exposed to varicella or herpes zoster who cannot receive varicella vaccine, varicella-zoster immune globulin can prevent varicella from developing or lessen the severity of the disease. Varicella-zoster immune globulin is recommended for people who cannot receive the vaccine and 1) who lack evidence of immunity to varicella, 2) whose exposure is likely to result in infection, and 3) are at high risk for severe varicella.

## Additional Information

<https://www.cdc.gov/chickenpox/>

Mode of Transmission	
	Droplet
	Contact

# Viral Meningitis

## What is it?

Viral meningitis is the most common type of meningitis, an inflammation of the tissue that covers the brain and spinal cord. It is often less severe than bacterial meningitis, and most people get better on their own (without treatment). Usually results from hematogenous spread, but meningitis due to herpes simplex virus type 2 (HSV-2) can also result from reactivation of a latent infection. Viral meningitis tends to be less severe than acute bacterial meningitis. Findings include headache, fever and nuchal rigidity (neck stiffness).

Most people who get mild viral meningitis completely recover on their own usually within 7-10 days. People who develop severe illness, or are at risk for developing severe illness (babies, people with weakened immune systems) may need to be hospitalized.

## What causes it?

The most common cause of viral meningitis is **Enterovirus**. Non-polio enteroviruses, Mumps virus, Herpesviruses including Epstein-Barr virus, herpes simplex viruses and varicella-zoster virus, Measles virus, Influenza virus, Arboviruses (spread through mosquitoes and other insects), Lymphocytic choriomeningitis virus

## How is it spread?

If you have close contact with a person who has viral meningitis, you may become infected with the virus that made that person sick. However, you are not likely to develop meningitis. That's because only a small number of people who get infected with the viruses that cause meningitis will actually develop viral meningitis.

## What are the signs?

Begins with symptoms of viral infection, such as fever, muscle aches, GI or respiratory symptoms. Headache, fever and nuchal rigidity follow. Symptoms resemble bacterial meningitis, but are usually less severe

## Prevention

Keep patients in respiratory isolation. Put a mask on the patient, providers should use gloves, masks, eye protection and gowns when possible

## What do I need to do if I am exposed?

It's very important for anyone with symptoms of meningitis to see a healthcare provider right away because some types of meningitis can be very serious, and only a doctor can determine if you have the disease, the type of meningitis, and the best treatment, which can sometimes be lifesaving.

## Diagnosis

Diagnosis is by cerebrospinal fluid (CSF) analysis.

## Treatment

Supportive measures for most, Acyclovir for suspected herpes simplex, Antiretroviral drugs for suspected HIV infection.

## Isolation and Decontamination





People who have mild viral meningitis should stay at home for at least 24 hours after the fever is gone (without the need for fever-reducing medications) except to get medical care or other necessities. Infected people should stay away from others as much as possible to prevent infecting them. If you must leave home, wear a facemask if you have one, or cover coughs and sneezes with a tissue. Wash your hands often to prevent spreading the causative virus to others.

## Prophylaxis





There are no vaccines to protect against non-polio enteroviruses, which are the most common cause of viral meningitis. Generally not recommended.

## Additional Information

<http://www.cdc.gov/meningitis/viral.html>

Mode of Transmission	
	Airborne
	Droplet
	Bloodborne
	Contact

# EMS Primer on Infectious Diseases




Mode of Transmission	
	Vomit
	Feces
	Zoonotic
	Biologic Weapon

## Section 2. Biologic Weapons

Biologic Weapons

Biologic Weapons



Mode of Transmission	
	Airborne
	Biologic Weapon
	Contact

# ANTHRAX

## What is it?

Anthrax is an infectious disease caused by the naturally occurring bacteria *Bacillus anthracis*. It is an uncommon illness in the United States. The *B. anthracis* spores were the agent used in the 2001 bioterrorism attacks that infected 22 Americans.

## What causes it?

Anthrax is caused by a bacteria called *Bacillus anthracis*. It is found naturally in the environment, particularly in the soil. These bacteria form spores which can cause disease.

## How is it spread?

There are three major anthrax syndromes: cutaneous, inhalational and gastrointestinal tract. Cutaneous anthrax is the most common form of the disease and is caused by the spores being introduced subcutaneously, often as a result of contact with infected animals or animal products. Inhalational anthrax results from breathing in the spores, and may occur when working with contaminated animal products such as wool, hair or hides. It has also resulted from the weaponized and intentionally released spores. Gastrointestinal tract anthrax develops following the consumption of undercooked infected meat from animals infected with anthrax. This form tends to occur in family clusters or point-source outbreaks. Meningitis has been associated with cutaneous, inhalational and gastrointestinal anthrax cases.

## What are the signs?

**Inhalational:** Following the incubation period of 1-7 days, there is a biphasic presentation. Early symptoms last 4-5 days and include fever, muscle aches, headache, nausea, vomiting and malaise. This is followed by a rapidly fulminant bacteremic phase with progressive, severe shortness of breath, hypoxemia and shock.

**Gastrointestinal:** Following the incubation period of 1-6 days, patients develop fevers, sore or swollen throat, nausea, bloody vomiting and/or diarrhea. Necrotic ulcers are surrounded by severe swelling, and can occur in the mouth, stomach, esophagus and intestines.

**Cutaneous:** Following the incubation period of 5-7 days, patients develop small, itchy blisters around the site, sometimes with a black painless center. Extensive swelling surrounds the exposure site. 90% of cutaneous anthrax are in exposed areas such as the face, neck, arms and hands. Any type of anthrax can cause severe disease and even death.

## Prevention

Anthrax is spread by the spores, not transmitted person-to-person. If you have a patient suspected to have anthrax, it is important to decontaminate the patient first, then standard precautions are sufficient. If you respond to a scene where weaponized anthrax is suspected, use of airborne precautions and following hazmat protocols is critical.

## What do I need to do if I am exposed?

If you think that you have been exposed to the *B. anthracis* spores, you should remove yourself from the environment and carefully perform decontamination, preferably assisted by a trained hazmat team. It is important to avoid activities that could potentially spread the spores further and infect others. After decontamination, you should be seen by a doctor for prophylactic antibiotics. If you develop symptoms of inhalational, gastrointestinal or cutaneous anthrax, you should present to the Emergency Department right away for evaluation and antibiotics. Left untreated, anthrax will continue to spread and can be deadly.

## Diagnosis

Diagnosis is made through a detailed history and physical exam, with blood, sputum and/or stool tests depending on the exposure.

## Treatment

All patients with systemic anthrax should be admitted to the hospital for treatment.

*B. anthracis* is susceptible to many antibiotics including penicillin, chloramphenicol, tetracycline, erythromycin and fluoroquinolones.

## Isolation and Decontamination



Clothing should be removed while minimizing agitation to prevent spore spread. Exposed individuals should shower thoroughly with soap and water. All potential surfaces should be wiped with a 0.5% hypochlorite solution (1 part bleach : 9 parts water) or another approved sporicidal/germicidal agent.

## Prophylaxis

Post exposure prophylaxis for inhalational anthrax includes Ciprofloxacin or Doxycycline for 60 days, PLUS a three-dose series of the anthrax vaccine.

## Additional Information

<http://www.cdc.gov/anthrax/index.html>

Mode of Transmission	
	Airborne
	Biologic Weapon

# Botulinum Toxin

## What is it?

Botulism is a rare but potentially life threatening neuroparalytic syndrome resulting from the action of a neurotoxin elaborated by the bacterium *Clostridium botulinum*.

## What causes it?

*C. botulinum* is a heterogeneous group of gram-positive, rod-shaped, spore-forming, obligate anaerobic bacteria. They are ubiquitous and are easily isolated from the surfaces of vegetables, fruits, and seafood, and exist in soil and marine sediment worldwide. Eight strains of *C. botulinum* have been distinguished based upon the antigenic specificities of their toxins (a single strain almost always produces only one toxin type). Some strains (A and B) produce proteolytic enzymes that denature and "spoil" the foods they inhabit, leaving them with an unpleasant appearance, taste, or smell. Other strains do not overtly change the food and, thus, contamination cannot reliably be suspected on the basis of the look, odor, or taste of the food.

## How is it spread?

Botulinum toxin is the most potent bacterial toxin and perhaps the most potent known poison. The minimum lethal dose in experimental mice (MLD) of botulinum toxin is 0.0003 mcg/kg. By comparison, the MLDs for curare and sodium cyanide are 500 and 10,000 mcg/kg, respectively. It is estimated that one gram of aerosolized botulinum toxin could kill at least 1.5 million people. The toxin itself has no smell or taste. If ingested, the toxin is primarily absorbed by the stomach and small intestine, although the large intestine is capable of absorbing the toxin as well. The toxin is resistant to degradation by gastric acidity and human alimentary enzymes alike.

## What are the signs?

The presumed mode of transmission of bioterrorism-associated botulism would be inhalation of aerosolized toxin, although transmission via the GI route is also a possible mode of attack. It is estimated that inhalation of aerosolized botulinum toxin would result in an acute symmetric descending flaccid paralysis with prominent bulbar palsies (diplopia, dysarthria, dysphonia, and dysphagia) after 12 to 72 hours. Cranial nerve involvement most commonly marks the onset of symptomatic illness and can include blurred vision, diplopia, nystagmus, ptosis, dysphagia, dysarthria, and facial weakness.

## Prevention

Since most cases of botulism are acquired through food ingestion, the most critical aspect of botulism prevention is proper food handling and preparation. Good home-canning techniques will destroy spores. Infants <12 months of age should not ingest honey. The most important measure for the prevention of wound botulism is prompt medical evaluation and treatment of infected wounds. Injection of street drugs should be avoided.

## What do I need to do if I am exposed?

If you think you have been exposed to the *C. botulinum* toxin, you should remove yourself from the environment and carefully perform decontamination, preferably assisted by a trained hazmat team. It is important to avoid activities that could potentially spread the toxin further and infect others. After decontamination, you should be seen by a doctor for evaluation and prophylactic antitoxin. If you develop symptoms of botulism, you should present to the Emergency Department right away for evaluation and treatment. Left untreated, botulism may continue to worsen and could be deadly.

## Diagnosis

Diagnosis is made through a detailed history and physical exam, with blood tests depending on the exposure.

## Treatment

Antitoxin is the main therapeutic option for botulism and should be administered as soon as possible after the diagnosis of botulism is made. If the clinical suspicion for botulism is high (eg, the patient is alert and afebrile but has the acute onset of bilateral cranial neuropathies associated with symmetric descending weakness) and symptoms are progressing, antitoxin should be administered as soon as possible and should not be delayed while awaiting results of diagnostic studies. Botulinum antitoxin binds to circulating neurotoxins and prevents their binding to the neuromuscular junction. Because botulinum toxin cannot reverse paralysis, prompt administration early in the course of disease is critical.

## Isolation and Decontamination



Clothing should be removed while minimizing agitation to prevent spread of the toxin. Exposed individuals should shower thoroughly with soap and water. All potential surfaces should be wiped with a 0.5% hypochlorite solution (1 part bleach : 9 parts water) or another approved sporicidal / germicidal agent.

## Prophylaxis

An investigational pentavalent botulinum toxoid vaccine was available from 1965 until 2011 from the United States Centers for Disease Control and Prevention (CDC). The CDC discontinued the availability of this vaccine in 2011 due to a decline in the immunogenicity of the vaccine (which was manufactured more than 30 years earlier) and an increase in local reactions to the vaccine following booster doses

## Additional Information

<https://www.cdc.gov/botulism/>

Mode of Transmission	
 Zoonotic	
 Biologic Weapon	

# Brucellosis

## What is it?

Brucellosis is a bacterial infection that is transmitted to humans through contact with infected animals or derived food products such as unpasteurized milk and cheese. It is one of the most widespread zoonotic infections worldwide, and can cause neurologic or cardiac illness. It can be particularly dangerous for pregnant women.

## What causes it?

It is caused by an infection with the bacteria in the *Brucella* genus. *Brucella melitensis* generally causes more severe infection than *B. abortus* or *B. suis*. Major endemic areas include the Mediterranean, Persian Gulf, the Indian subcontinent, and parts of Mexico and Central and South America. The prevalence of Brucellosis has been increasing due to growing international tourism and migration. Emerging areas include the Balkan Peninsula and many of the former Soviet Union Republics.

## How is it spread?

The bacteria naturally infect domesticated animals including sheep, cows, goats, and pigs. Humans can become infected after coming in contact with fluids from these animals, particularly during slaughter or after consumption of unpasteurized milk or cheese.

## What are the signs?

Brucellosis has an incubation period of 1-4 weeks, after which patients can develop many symptoms including fever, weakness, fatigue, body aches, night sweats, and loss of appetite. In some patients symptoms will last a long time, and occasionally include swelling of the liver or spleen, swelling of the testicles or scrotum, endocarditis (a serious infection of the heart), or neurological involvement. In pregnant patients it can cause miscarriage.

## Prevention

Prevention focuses on keeping domestic livestock healthy with vaccines, quarantine of herds and slaughter of infected animals. Vaccines are effective for cattle, sheep and goats, but requires a sustained program over several years. Take care not to consume undercooked meat or unpasteurized dairy products. Person-to-person transmission is extremely rare, but it is always important to exercise standard precautions when caring for patients with suspected Brucellosis or other infectious symptoms.

## What do I need to do if I am exposed?

There is nothing you have to do if you do not develop symptoms. If you do develop symptoms of Brucellosis, you should see your doctor for an exam and confirmatory testing.

## Diagnosis

Diagnosis is made through detailed history and physical exam, usually confirmed with microscopic analysis of blood smears. Blood cultures require a prolonged period of incubation and occasionally specialized medium in the acute phase. Bone marrow cultures produce a higher yield. Confirmation requires ELISA testing followed by Western blot confirmation.

## Treatment

Patients who are confirmed to have Brucellosis are treated with combinations of antibiotics for a prolonged period with a minimum of 6 weeks. Doxycycline PLUS Rifampin or Ofloxacin PLUS Rifampin are usually effective. Treatment with Rifampin PLUS a tetracycline AND an aminoglycoside is indicated for infections with complications such as endocarditis or meningoenzephalitis.

## Isolation and Decontamination

Person-to-person transmission via tissue transplantation and sexual contact have been reported but are not significant. Environmental decontamination can be accomplished with a 0.5% hypochlorite solution.

## Prophylaxis

Post exposure prophylaxis is currently only recommended for laboratory exposure to *Brucella* isolates. No human vaccine is currently available.

## Additional Information

<http://www.cdc.gov/brucellosis>

Mode of Transmission	Zoonotic
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# Equine Encephalitis (VEE, EEE, WEE)

## What is it?

The Venezuelan equine encephalitis (VEE) virus complex is a group of six serotypes (I to VI) which contain 13 serologically distinct subtypes that are endemic in northern South America and Trinidad and cause rare cases of human encephalitis in Central America, Mexico and Florida. Natural infections are acquired by the bites of a wide variety of mosquitoes. VEE was tested as a biowarfare agent during US offensive biowarfare programs in the 1950's and 60's. A biowarfare attack with a virus intentionally disseminated as an aerosol would most likely cause human disease as a primary event or simultaneously with equids (horses).

## What causes it?

The Venezuelan equine encephalitis (VEE) virus complex is a group of six serotypes (I to VI) which contain 13 serologically distinct subtypes.

## How is it spread?

Eastern equine encephalitis virus (EEEV) is maintained in a cycle between *Culiseta melanura* mosquitoes and avian hosts in freshwater hardwood swamps. *Cs. melanura* is not considered to be an important vector of EEEV to humans because it feeds almost exclusively on birds. Transmission to humans requires mosquito species capable of creating a "bridge" between infected birds and uninfected mammals such as some *Aedes*, *Coquillettidia*, and *Culex* species.

## What are the signs?

Incubation period is 2-6 days. VEE presents as an acute systemic febrile illness in which encephalitis develops in a small percentage (4% children; <1% adults). Symptoms include generalized malaise, spiking fevers, rigors, severe headache, photophobia and myalgias for 24-72 hours. Nausea, vomiting, cough, sore throat and diarrhea may follow. Full recovery from malaise and fatigue takes 1-2 weeks. The incidence of CNS disease and associated morbidity and mortality could be much higher after biowarfare attack with VEE.

## Prevention

The most effective way to prevent Equine Encephalitis is to prevent mosquito bites.

## What do I need to do if I am exposed?

Anyone in an area where the virus is circulating can get infected with EEEV. The risk is highest for people who live in or visit woodland habitats, and people who work outside or participate in outdoor recreational activities, because of greater exposure to potentially infected mosquitoes. If you think you have been exposed, you should monitor for symptom development and follow up with your Employee Health provider for further evaluation and management.

## Diagnosis

Clinical and epidemiological diagnosis. Physical findings are nonspecific. The white blood cell count may show a leukopenia with striking lymphopenia. Virus may be isolated from serum, and in some cases throat or nasal swab specimens. Both neutralizing and IgG antibody in paired sera or VEE-specific IgM present in a single serum sample indicates recent infection.

## Treatment

Supportive only. Treat uncomplicated VEE infections with analgesics to relieve headache and myalgia. Patients who develop encephalitis may require anticonvulsants and intensive supportive care to maintain fluid and electrolyte balance, ensure adequate ventilation and avoid complicating secondary bacterial infections.

## Isolation and Decontamination




Patient isolation and quarantine are not required. Standard precautions augmented with vector control while the patient is febrile. There is no evidence of direct human-to-human or horse-to-human transmission. The virus can be destroyed by heat (80°C for 30 minutes) and standard disinfectants.

## Prophylaxis



A live, attenuated vaccine is available as an IND. A second, formalin-inactivated, killed vaccine is available for boosting antibody titers in those initially receiving the first vaccine. There is no postexposure immunoprophylaxis. In experimental animals, alpha-interferon and the interferon-inducer poly-ICLC have proven highly effective as postexposure prophylaxis.

## Additional Information

<https://www.cdc.gov/easternequineencephalitis/tech/virus.html>

Mode of Transmission	
	Airborne
	Droplet
	Contact

# Glanders and Melioidosis

Mode of Transmission	
	Zoonotic
	Biologic Weapon

## What is it?

Glanders is caused by a bacteria called *Burkholderia mallei*, and Melioidosis is caused by *B. pseudomallei*. They are gram-negative bacilli that persist in nature only in infected animal hosts. It causes disease in horses, mules and donkeys. Human cases have occurred among veterinarians, horse and donkey caretakers and abattoir workers. ***B. mallei* was reportedly one of the first bacterial agents to be weaponized in a modern biological warfare program.**

## What causes it?

Glanders is caused by a bacteria called *Burkholderia mallei*, and Melioidosis is caused by *B. pseudomallei*.

## How is it spread?

**Glanders.** Cutaneous exposure typically leads to local inflammatory nodules with subsequent lymphangitis and regional lymphadenitis. Nodules typically ulcerate and drain. Inhalational exposure may produce either upper or lower respiratory tract disease. Pharyngitis or rhinitis may feature constitutional symptoms, headache, purulent exudates and cervical lymphadenopathy. Pulmonary involvement may follow inhalation of organisms or develop secondarily by hematogenous spread, and may be rapidly progressive.

**Melioidosis.** People can get Melioidosis through direct contact with contaminated soil and surface waters. Humans and animals are believed to acquire the infection by inhalation of contaminated dust or water droplets, ingestion of contaminated water, and contact with contaminated soil, especially through skin abrasions. It is very rare for people to get the disease from another person. While a few cases have been documented, contaminated soil and surface water remain the primary way in which people become infected.

## What are the signs?

Incubation periods after inhalation are usually less than 14 days, but may range from days to weeks for glanders and days to decades for melioidosis. Onset of symptoms may be abrupt or gradual. Respiratory tract disease can produce fever (usually above 102°F), rigors, sweats, myalgias, headache, pleuritic chest pain and cervical lymphadenopathy. Pneumonia can progress rapidly and result in bacteremia, sepsis and disseminated infection, leading to hepatosplenomegaly and generalized papular / pustular eruptions. Both diseases are usually fatal without treatment.

## Prevention

Presently, there is no vaccine available for glanders. In countries where glanders is endemic in animals, prevention of the disease in humans involves identification and elimination of the infection in the animal population. Within the health care setting, transmission can be prevented by using standard and airborne precautions.

## What do I need to do if I am exposed?

If you think you may have been exposed, you should monitor closely for symptoms and follow up closely with your Employee Health provider for further evaluation and management.

## Diagnosis

Methylene blue or Wright's stain of exudates may reveal scant small bacilli with a safety-pin bipolar appearance. Standard cultures can identify both *Burkholderia mallei* and *B. pseudomallei* (the causative agents of glanders and melioidosis, respectively). Chest X-Ray may show infiltrates with consolidation and cavitation, multiple small lung abscess or miliary lesions. Abdominal ultrasound may reveal splenic or hepatic abscesses. Leukocyte counts may be normal, elevated or decreased. Serologic tests may be useful, but low titers or negative serology does not exclude the diagnosis.

## Treatment

Initial therapy consists of the IV administration of either ceftazidime, imipenem or meropenem (plus trimethoprim-sulfamethoxazole (TMP-SMX) if septicemic), followed by prolonged oral antibiotic therapy. Surgical drainage is indicated for large abscesses. Lifelong follow up is advised after treatment for melioidosis due to a risk of relapse.

## Isolation and Decontamination





Person-to-person airborne or droplet transmission is unlikely, although secondary cases may occur through improper handling of infectious materials. Standard precautions for healthcare workers. Contact precautions are indicated while caring for patients with skin lesions. Cultures must be managed under BSL-3 conditions. Environmental decontamination using a 0.5%-1.0% hypochlorite solution should be effective.

## Prophylaxis

No vaccines are currently available. There are no human data or FDA-approved regimens for postexposure prophylaxis, although TMP-SMX shows promise in animal studies, and should be given ASAP after exposure.

## Additional Information

<https://www.cdc.gov/glanders/>  
<https://www.cdc.gov/melioidosis/>

Mode of Transmission	
	Airborne
	Droplet
	Contact
	Biologic Weapon

# Mycotoxins (T-2)

## What is it?

The trichothecene mycotoxins are a group of toxins produced by multiple genera of fungi. Some of these substances may be present as contaminants from mold or may occur naturally in foodstuffs or in livestock feeds. Symptoms may occur among exposed humans or animals. The likelihood of developing adverse effects following exposure depends on such variables as: toxin type and purity, dose, and duration of exposure. Dermal exposure in some situations could lead to burning pain, redness, and blisters, and oral exposure may lead to vomiting and diarrhea. Ocular exposure might result in blurred vision, and inhalational exposure might cause nasal irritation and cough. Systemic symptoms can develop with all routes of exposure (especially inhalation) and might include weakness, ataxia, hypotension, coagulopathy, and death.

## What causes it?

Mycotoxins are secondary metabolites produced by microfungi that are capable of causing disease and death in humans and other animals. Because of their pharmacological activity, some mycotoxins or mycotoxin derivatives have found use as antibiotics, growth promotants, and other kinds of drugs; still others have been implicated as chemical warfare agents. This review focuses on the most important ones associated with human and veterinary diseases, including aflatoxin, citrinin, ergot alkaloids, fumonisins, ochratoxin A, patulin, trichothecenes, and zearalenone.

## How is it spread?

For many mycoses, the ordinary portal of entry is through the pulmonary tract, but direct inoculation through skin contact is not uncommon. Mycoses are frequently acquired via inhalation of spores from an environmental reservoir or by unusual growth of a commensal species that is normally resident on human skin or the gastrointestinal tract. These commensal species become pathogenic in the presence of antibacterial, chemotherapeutic, or immunosuppressant drugs, human immunodeficiency virus infection, in-dwelling catheters, and other predisposing factors. The majority of mycotoxicoses, on the other hand, result from eating contaminated foods. Skin contact with mold-infested substrates and inhalation of spore-borne toxins are also important sources of exposure.

## What are the signs?

The symptoms of a mycotoxicosis depend on the type of mycotoxin; the amount and duration of the exposure; the age, health, and sex of the exposed individual; and many poorly understood synergistic effects involving genetics, dietary status, and interactions with other toxic insults. Thus, the severity of mycotoxin poisoning can be compounded by factors such as vitamin deficiency, caloric deprivation, alcohol abuse, and infectious disease status. In turn, mycotoxicoses can heighten vulnerability to microbial diseases, worsen the effects of malnutrition, and interact synergistically with other toxins. The trichothecenes are extremely potent inhibitors of eukaryotic protein synthesis; different trichothecenes interfere with initiation, elongation, and termination stages. It has been hypothesized that T-2 and diacetoxyscirpenol are associated with a human disease called alimentary toxic aleukia. The symptoms of T-2 poisoning include the following: Severe itching and redness of the skin, sores, shedding of the skin; Distortion of any of the senses, loss of the ability to coordinate muscle movement; Nausea, vomiting and diarrhea; Nose and throat pain, discharge from the nose, itching and sneezing; Cough, difficulty breathing, wheezing, chest pain and spitting up blood; Temporary bleeding disorders, bleeding from the mucus membranes

## Prevention

It is important to note that mold that produces mycotoxins can grow on a variety of different crops and foodstuff and can penetrate deep into food and do not just grow on the surface. Mold usually does not grow in properly dried and stored foods, so efficient drying of commodities and maintenance of the dry state, or proper storage, is an effective measure against mould growth and the production of mycotoxins.

## What do I need to do if I am exposed?

First, leave the area where the T-2 mycotoxin was released and move to fresh air. Then, quickly take off clothing that may have T-2 on it. If possible, any clothing that has to be pulled over the head should be cut off the body instead so the chemical does not get near the eyes, mouth or nose. If helping other people remove their clothing, try to avoid touching any contaminated areas. As quickly as possible, wash any T-2 from the skin with lots of soap and water. If the eyes are burning or vision is blurred, rinse your eyes with plain water for 10 to 15 minutes.

## Diagnosis

Diagnosis is usually made by clinical and epidemiologic identification. Physical exam findings are variable and may be nonspecific. A high index of suspicion and a history consistent with mold exposure are essential to making the diagnosis.

## Treatment

Except for supportive therapy (e.g., diet, hydration), there are almost no treatments for mycotoxin exposure

## Isolation and Decontamination

Place the clothing and any other contaminated items inside a plastic bag. Avoid touching contaminated areas of the clothing. If you can't avoid touching contaminated areas, or you aren't sure where the contaminated areas are, wear rubber gloves or use tongs, sticks or similar objects. Anything that touches the contaminated clothing should also be placed in the bag. Seal the bag, and then seal that bag inside another plastic bag.





## Prophylaxis

There is no currently available vaccine for T-2 Poisoning.

## Additional Information

<https://emergency.cdc.gov/agent/trichothecene/casedef.asp>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC164220/>



Mode of Transmission	
	Droplet
	Bloodborne
	Zoonotic
	Biologic Weapon

# Plague

## What is it?

The Plague (aka "The Black Plague" or "The Black Death") is an infection of the blood, lymph nodes, and/or lungs. It is rare in the US, but highly infectious and very dangerous.

## What causes it?

The Plague is caused by a bacteria called *Yersinia pestis*.

## How is it spread?

It is found in rodents and other mammals, and can be spread to humans by fleas through their bite.

## What are the signs?

There is an incubation period of 2-6 days, after which the victim typically will develop swelling and extreme tenderness in the lymph nodes nearest the bite. They develop fevers, chills, body aches, and can develop shortness of breath and coughing up blood if it gets into their blood and lungs. If it is not treated, the plague can rapidly lead to death.

## Prevention

A vaccine was developed for the plague but it was poorly studied and is not available in the US. As always, proper PPE should be used with any patient with infectious symptoms.

## What do I need to do if I am exposed?

If you are found to have been exposed to the plague, you should see your doctor as soon as possible to start antibiotic prophylaxis. If you develop symptoms, you should go to the emergency room immediately for evaluation and treatment.

## Diagnosis

Diagnosis is typically with a blood test; sometimes testing can be done by taking a sample of the swollen lymph node or sputum culture.

## Treatment

Treatment is with antibiotics, typically streptomycin, gentamicin, or doxycycline.

## Isolation and Decontamination




Plague is a very serious illness, but is treatable with commonly available antibiotics. The earlier a patient seeks medical care and receives treatment that is appropriate for plague, the better their chances are of a full recovery. People in close contact with very sick pneumonic plague patients may be evaluated and possibly placed under observation. Preventive antibiotic therapy may also be given, depending on the type and timing of personal contact.

## Prophylaxis

Prophylaxis is with doxycycline 100mg Twice Daily for 7 days.

## Additional Information

<https://www.cdc.gov/plague/>

Mode of Transmission	
	Airborne
	Zoonotic
	Biologic Weapon

# Q Fever

## What is it?

Q Fever is an illness caused by the bacteria *Coxiella burnetii*. Acute Q Fever is characterized by high fever, headache, confusion and sore throat. Up to 20% of patients may have a maculopapular or purpuric rash. 30-50% of with symptomatic infection will develop pneumonia, many with a dry cough, crackles and pleuritic chest pain. Chronic Q Fever is characterized by an infection that lasts more than 6 months. It is uncommon but a much more serious form of the illness.

## What causes it?

It is caused by a bacteria called *Coxiella burnetii* which lives primarily in livestock like cattle, sheep, and goats.

## How is it spread?

The bacteria are found in the milk, urine, feces, and amniotic fluid of the animals that carry the bacteria. Once in the environment, the bacteria are very tough, and can become airborne in barnyard dust. People can then inhale the bacteria and become sick. Human to human transmission is rare.

## What are the signs?

About ½ of people infected with *Coxiella burnetii* show signs of clinical illness.

After an incubation period of a few weeks, symptoms include fevers, body aches, cough, chest pain, abdominal pain, nausea, and vomiting. Most people get better on their own, but some people will develop severe infections including infection of the liver or heart. A small percentage of people will develop a chronic form which can cause endocarditis; this form requires antibiotics and can be fatal if it isn't treated.

## Prevention

Prevention is primarily focused around avoiding exposure. Take care when in areas where livestock are kept, or in areas where meat or dairy are processed. Infection is not typically person to person, and normal PPE is adequate for patients with Q fever.

## What do I need to do if I am exposed?

Prophylactic antibiotics are not helpful in Q fever. If you do not develop symptoms, there is nothing you need to do. If you do begin to develop symptoms like the ones above, you should see your doctor for evaluation and possible treatment.

## Diagnosis

Diagnosis is with blood tests, though these are not always positive in the first 1-2 weeks of illness.

## Treatment

Treatment is with the antibiotic Doxycycline.

## Isolation and Decontamination




*C. burnetii* is not thought to be transmitted person to person, but there have been rare cases of transmission attributed to sexual contact.

## Prophylaxis

Post-exposure prophylaxis may be considered for occupational exposures. 100mg Doxycycline twice daily for 15-21 days is frequently prescribed.

## Additional Information

<http://www.cdc.gov/qfever/>

Mode of Transmission	
	Airborne
	Droplet
	Biologic Weapon

# Ricin

## What is it?

Ricin is a poison found naturally in castor beans. If castor beans are chewed and swallowed, the released ricin can cause injury.

## What causes it?

Ricin can be made from the waste material left over from processing castor beans. It can be made in the form of a powder, a mist, or a pellet, or it can be dissolved in water or weak acid.

## How is it spread?

You can be exposed to ricin either by ingesting (swallowing) or inhaling (breathing) material containing ricin.

## What are the signs?

Ricin is very toxic. It works by getting inside the cells of a person's body and preventing the cells from making the proteins they need. Without the proteins, cells die. Eventually this is harmful to the whole body, and may cause death.

If ricin is ingested, initial symptoms typically occur in less than 6-12 hours. These initial symptoms are most likely to affect the gastrointestinal system and include nausea, vomiting and abdominal pain. The symptoms of ricin poisoning are then likely to rapidly progress (generally over 12-24 hours) to include problems such as severe dehydration, and kidney and liver problems. This rapid progression of symptoms and illness is noticeably different than what typically occurs with most (but not all) commonly encountered infectious foodborne illnesses, which generally resolve within a day or two. Nevertheless, it is important to note that ricin is not the only potential cause of such symptoms, other illnesses due to chemicals and non-chemical causes (e.g., infectious) can also present with these signs and may be cause for concern.

If ricin is inhaled, initial symptoms may occur as early as 4-6 hours after exposure, but serious symptoms could also occur as late as 24 hours after exposure. The initial symptoms are likely to affect the respiratory system and can include difficulty breathing, shortness of breath, chest tightness, and cough. The symptoms of ricin poisoning are then likely to rapidly progress (generally over 12-24 hours) to include problems such as worsening respiratory symptoms, pulmonary edema (fluid within the lungs), and eventually, respiratory failure. This rapid progression of symptoms and illness is noticeably different than what typically occurs with most common colds and cough-type illnesses. Nevertheless, it is important to note that ricin is not the only potential cause of such symptoms, other illnesses due to chemicals and non-chemical causes (e.g., infectious) can also present with these signs and may be cause for concern.

**Death from ricin poisoning can take place within 36 to 72 hours of exposure, depending on the route of exposure (inhalation, ingestion, or injection) and the dose received.**

## Prevention

If you are near a release of ricin, emergency coordinators may tell you to either evacuate the area or to "shelter in place" inside a building to avoid being exposed to the chemical.

## What do I need to do if I am exposed?

If you think you may have been exposed to ricin, you should remove your clothing, rapidly wash your entire body with soap and water, and get medical care as quickly as possible.

**Removing your clothing:** Quickly take off clothing that may have ricin on it. Any clothing that has to be pulled over the head should be cut off the body instead of pulled over the head; If you are helping other people remove their clothing, try to avoid touching any contaminated areas, and remove the clothing as quickly as possible.

**Washing yourself:** As quickly as possible, wash any ricin from your skin with large amounts of soap and water. Washing with soap and water will help protect people from any chemicals on their bodies; If your eyes are burning or your vision is blurred, rinse your eyes with plain water for 10 to 15 minutes. If you wear contacts, remove them and put them with the contaminated clothing. Do not put the contacts back in your eyes (even if they are not disposable contacts). If you wear eyeglasses, wash them with soap and water. You can put your eyeglasses back on after you wash them.

**Disposing of your clothes:** After you have washed yourself, place your clothing inside a plastic bag. Avoid touching contaminated areas of the clothing. If you can't avoid touching contaminated areas, or you aren't sure where the contaminated areas are, wear rubber gloves, turn the bag inside out and use it to pick up the clothing, or put the clothing in the bag using tongs, tool handles, sticks, or similar objects. Anything that touches the contaminated clothing should also be placed in the bag. If you wear contacts, put them in the plastic bag, too; Seal the bag, and then seal that bag inside another plastic bag. Disposing of your clothing in this way will help protect you and other people from any chemicals that might be on your clothes; When the local or state health department or emergency personnel arrive, tell them what you did with your clothes. The health department or emergency personnel will arrange for further disposal. Do not handle the plastic bags yourself.

## Diagnosis and Treatment

- If authorities suspect that people have inhaled ricin, a potential clue would be that a large number of people who had been close to each other rapidly developed fever, cough, and excess fluid in their lungs. These symptoms would likely be followed by severe breathing problems and possibly death.
- If in suspected situations where ricin may have been disseminated, preliminary environmental testing by public health or law enforcement authorities detects ricin in powders or materials released into the immediate environment. Persons occupying such areas may initially be observed for signs of ricin poisoning.
- CDC can assess selected specimens on a provisional basis for urinary ricinine, an alkaloid in the castor bean plant. Only urinary ricinine testing is available at CDC or the LRN.

## Treatment

Ricin poisoning is treated by giving victims supportive medical care to minimize the effects of the poisoning. The types of supportive medical care would depend on several factors, such as the route by which victims were poisoned (that is, whether poisoning was by inhalation, ingestion, or skin or eye exposure). Care could include such measures as helping victims breathe, giving them intravenous fluids (fluids given through a needle inserted into a vein), giving them medications to treat conditions such as seizure and low blood pressure, flushing their stomachs with activated charcoal (if the ricin has been very recently ingested), or washing out their eyes with water if their eyes are irritated.

## Isolation and Decontamination





If ricin was released into the air, some ricin might have gotten onto the clothing of people who were present and might have then been transported on the clothing to their homes. The likelihood is very low in this instance that enough ricin would have gotten onto your clothing and would have been transported home with you for your health to be threatened. However, any exposed clothing should be handled according to the general guidelines given in the exposure guidelines above.

## Prophylaxis

There is no currently available vaccine against Ricin poisoning.

## Additional Information

<https://emergency.cdc.gov/agent/ricin/qa.asp>

Mode of Transmission	
	Airborne
	Droplet
	Contact
	Biologic Weapon

# Smallpox

## What is it?

Smallpox disease is a serious, highly contagious, and often life-threatening infection marked by a rash of round pox (blisters) on the face, arms, and legs. About 30 percent of people who become infected with smallpox die from their illness.

## What causes it?

Smallpox is caused by the virus called the variola virus.

## How is it spread?

Direct and fairly prolonged face-to-face contact is required to spread smallpox from one person to another. Smallpox also can be spread through direct contact with infected bodily fluids or contaminated objects such as bedding or clothing. Rarely, smallpox has been spread by virus carried in the air in enclosed settings such as buildings, buses, and trains. After exposure, it takes between 7 and 17 days for symptoms of smallpox to appear (average incubation time is 12 to 14 days).

## What are the signs?

The clinical case definition of smallpox is an illness with acute onset of fever  $\geq 101^{\circ}\text{F}$  ( $38.3^{\circ}\text{C}$ ) followed by a rash characterized by firm, deep-seated vesicles or pustules in the same stage of development in the same area of the body without other apparent cause.

The symptoms of smallpox begin with high fever, head and body aches, and sometimes vomiting. A rash follows that spreads and progresses to raised bumps and pus-filled blisters that crust, scab, and fall off after about three weeks, leaving a pitted scar.

## Prevention

Routine vaccination of the American public against smallpox stopped in 1972 after the disease was eradicated in the United States.

## What do I need to do if I am exposed?

The most important method for preventing transmission of smallpox is vaccination. All staff who provide care for smallpox patients must be vaccinated against smallpox. In a smallpox emergency, only staff with confirmed vaccination status should provide direct care to patients with suspected or confirmed smallpox.

Of the three smallpox vaccines available for use in a smallpox emergency, two provide immunity after the confirmation of a “take” 6 to 8 days after vaccination: ACAM2000® and APSV. The third, Imvamune, may not provide full immunity until 2 weeks after the second dose (for primary vaccinees – those who have not previously been vaccinated for smallpox), which may leave primary vaccinees unprotected for 6 weeks after the initial dose.

Consider ways to use only staff who are able and willing to be vaccinated with ACAM2000® or APSV for work that exposes them to the smallpox virus. Staff who should be vaccinated with Imvamune should not be exposed to patients with smallpox or the vaccination sites of those who have received ACAM2000® or APSV until they achieve full immunity.

## Diagnosis and Treatment

A doctor can recognize the disease because it causes a special kind of rash. The rash shows up as blisters on the skin that fill with fluid and crust over. If consultation among medical providers, state and local public health departments, and CDC determines a patient is at high risk of having smallpox, Laboratory Response Network (LRN) laboratories will conduct diagnostic testing for variola virus. The CDC will conduct concurrent, confirmatory testing.

## Treatment

There is no specific treatment for smallpox disease, and the only prevention is vaccination. However, vaccination within 3 days after exposure may prevent or greatly lessen the severity of smallpox in most people.

## Isolation and Decontamination

If consultation with CDC and local and state public health departments suggests a patient is at high risk of having smallpox, or confirms a diagnosis of smallpox, isolate the patient from the general patient population as soon as possible. **Follow standard, contact, and airborne precautions.**





After transporting the patient, disinfect any equipment used (such as gurneys, wheelchairs, etc.) using standard disinfection procedures and handle linens with care.

## Prophylaxis

There is a vaccine to protect people from smallpox. If there were a smallpox outbreak, health officials would use the smallpox vaccine to control it. While some antiviral drugs may help treat it or prevent the smallpox disease from getting worse, there is no treatment for it that has been proven effective in people sick with the disease.

## Additional Information

<https://www.cdc.gov/smallpox/about/>

Mode of Transmission	
	Vomit
	Feces
	Contact
	Biologic Weapon

# Staphylococcal Enterotoxin B

## What is it?

Staphylococcal enterotoxin B (SEB), is an enterotoxin produced by the gram-positive bacteria *Staphylococcus aureus*. It is a common cause of food poisoning, with severe diarrhea, nausea and intestinal cramping often starting within a few hours of ingestion.

## What causes it?

The function of this protein is to facilitate the infection of the host organism. It is a virulence factor designed to induce pathogenesis. One of the major virulence exotoxins is the toxic shock syndrome toxin (TSST), which is secreted by the organism upon successful invasion. It causes a major inflammatory response in the host via superantigenic properties, and is the causative agent of toxic shock syndrome. It functions as a superantigen through activation of a significant fraction of T-cells (up to 20%) by cross-linking MHC class II molecules with T-cell receptors. TSST is a multisystem illness with several symptoms such as high fever, hypotension, dizziness, rash and peeling skin.

## How is it spread?

SEB is one of the most common toxins implicated in toxin-mediated food-borne disease. Typically, heavily colonized food handlers contaminate food products with *S. aureus* via manual contact, coughing, or sneezing. *S. aureus* grows rapidly and excretes enterotoxins, especially in food products such as cream, mayonnaise, unrefrigerated meats, dairy, and bakery products. Heating the contaminated food only kills the bacteria but does not destroy the heat-stable, preformed SEB toxin. After ingestion of the toxin, the incubation period before patients become symptomatic is only approximately 4 to 6 hours.

TSS has been reported to occur in association with use of barrier contraceptives and after vaginal and cesarean delivery. It has also been reported in the setting of soft tissue infection, endovascular infection, and visceral abscesses as well as upper and lower respiratory tract infection. Up to one-third of patients who have TSS develop recurrent disease. This requires persistent colonization with a toxigenic strain of *S. aureus* and only develops in patients who do not mount a humoral immune response to the implicated staphylococcal toxin.

There was particular interest in weaponizing SEB in the Cold War Era because of its stability and potential simplicity in production and dispersal. SEB was studied in an aerosolized form for use as a weapon. The fact that a low dose of SEB is sufficient to incapacitate people is another factor that makes it a potential weapon. Inhalation of SEB leads to shortness of breath and chest pain for several hours after exposure. With heavy exposure, more serious symptoms could occur such as high fever, pulmonary edema, possible acute respiratory distress syndrome, or septic shock. Symptoms were examined in both animal studies and in several accidental laboratory accidents. The probability of a terrorist having the technical skills to weaponize SEB is low.

## What are the signs?

Historical clues are important in diagnosing enterotoxin-induced gastroenteritis. After either gastrointestinal or inhalational exposure, a nonspecific flu-like illness may develop, with symptoms to include myalgias, headache, chills, and fever. GI symptoms start within several hours (typically 4-7) of ingestion of contaminated foods, beginning with significant nausea, vomiting, and intestinal cramping, followed by urgency and profuse watery nonbloody diarrhea. Symptoms normally resolve within 12-24 hours. Multiple family members or patrons of the same eating establishment may be affected.

Ingestion of staphylococcal enterotoxin B (SEB) that is produced and excreted by *Staphylococcus aureus* in improperly refrigerated, stored, and handled foodstuffs results in food poisoning. The incubation period is 3-12 hours (rarely up to 18 hours) after ingestion. Classic symptoms are an abrupt onset of intense nausea, vomiting, cramping abdominal pain, and diarrhea, which incapacitate the patient. Most cases are self-limited and resolve in 8-24 hours.

## Prevention

Food-borne staphylococcal enterotoxin B (SEB) can be prevented by proper storage of dairy products and proper storage and preparation of meat products. Any contaminated food should be destroyed. SEB is not dermally active and can be removed from surfaces/skin with standard soap and water (ie, good handwashing). Secondary aerosol exposure of SEB from infected patients is unlikely to be a hazard.

## What do I need to do if I am exposed?

It is unlikely that you will contract the disease by simply being in close contact with an infected person. Unless you begin to experience the symptoms described above, it is not necessary to seek immediate medical attention. Exercise standard and contact precautions, as usual. Ensure that you wash your hands with soap and clean water after exposure.

## Diagnosis

SEB-mediated intoxication is usually diagnosed based on clinical suspicion and symptoms. The clinical signs of SEB intoxication are fever, vomiting, myalgia, diarrhea, headache, and in severe cases, lethal shock. Laboratory findings are not specific for the diagnosis of SEB intoxication, as nonspecific neutrophilic leukocytosis and an elevated erythrocyte sedimentation rate are present in many illnesses.

## Treatment

There is no treatment available for SEB-mediated shock other than symptomatic support. The disease in the setting of food intoxication is usually self-limiting, and patients recover with active hydration and supportive measures. Steroids and antibiotics have not been shown to be effective for SEB intoxication.

## Isolation and Decontamination

Personal contact rarely causes infection; however, enteric precautions and careful hand-washing should be employed when caring for any patient with diarrheal illness. Bactericidal solutions like 0.5% hypochlorite would provide adequate surface decontamination.



## Prophylaxis

Currently, there is no treatment or vaccine available.

## Additional Information

[https://en.wikipedia.org/wiki/Enterotoxin\\_type\\_B](https://en.wikipedia.org/wiki/Enterotoxin_type_B)

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5086421/>

Mode of Transmission	
 Zoonotic	
 Biologic Weapon	

# Tularemia

## What is it?

*Francisella tularensis* is a highly infectious bacterium that causes a zoonotic infection, tularemia. Rabbits, hares, and rodents are especially susceptible and often die in large numbers during outbreaks. Human infection occurs after contact with infected animals. Signs and symptoms vary depending on the route of entry.

## What causes it?

It is caused by a bacterium called *Francisella tularensis*.

## How is it spread?

The *Francisella tularensis* bacteria lives in animals like rabbits and rodents. People can get the disease from ticks that have fed on infected animals, by handling or butchering infected animals, by drinking contaminated water, or by breathing in aerosolized particles. If *F. tularensis* were used as a weapon, the bacteria would likely be made airborne for exposure by inhalation. People who inhale an infectious aerosol would generally experience severe respiratory illness, including life-threatening pneumonia and systemic infection, if they are not treated. The bacteria that cause tularemia occur widely in nature and could be isolated and grown in quantity in a laboratory, although manufacturing an effective aerosol weapon would require considerable sophistication.

## What are the signs?

Signs depend on how the patient got the disease. Patients exposed by handling infected animals may develop large skin ulcers with swollen lymph nodes. If swallowed, it causes an infection in the throat. Respiratory symptoms are the most serious caused by inhalation of aerosols containing the bacteria. They include cough, chest pain and difficulty breathing. If the bacteria is acquired through the eyes or mouth, symptoms include irritation and inflammation of the eyes, swelling of lymph nodes, sore throat, mouth ulcers, tonsillitis and swelling of glands in the neck.

All forms are accompanied by a fever.

## Prevention

Prevention focuses on taking care when around animals which may carry infection. Tularemia occurs naturally in many parts of the United States. Use insect repellent containing DEET on your skin, or treat clothing with repellent containing permethrin, to prevent insect bites. Use care and wear gloves when handling sick or dead animals. Be sure to cook your food thoroughly and that your water is from a safe source. Note any change in the behavior of your pets (especially rodents, rabbits, and hares) or livestock, and consult a veterinarian if they develop unusual symptoms. There is no currently available vaccine, and it is not spread person-to-person.

## What do I need to do if I am exposed?

Use standard PPE with all patients with infectious symptoms. If you have a patient with tularemia, there is nothing that you need to do as it is not transmitted from person to person.

## Diagnosis

Tularemia can be difficult to diagnose. It is a rare disease, and the symptoms can be mistaken for other, more common, illnesses. For this reason, it is important to note any likely exposures, such as tick and deer fly bites, or contact with sick or dead animals. Confirmatory diagnosis is made with blood tests and cultures.

## Treatment

Antibiotics used to treat tularemia include streptomycin, gentamicin, doxycycline, and ciprofloxacin. Treatment usually lasts 10 to 21 days depending on the stage of illness and the medication used. Although symptoms may last for several weeks, most patients completely recover.

## Isolation and Decontamination

Tularemia is not known to be spread from person to person. People who have tularemia do not need to be isolated. People who have been exposed to the tularemia bacteria should be treated as soon as possible. The disease can be fatal if it is not treated with the right antibiotics.





## Prophylaxis

No vaccine is currently available against tularemia.




## Additional Information

<https://www.cdc.gov/tularemia/>



Mode of Transmission	
	Airborne
	Droplet
	Bloodborne
	Contact

# Viral Hemorrhagic Fever

Mode of Transmission	
	Vomit
	Feces
	Biologic Weapon

## What is it?

Viral Hemorrhagic Fever (VHF) and the Ebola Virus Disease (EVD) are rare and deadly diseases in people and nonhuman primates. The viruses that cause EVD are located mainly in sub-Saharan Africa. People can get EVD through direct contact with an infected animal (bat or nonhuman primate) or a sick or dead person infected with Ebola virus.

## What causes it?

Ebola Virus Disease (EVD) is a rare and deadly disease most commonly affecting people and nonhuman primates (monkeys, gorillas, and chimpanzees). It is caused by an infection with a group of viruses within the genus *Ebolavirus*: Ebola virus (species *Zaire ebolavirus*), Sudan virus (species *Sudan ebolavirus*), Tai Forest virus (species *Tai Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*), Bundibugyo virus (species *Bundibugyo ebolavirus*), Reston virus (species *Reston ebolavirus*), Bombali virus (species *Bombali ebolavirus*). Of these, only four (Ebola, Sudan, Tai Forest, and Bundibugyo viruses) are known to cause disease in people.

## How is it spread?

Scientists think people are initially infected with Ebola virus through contact with an infected animal, such as a fruit bat or nonhuman primate. This is called a spillover event. After that, the virus spreads from person to person, potentially affecting a large number of people. The virus spreads through direct contact (such as through broken skin or mucous membranes in the eyes, nose, or mouth) with: Blood or body fluids (urine, saliva, sweat, feces, vomit, breast milk, and semen) of a person who is sick with or has died from EVD; Objects (such as needles and syringes) contaminated with body fluids from a person sick with EVD or the body of a person who died from EVD; Infected fruit bats or nonhuman primates (such as apes and monkeys); Semen from a man who recovered from EVD (through oral, vaginal, or anal sex). The Ebola virus CANNOT spread to others when a person shows no signs or symptoms of Ebola Virus Disease (EVD). Additionally, Ebola virus is not usually transmitted by food. However, in certain parts of the world, Ebola virus may spread through the handling and consumption of bushmeat (wild animals hunted for food). There is also no evidence that mosquitoes or other insects can transmit Ebola virus.

## What are the signs?

Symptoms of Ebola Virus Disease (EVD) include: Fever, Severe Headache, Muscle Pain, Weakness, Fatigue, Diarrhea, Vomiting, Abdominal Pain, Unexplained Hemorrhage (bleeding or bruising). Symptoms may appear anywhere from 2 to 21 days after contact with the virus, with an average of 8 to 10 days. Many common illnesses can have these same symptoms, including influenza (flu) or malaria. EVD is a rare but severe and often deadly disease. Recovery from EVD depends on good supportive clinical care and the patient's immune response. Studies show that survivors of Ebola virus infection have antibodies (molecules that are made by the immune system to label invading pathogens for destruction) that can be detected in the blood up to 10 years after recovery.

## Prevention

When evaluating a patient who may have Ebola, it is important to **avoid** the following: Contact with blood and body fluids (such as urine, feces, saliva, sweat, vomit, breast milk, semen, and vaginal fluids); Items that may have come in contact with an infected person's blood or body fluids (such as clothes, bedding, needles, and medical equipment); Funeral or burial rituals that require handling the body of someone who died from EVD; Contact with semen from a man who had EVD until you know the virus is gone from the semen. These same prevention methods apply when living in or traveling to an area affected by an Ebola outbreak. After returning from an area affected by Ebola, monitor your health for 21 days and seek medical care immediately if you develop symptoms of EVD.

## What do I need to do if I am exposed?

If you think you may have been exposed, it is important that you immediately report your exposure to the hospital receiving the source patient. As with patients returning from areas with an Ebola outbreak, you will be monitored very closely for 21 days, and should seek care immediately if you develop symptoms.

## Diagnosis

Recovery from EVD depends on good supportive care and the patient's immune response. Those who do recover develop antibodies that can last 10 years, possibly longer. It is not known if people who recover are immune for life or if they can later become infected with a different species of Ebola virus. Some survivors may have long-term complications, such as joint and vision problems. There is currently no antiviral drug licensed by the U.S. Food and Drug Administration (FDA) to treat EVD in people. Drugs that are being developed to treat EVD work by stopping the virus from making copies of itself. Blood transfusions from survivors and mechanical filtering of blood from patients are also being explored as possible treatments for EVD.

## Treatment

There is no approved vaccine or treatment for EVD. Research on EVD focuses on finding the virus' natural host, developing vaccines to protect at-risk populations, and discovering therapies to improve treatment of the disease.

## Isolation and Decontamination





During an Ebola outbreak, the virus can spread quickly within healthcare settings (such as clinics or hospitals). Clinicians and other healthcare personnel providing care should use dedicated medical equipment, preferably disposable. Proper cleaning and disposal of instruments such as needles and syringes are important. If instruments are not disposable, they must be sterilized before additional use. Ebola virus is killed using a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim for a non-enveloped virus. On dry surfaces, like doorknobs and countertops, the virus can survive for several hours. However, in body fluids, like blood, the virus can survive up to several days at room temperature. Serologic studies show that Ebola virus has been detected in dogs and cats living in areas affected by an Ebola outbreak, but there are no reports of dogs or cats becoming sick with EVD, or spreading the Ebola virus to people or other animals. However, certain exotic or unusual pets (monkeys, apes, or pigs) have a higher risk of being infected with the virus and spreading it, if they are exposed to it.

## Prophylaxis





There is no approved vaccine or treatment for EVD. Research on EVD focuses on finding the virus' natural host, developing vaccines to protect at-risk populations, and discovering therapies to improve treatment of the disease.

## Additional Information

<https://www.cdc.gov/vhf/ebola/>

Mode of Transmission	
	Airborne
	Droplet
	Bloodborne
	Contact

# EMS Primer on Infectious Diseases

Mode of Transmission	
	Vomit
	Feces
	Zoonotic
	Biologic Weapon

Infrequent Infectious Pathogens

Infrequent Infectious Pathogens

## Section 3. Infrequently Encountered Infectious Pathogens



# Babesiosis

## What is it?

Babesiosis is a tick borne illness that is caused by the *Babesia* protozoa. It infects vertebrate animals and causes destruction of the red blood cells. Infections in the US are primarily caused by the *Babesia microti* and *B. duncani* protozoa. There are typically less than 2,000 cases per year in the US, mostly in the summer months.

## What causes it?

It is caused by protozoa in the *Babesia* family. They live in the blood of animals and cause the destruction of red blood cells.

## How is it spread?

It is spread to humans from animals by the Ixoda ticks that live in the Northeastern and Upper Midwestern United States.

## What are the signs?

*Babesia* infections range from asymptomatic to severe and are sometimes fatal. The severity of the infection depends on the *Babesia* species and the immune status of the host. After the tick bite, there is usually an incubation period of 1-6 weeks. After this, infected patients develop fevers, chills, fatigue, malaise, and weakness. Some go on to develop headaches, body aches, nausea, vomiting and abdominal pain. Severe cases are rare, and more common in the elderly or the immunosuppressed. In severe cases patients can develop hemolytic anemia, which can be dangerous.

## Prevention

Take care to wear long sleeves and pants in areas with ticks. Check your skin carefully for ticks after spending any time outdoors; the Ixoda ticks that spread Babesiosis are about the size of a poppy seed. Though it is not transmitted directly person-to-person, standard precautions should still be exercised if you care for a patient who is suspected to have Babesiosis.

## What do I need to do if I am exposed?

There is nothing you have to do if you do not develop symptoms. If you develop symptoms, you should call your doctor for an exam and confirmatory testing.

## Diagnosis

Diagnosis is made through detailed history and physical exam, with microscopic analysis of blood smears to identify the protozoa. Confirmatory diagnosis is with a polymerase chain reaction or immunofluorescent antibody testing, or by definitively identifying the parasites inside the red blood cells under a microscope.

## Treatment

Symptomatic patients confirmed to have *Babesia* protozoa are treated with a combination of antibiotics, typically Atovaquone PLUS Azithromycin for 7-10 days along with supportive care.

## Prophylaxis

There is no role for prophylactic antibiotics, and no human vaccine is available.

## Additional Information

[www.cdc.gov/parasites/babesiosis](http://www.cdc.gov/parasites/babesiosis)



# Blastomycosis

## What is it?

Blastomycosis is a systemic fungal infection that happens after inhalation of the fungus *Blastomyces dermatitidis*. The lungs are the most common site of infection, and can cause pneumonia. Extrapulmonary disease of the skin, bones, and genitourinary system is common, but almost any organ can be infected.

## What causes it?

It is caused by the fungus *Blastomyces dermatitidis*. Most cases have been reported in North America. Endemic areas include the southeastern and south-central states bordering the Mississippi and Ohio River basins, the midwestern states and Canadian provinces bordering the Great Lakes, and a small area in New York and Canada along the St. Lawrence River.

## How is it spread?

Blastomycosis is spread by inhalation of the spores. Most people who breathe the spores don't get sick, but occasionally it can cause serious illness. Outbreaks or epidemics of blastomycosis have been reported and have often been associated with waterways. Exposure to soil, whether related to work or recreation, appears to be the common factor associated with both endemic and epidemic disease.

## What are the signs?

The incubation period is from several weeks to several months. Clinical symptoms range from asymptomatic to acute or chronic pneumonia and extrapulmonary infection. Initial symptoms are typically vague and include fevers, chills, night sweats, body aches, cough, chest pain, and fatigue. In severe cases it can cause shortness of breath, and occasionally can spread outside of the lungs can cause dangerous disease.

## Prevention

Though Blastomycosis is not contagious from person-to-person, standard precautions should still be exercised. There is no vaccine.

## What do I need to do if I am exposed?

There is nothing you have to do if you do not develop symptoms. If you develop symptoms of Blastomycosis, you should see your doctor for an exam and confirmatory testing.

## Diagnosis

Diagnosis is made through detailed history and physical exam, usually with confirmatory blood or sputum tests.

## Treatment

Treatment depends on the severity of the disease and the immune status of the patient.



Patients who are confirmed to have Blastomycosis are treated with antifungal medications like Amphotericin B or Itraconazole. Treatment generally prolonged, from 6-12 months.

## Prophylaxis

There is no role for prophylactic antibiotics, and no human vaccine is available.

## Additional Information

[www.cdc.gov/fungal/diseases/blastomycosis/index.html](http://www.cdc.gov/fungal/diseases/blastomycosis/index.html)

Mode of Transmission	
	Feces
	Zoonotic

# Campylobacter

## What is it?

Campylobacteriosis is a bacterial infection that causes acute diarrhea and may cause systemic illness in humans after contact with infected poultry or contaminated food or water. It is a disease of the intestine that is typically caused by the bacteria *Campylobacter jejuni*.

## What causes it?

It is caused by an infection with bacteria from the *Campylobacter* genus, most commonly *Campylobacter jejuni* or *Campylobacter coli*.

## How is it spread?

*Campylobacter* lives in the intestinal tracts of a wide range of animal hosts, most notably poultry. Infection typically comes from consuming undercooked poultry or through cross-contamination of foods contacted by infected poultry. Additionally, infected animals and humans can spread the disease through their stool. Typically the disease is not spread from person-to-person unless the infected person is having large volumes of diarrhea and proper hygiene or PPE are not exercised.

## What are the signs?

*Campylobacter* has an incubation period of 1-3 days. Approximately 1/3 of cases have a prodromal period characterized by high fever, shaking chills, generalized aches, dizziness, and delirium. This lasts for approximately 1 day and is followed by acute onset of crampy, periumbilical abdominal pain and diarrhea. Patients frequently report >10 bowel movements per day. Bloody stools are observed on the 2<sup>nd</sup> or 3<sup>rd</sup> day of diarrhea in about 15% of patients. Symptoms last for roughly 2-5 days. The diarrhea is self-limited, but patients continue to excrete *Campylobacter* in the stool for several weeks after recovery. Two major late complications of *Campylobacter* infection include reactive arthritis and Guillan Barre Syndrome (GBS).

In rare severe cases and in immunocompromised patients, infections can become systemic, presenting with hypotension, altered mental status, and severe sepsis.

## Prevention

Prevention focuses on interrupting the spread from poultry and exercising good hygiene. Cook all poultry thoroughly, and wash knives, utensils and cutting boards used during preparation with soap and water. Wash your hands with soap and water frequently. Avoid raw or unpasteurized milk. Avoid cross-contamination of raw poultry meat with other food products. Wash hands after contact with feces.

## What do I need to do if I am exposed?

Typically symptoms began 2-5 days after exposure. If you begin to experience symptoms, supportive measures such as staying well hydrated, washing hands frequently, and following up with your doctor for evaluation as needed. If symptoms persist longer than 10 days or there are signs of severe infection, present to your local Emergency Department.

## Diagnosis

Diagnosis is made through detailed history and physical exam, typically confirmed by stool culture. Patients with late onset reactive arthritis or Guillan Barre Syndrome may need blood tests to confirm the diagnosis. Treatment is typically supportive insuring that you stay hydrated. Antibiotics are only required for very severe disease

## Treatment

*Campylobacter* is usually a mild, self-limited infection. Treatment is based on maintenance of good hydration and correction of electrolyte imbalances. Antibiotics are generally not needed for most cases of *C. jejuni* gastroenteritis.



Patients with severe disease or at risk of severe disease may be treated with Ciprofloxacin, Levaquin or Azithromycin for 3 days, or until symptoms have resolved.

## Prophylaxis

There is no role for post exposure prophylaxis, and no human vaccine is currently available. Individuals with acute diarrheal illness should not prepare or handle food until all symptoms are resolved.

## Additional Information

<http://www.cdc.gov/foodsafety/diseases/campylobacter/index.html>

Mode of Transmission	
 Zoonotic	
 Bloodborne	

# Chikungunya

## What is it?

Chikungunya fever is an arthropod borne arbovirus infection characterized by severe polyarthralgia and arthritis along with fever.

## What causes it?

Usually a mosquito-borne infection from an endemic area. Chikungunya epidemics have occurred in Africa, India and Indonesia. Natural hosts in endemic areas include humans and nonhuman primates.

## How is it spread?

Sources of exposure can include contact with blood or body fluids from an infected individual or host, exposure to virus isolates or cell lines or to tissues of infected primates or other hosts.

## What are the signs?

Incubation period is most typically 2-4 days, but can range from 2-12 days. Symptoms most commonly present with abrupt onset of high fever and malaise after an incubation period of 2-4 days. Fever often improves after a few days, then returns (“saddleback” presentation). Joint pains or polyarthralgias can be severe and disabling, and begin 2-5 days after fever onset. Multiple joints are typically involved including the hands, wrists and ankles, knees and shoulders. Macular or maculopapular rash with pruritis of the limbs and trunc can occur 3 or more days onset of illness.

Other symptoms include headache, sore throat, nausea and vomiting. Chronic, persistent infection and severe complications can occur.

## Prevention

Good hand hygiene and standard PPE.

## What do I need to do if I am exposed?

For exposures from needlesticks, cleanse the affected area as soon as possible for at least 15 minutes. Scrub with the disinfectant product approved for your EMS Service. For eye or mucus membrane exposure, irrigate for 15 minutes with sterile saline or tap water, preferably in an eye wash station.

## Diagnosis

IgM anti-Chikungunya antibodies are present starting 5 days post-symptom onset and persist from several weeks to 3 months. IgG antibodies are present about 2 weeks after symptom onset and can persist for several years. Chikungunya antibody testing by IFA (Immunofluorescence Assay) is available for infection confirmation in symptomatic patients and would be managed by an Infectious Disease specialist.

## Treatment

Clinical treatment includes supportive care only, particularly relieving symptoms of pain and fever. Management of symptoms and cases would be in coordination with an Infectious Disease specialist.

## Isolation and Decontamination

As with any patient exhibiting fever, headache and upper respiratory illness, standard contact and respiratory precautions should be exercised. Chikungunya is not known to be spread directly from person-to-person without a mosquito vector, so the risk of transmission should be low.



## Prophylaxis

No prophylaxis available following exposure to the infective agent or for treatment after development of disease. Antiviral agents have not been shown to be effective in human disease. There is no vaccine available for Chikungunya virus.

## Additional Information

<https://www.cdc.gov/chikungunya/>



Mode of Transmission	
	Feces
	Droplet

# Cholera

## What is it?

Cholera is an acute diarrheal illness that is caused by toxins produced after infection with the bacteria *Vibrio cholera*.

## What causes it?

*Vibrio cholera* is a short, curved, motile, gram-negative, non-sporulating bacteria. There are two subtypes, O1 and O139, that have been associated with causing illness in humans. The clinical syndrome is caused by the toxin produced by the bacteria on the epithelial cells of the intestines. Fluid loss in cholera originates in the small intestine with the colon being relatively unaffected. The large volume of fluid lost from the upper intestines overwhelms the ability of the lower intestines to reabsorb.

## How is it spread?

Cholera is spread through drinking water or eating food contaminated with *Vibrio cholera* bacteria. In endemic areas, *V. cholera* is found in the water supply. In areas that are frequently exposed to the bacteria, there is some level of immunity that limits outbreaks to the rainy seasons. During epidemic outbreaks, the source of contamination is usually the feces of an infected person that contaminates water or food and affects people who have not previously been exposed.

## What are the signs?

There is generally an incubation period of 1-2 days before symptoms develop. Clinical manifestations can range from asymptomatic intestinal colonization to severe, life-threatening diarrhea. Most will experience abdominal discomfort, cramping, vomiting and diarrhea. Fever is rare in acute cholera. Approximately 5-10% of affected people will have severe disease characterized by profuse watery diarrhea, vomiting, and leg cramps. In these people, complications occur from the volume and electrolyte loss, and rapid rehydration needs to occur. If not appropriately resuscitated, they can become severely dehydrated and die.

## Prevention

A clean water supply and good sanitation are the main strategies for cholera prevention. Travelers to areas where cholera is endemic should practice general precautions for the prevention of travelers' diarrhea. Wash your hands often with soap and clean water. Avoid drinking tap water or from potentially contaminated sources. Avoid eating foods washed with potentially contaminated water. Water can be treated with chlorine or iodine, by filtration or by boiling.

## What do I need to do if I am exposed?

The likelihood of being exposed in the United States is very rare. It is also unlikely that you will contract the disease by simply being in close contact with an infected person. Unless you begin to experience symptoms of diarrhea it is not necessary to seek immediate medical attention. Ensure that you wash your hands with soap and clean water after exposure.

## Diagnosis

Diagnosis is made through detailed history and physical exam. "Rice water" diarrhea with dehydration are classic findings. Microscopic exam of stool samples reveals few or no red or white cells. The bacteria can be identified by darkfield or phase contrast microscopy, and by direct visualization of darting, motile vibrio.

## Treatment

Fluid and electrolyte replacement are the most important principles in treating cholera. Antibiotics (tetracycline, ciprofloxacin or erythromycin) may shorten the duration of diarrhea and reduce shedding of the organism.

## Isolation and Decontamination



Personal contact rarely causes infection; however, enteric precautions and careful hand-washing should be employed when caring for any patient with diarrheal illness. Bactericidal solutions like 0.5% hypochlorite would provide adequate surface decontamination.

## Prophylaxis

An oral cholera vaccine is available, but only provides about 50-60% protection and lasts for no more than 6 months. Vaccination schedule is at the onset of epidemic and 4 weeks, with booster doses every 6 months.

## Additional Information

<http://www.cdc.gov/cholera/general/>

Mode of Transmission	
	Feces
	Droplet

# Cryptosporidium

## What is it?

Cryptosporidium is an infectious disease of the intestine that causes watery diarrhea. It is caused by the intracellular protozoa from the *Cryptosporidium* family. Although it can affect all people, some groups are likely to develop more serious illness. For people with weakened immune systems, symptoms can be severe and could lead to severe or life-threatening illness.

## What causes it?

There are about 20 species of *Cryptosporidium* that infect mammals, birds, reptiles and fish. *Cryptosporidium parvum* and *C. hominis* are the main species that causes clinical disease in humans.

## How is it spread?

*Cryptosporidium* lives in the intestines of infected humans or animals and is shed in the feces. It is spread in a fecal-to-oral route, typically from consuming undercooked food or drinking contaminated water. There is an incubation period of 7-10 days after exposure and symptoms last approximately 10-14 days in immunocompetent patients. Outbreaks have been associated with water supplies, animal contact, travel, swimming pools and recreational water parks. In endemic areas, the incidence increases around the rainy season. Patients are infectious to others from the time symptoms begin until 2 weeks after symptoms resolve.

## What are the signs?

Symptoms can range from asymptomatic infection to severe diarrhea with volume depletion, and depend on the immune status of the patient. People who develop diarrhea frequently have associated anorexia, crampy abdominal pain, low grade fever and generalized malaise. Bloody stool is rare unless there is coinfection with another organism. Most immunocompetent patients will have mild to moderate symptoms and are able to keep up with fluid losses without additional therapy.

## Prevention

Good hand washing and proper disposal of contaminated materials are most important. Avoid eating undercooked or raw foods. All fruits and vegetables you plan to eat raw should be thoroughly washed with clean water.

## What do I need to do if I am exposed?

Generally people do not need to present to their doctor if exposure is suspected unless they develop symptoms. If you suspect you were exposed, wash your hands frequently and use standard precautions to avoid spreading the disease.

## Diagnosis

Diagnosis is made through detailed history and physical exam, and confirmed with microscopic identification of the *Cryptosporidium* oocysts, by PCR testing on stool samples, or by enzyme assays.

## Treatment

Treatment is primarily supportive care, and may include anti-diarrheal medications like Loperamide. Most immunocompetent patients are able to keep up with fluid losses without additional therapy. Antibiotics are generally not needed in patients with competent immune systems. Severe acute symptoms or persistent symptoms (>2 weeks) may be treated with Nitazoxanide for 3 days.

## Isolation and Decontamination



The *Cryptosporidium* oocysts are resistant to most standard decontamination techniques, including chlorination. People with *Cryptosporidium* diarrhea should avoid swimming in public pools for two weeks after diarrhea has resolved.

## Prophylaxis

No human vaccine currently exists. Asymptomatic family or other contacts do not routinely need treatment, but should be aware that they may be excreting *Cryptosporidium* oocysts in their stool and should take care with their personal hygiene.

## Additional Information

<http://www.cdc.gov/parasites/crypto/treatment.html>

Mode of Transmission	
	Droplet
	Contact

# Diphtheria

## What is it?

Diphtheria is an infectious disease caused by the bacteria *Corynebacterium diphtheriae*. It can cause respiratory illness or cutaneous disease.

## What causes it?

Symptomatic diphtheria results from localized inflammation of the infected respiratory tract or skin from the potent toxin produced by the bacteria. Humans are the only known reservoir for *C. diphtheriae*, and it is believed that asymptomatic carriers are important in spread of the disease.

## How is it spread?

Diphtheria is spread from person-to-person, usually through respiratory droplets, like from coughing or sneezing. Rarely, people can get sick from touching open sores (skin lesions) or clothes that touched open sores of someone sick with diphtheria. A person also can get diphtheria by coming in contact with an object, like a toy, that has the bacteria that cause diphtheria on it.

## What are the signs?

Respiratory symptoms are typically caused by the toxin-producing strains of *C. diphtheriae*, and begin after a 2-5 day incubation period. The most common presenting symptoms are sore throat, swollen lymph nodes in the neck and low grade fever. The toxin may cause a grayish membrane to form on the back of the throat that can spread to all of the respiratory tract. Untreated, the infection may cause systemic symptoms including cardiac dysfunction, myocarditis and neurologic toxicity including muscle weakness of the throat, neck and face.

Cutaneous diphtheriae is characterized by chronic, nonhealing sores or ulcers of the skin with a gray membrane. These ulcers generally do not cause respiratory tract infections, but may be a source for susceptible (unvaccinated) individuals.

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask.

The best way to prevent diphtheria is to get vaccinated. In the United States, there are four vaccines used to prevent diphtheria: DTaP, Tdap, DT, and Td.

## What do I need to do if I am exposed?

If you have close contact with a patient suspected to have diphtheria, you should be seen by your primary care physician for evaluation. Your doctor will examine you and determine your level of exposure and risk, and review the source patient's records to decide if post-exposure antibiotics are appropriate.

If you develop symptoms of diphtheria, you should present to the Emergency Department for diagnosis and treatment. Your close contacts should also be evaluated to determine the need for prophylactic treatment.

## Diagnosis

Diagnosis is made through a detailed history and physical exam. Mild redness of the pharynx with progression with formation of a gray membrane is a classic physical exam finding. Definitive diagnosis requires cultures from the respiratory tract secretions or cutaneous lesions.

## Treatment

Empiric therapy of the patient with suspected diphtheria with targeted antibiotics should be started after cultures are drawn, even before the test results are back. General treatment regimens are Procaine Penicillin or Erythromycin for 14 days.

## Isolation and Decontamination



Diphtheria patients are usually kept in isolation, until they are no longer contagious, usually about 48 hours after starting antibiotics. After the patient finishes taking the antibiotic, the doctor will run tests to make sure the patient has cleared the infection.

## Prophylaxis

Chemoprophylaxis should be administered to people with close contact as well as medical staff exposed to oral or respiratory secretions. If immunizations against diphtheria are not current, they should be administered. After cultures are taken, the exposed person may get an intramuscular shot of Penicillin or take Erythromycin for 7-10 days.

## Additional Information

<https://www.cdc.gov/diphtheria/about/>

Mode of Transmission	
	Feces
	Droplet

# *E. coli* 0157:H7 (Shiga-Toxin *E. coli*)

## What is it?

Shiga-toxin producing *Escherichia coli* (STEC) is a bacterial infection of the intestines that can cause severe disease including hemorrhagic diarrhea and kidney failure.

## What causes it?

STEC is caused by certain strains of *E. coli*, a bacteria that can infect the intestines. This is the kind of illness reported in the news as "*E. coli* outbreaks."

## How is it spread?

*E. coli* is typically transmitted by ingesting contaminated food or water. It infects the intestines and is spread through feces.

## What are the signs?

There is an incubation period of 3-4 days. Symptoms include crampy abdominal pain, bloody diarrhea, nausea, vomiting, fever, and body aches. Most people get better on their own, but some will develop Hemolytic Uremic Syndrome (HUS), a major complication which can lead to kidney failure. Those who develop HUS will become fatigued, will not produce much urine, and develop swelling in the feet or hands.

## Prevention

As always, standard precautions should be exercised, and good hand washing is key. If you have a patient who has a current or recent history of diarrhea, make sure to wash your hands thoroughly with soap and water as soon as you can after patient care is done, and before eating, drinking, or touching your face. Disinfect all surfaces in the rig thoroughly, and use full PPI.

## What do I need to do if I am exposed?

If you do not have any symptoms, then you should not need any care and you can go about your normal activities. If you develop symptoms of diarrhea, stay well hydrated and follow your department's illness protocols. You can go to your primary care doctor on a non-emergent basis. If you develop symptoms of HUS, including decreased urination or swelling, you should go to the emergency room as this can cause permanent kidney damage and even death.

## Diagnosis

Diagnosis is made through detailed history and physical exam, and confirmed with stool studies (tests on the feces). Occasionally PCR and blood tests may be needed.

Treatment is primarily supportive care, with an emphasis on maintaining hydration. Antibiotics do not help and can make this infection worse. Anti-diarrheal medicines can also make this condition worse, and should be avoided.

Prophylaxis: Not indicated. Hand washing is the most important measure.

## Treatment

Treatment is primarily supportive care, with an emphasis on maintaining hydration. **Antibiotics do not help** and can make this infection worse. **Anti-diarrheal medicines can also make this disease worse**, and should be avoided. Hand hygiene is the most important measure.

## Isolation and Decontamination

Most individuals shed STEC for seven days or less, although some may be up to three weeks. STEC is usually eliminated from the human GI tract after one month. As with any patient with diarrheal illness, be sure to use standard and contact precautions to prevent person-to-person spread. Supervision of hand washing by children may help decrease the spread.

## Prophylaxis

No human vaccine currently exists. Asymptomatic family or other contacts do not routinely need treatment, but should be aware of the condition and exercise additional hand hygiene vigilance.

## Additional Information

<http://www.cdc.gov/ecoli/general/index.html>



# Ehrlichiosis

## What is it?

Ehrlichiosis is a tick-borne illness that is caused by at least three different *Ehrlichia* species in the United States. The two most important species are *Ehrlichiosis chaffeensis* which causes human monocytic ehrlichiosis (HME) and *Anaplasma phagocytophilum*, which causes human granulocytic anaplasmosis (HGA). HME is endemic in the southeastern, south central and mid-Atlantic areas of the US. HGA is more frequently reported than HME, with highest incidence in Rhode Island, Minnesota, Connecticut, Wisconsin, New York and Maryland. Both diseases present with malaise, muscle aches, headache and chills, with high incidence of nausea, vomiting, joint pain and cough. Rash occurs in a minority of patients.

## What causes it?

Both *Ehrlichia chaffeensis* and *Anaplasma phagocytophilum* are bacteria that are obligate intracellular bacteria that live in human and animal white blood cells.

## How is it spread?

This is a zoonotic infection and is spread by the bite of a carrier tick. White tail deer are the primary animal reservoir for HME, and deer and the white-footed mouse are the hosts for HGA.

## What are the signs?

There is a wide spectrum of disease, ranging from asymptomatic to self-limited or chronic infection. Most infections have an incubation period of 1-2 weeks. Typical symptoms include: fever, headache, fatigue, and muscle aches. Additionally, some patients will present with confusion, conjunctival injection (red eyes) and/or rash (in up to 60% of children, less than 30% of adults).

## Prevention

Take care to wear long sleeves and pants in areas with ticks. Check your skin carefully for ticks after spending any time outdoors. Though it is not spread directly person-to-person, standard precautions should still be exercised if you care for a patient who is suspected to have Ehrlichiosis.

## What do I need to do if I am exposed?

There is nothing you have to do if you do not develop symptoms. If you develop symptoms, you should call your doctor for an exam and confirmatory testing.

## Diagnosis

Diagnosis is made through detailed history and physical exam, with microscopic analysis of blood smears. Confirmatory diagnosis is with a polymerase chain reaction or immunofluorescent antibody testing.

## Treatment



Symptomatic patients confirmed to have Ehrlichiosis are treated with antibiotics, typically Doxycycline twice daily for 10 days along with supportive care.

## Prophylaxis

There is no role for prophylactic antibiotics, and no human vaccine is available.

## Additional Information

<https://www.cdc.gov/ehrlichiosis/symptoms/index.html>

Mode of Transmission	
	Feces
	Droplet

# Giardiasis

## What is it?

Giardiasis is an intestinal illness characterized by watery diarrhea.

## What causes it?

Giardiasis is caused by the protozoan parasite *Giardia duodenalis*, which is capable of causing sporadic or epidemic diarrheal illness. Giardia is an important cause of waterborne and foodborne disease, daycare center outbreaks and disease in international travelers.

## How is it spread?

Giardiasis is spread by ingestion of the Giardia cysts. Water is a major source of giardiasis transmission. The Cysts survive readily in streams and are hardy in cold water. Water-dwelling mammals such as beavers can become infected and contaminate the water. An infected host will pass the parasite in the feces, and from there can contaminate water, food, and surfaces in the environment such as door handles. Person-to-person transmission can occur in settings in which there is fecal incontinence and poor hygiene.

## What are the signs?

After ingestion of the parasite there is an incubation period of 1-3 weeks. Common symptoms include diarrhea, loose or greasy stool, abdominal cramping and discomfort, increased gas, with occasional nausea and vomiting. Without treatment, symptoms can last several weeks. It is uncomfortable but generally not dangerous, though it can cause dehydration. Dehydration can be dangerous for young children, pregnant women, and the elderly.

## Prevention

A clean water supply and good sanitation are the main strategies for Giardiasis prevention. Hikers and campers should be sure to filter water appropriately, if drinking from streams or lakes. Wash your hands often with soap and water. Avoid drinking water from potentially contaminated sources. Avoid eating foods washed with potentially contaminated water.

## What do I need to do if I am exposed?

Generally people do not need to present to their doctor if exposure is suspected unless they develop symptoms. If you suspect you have been exposed, wash your hands frequently and use standard precautions to avoid spreading the disease.

## Diagnosis

Diagnosis is made through a detailed history and physical exam, and confirmed with stool evaluation to either test for antibodies or to look for bacteria under a microscope.

## Treatment

Patients who are confirmed to have Giardiasis are treated with antibiotics, usually Metronidazole for 5 days.



## Prophylaxis

There is no role for prophylactic antibiotics, and no human vaccine is currently available.

## Additional Information

<http://www.cdc.gov/parasites/giardia/index.html>



Mode of Transmission	
	Airborne
	Zoonotic

# Hantavirus

## What is it?

Hantavirus is a viral illness that causes severe, acute febrile illnesses. The first is a hemorrhagic fever with renal syndrome (HFRS), and the second causes Hantavirus cardiopulmonary syndrome (HCPS), also known as Hantavirus Pulmonary Syndrome (HPS).

## What causes it?

There are at least 20-30 distinct viral species of the genus Hantavirus in the family Bunyaviridae. At least 12 of these cause illness in humans. Hantaviruses are single-stranded RNA viruses that are able to infect endothelial cells in the human body. Rodents known to carry hanta virus include deer mice, cotton rats, rice rats, and white-footed mice.

## How is it spread?

Rodents are the main reservoir of Hantaviruses, and contact with rodents are important factors in transmission. Many Hantaviruses are shed in the urine, feces or saliva of infected rodents. Exposures may include: 1) Breathing in the virus. This may happen when rodent urine and droppings containing hantavirus are stirred up into the air. 2) Touching eyes, nose or mouth after touching rodent droppings, urine, or nesting materials that contain the virus. 3) A bite from an infected rodent.

Person-to-person spread of hantavirus is rare, and is often difficult to distinguish from common-source exposure to rodents.

## What are the signs?

The severity of infection depends on the Hantavirus species and the immune status of the host. After exposure to infected rodent materials, there is usually an incubation period of 1-6 weeks. After this, infected patients develop early symptoms including fatigue, fever and muscle aches, especially in the large muscle groups—thighs, hips, back, and sometimes shoulders. These symptoms are universal.

Classic hemorrhagic fever with renal syndrome (HFRS) include fever, hemorrhage, hypotension and renal failure. Patients with severe HFRS progress sequentially from fever to abrupt hypotension, clinical shock and then stop producing urine. As platelet counts drop, findings of diffuse hemorrhage appear including bruising, vomiting blood and black or bloody stools. In Hantavirus cardiopulmonary syndrome (HCPS), infected patients develop headaches, dizziness, chills, nausea, vomiting, diarrhea, and abdominal pain. 4-10 days after the initial phase of illness, the late symptoms of HPS appear which include coughing and shortness of breath, pulmonary edema, arrhythmias and death.

## Prevention

Although the transmission from person-to-person is low, standard precautions should still be exercised. There is currently no human vaccine available. Prevention focuses primarily on measures to limit contact with potentially infected rodents in affected areas.

## What do I need to do if I am exposed?

If you have close contact with a patient suspected to have Hantavirus, you should be seen by your primary care physician for evaluation. Your doctor will examine you and determine your level of exposure and risk, and review the source patient's records to decide if further treatment is needed. There is no role for prophylactic antivirals, and no human vaccine is currently available.

## Diagnosis

Diagnosis is made through detailed history and physical exam, with blood tests to look for antibodies to the Hantavirus. Generally, the history of potential rodent contact and the presence of either early or late symptoms help the clinician make the diagnosis.

## Treatment



There is no specific treatment, cure, or vaccine for Hantavirus infection. However, if individuals are recognized early and receive supportive medical care in an intensive care unit, they may do better. In intensive care, patients are intubated and given oxygen therapy to help them through the period of severe respiratory distress.

## Prophylaxis

No human vaccine currently exists. Asymptomatic family members or other contacts do not routinely need treatment, but should be aware that they may have been exposed and should monitor for symptoms at home.

## Additional Information

<https://www.cdc.gov/hantavirus/>

Mode of Transmission	
	Feces
	Droplet

# Hepatitis A

## What is it?

Hepatitis A is a viral infection of the liver that can cause abdominal discomfort, nausea, vomiting, diarrhea, and jaundice.

## What causes it?

Hepatitis A is caused by the hepatitis A virus (HAV), a member of the genus *Hepatovirus* in the family Picornaviridae. It is usually transmitted by the fecal-oral route and is highly contagious.

## How is it spread?

Hepatitis A is spread through drinking water or eating food contaminated with HAV. Risk factors for HAV transmission include residence in or travel to areas with poor sanitation, household or sexual contact with another person with hepatitis A, exposure to daycare centers, exposure to residential institutions and illicit drug use. Bloodborne transmission can occur but is uncommon.

## What are the signs?

There is generally an incubation period of 28 days before symptoms develop. Clinical manifestations include fever, body aches, abdominal pain, nausea, vomiting, diarrhea, dark urine, light-colored stool, and jaundice. Symptoms are typically self-limited, but can last for weeks or sometimes even months. Fulminant liver failure occurs in <1% of cases. It is more dangerous in pregnant women and the elderly.

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask.

The best way to prevent Hepatitis A is to get vaccinated. In the United States, the vaccine for hepatitis A that is part of the routine childhood vaccines.

## What do I need to do if I am exposed?

If you have close contact with a patient suspected to have HAV, you should contact your primary care physician and review your immunization records. Your doctor will help determine your level of exposure and risk, and review the source patient's records to decide if post-exposure treatment is appropriate. You may be asked to stop any medications that are metabolized by the liver to prevent toxicity.

## Diagnosis

Diagnosis is with a blood test. Preventive treatment is with the vaccine or with immunoglobulin.

## Treatment

Primarily supportive care.

## Isolation and Decontamination

Infected individuals are contagious during the incubation period and remain so for about a week after jaundice appears. HAV is shed in the stool in high concentrations 1-2 weeks before and 1 week after onset of clinical illness.

## Prophylaxis

Individuals who warrant post exposure prophylaxis with Hepatitis A vaccine or immunoglobulin include close personal contacts, child care centers and food handlers. Postexposure prophylaxis is not warranted in association with a single case of hepatitis A in a school, office or hospital if the source of infection is outside the school or work setting.

## Additional Information

<http://www.cdc.gov/hepatitis/hav/afaq.htm>



# Hepatitis C

## What is it?

Hepatitis C is a viral infection of the liver that causes both acute and chronic inflammation of the liver. In the acute phase, patients may have abnormal liver tests, scleral icterus (yellow eyes) and occasionally fulminant liver failure. In the chronic phase, patients may range from asymptomatic carriers to chronic hepatitis, cirrhosis and hepatocellular carcinoma. The vast majority of Hepatitis C patients are minimally symptomatic, although fatigue is a common complaint. Even if they develop cirrhosis, many patients only have nonspecific symptoms.

## What causes it?

Hepatitis C is caused by the hepatitis C virus (HCV), an RNA virus of the family flavaviridae. It is a bloodborne pathogen that is spread by percutaneous inoculation (needle stick), sexual transmission or blood transfusion.

## How is it spread?

Hepatitis C is transmitted through blood or sexual contact. The most common way it is transmitted is through sharing needles during IV drug use, but it also can be transmitted through needle stick injuries.

## What are the signs?

The incubation period is typically 4-12 weeks. Most carriers are asymptomatic. 20-30% of people will have symptoms including fatigue, jaundice (yellowing of the skin), and abdominal pain. ~75% of people who get hepatitis C will become chronic carriers of the disease; it is this group that runs the risk of long-term liver damage, cirrhosis, liver failure, cancer, and death. It can be many years before these serious complications develop.

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask. Always use caution with sharps, do not recap needles and dispose of sharps into designated containers immediately after use.

There is currently no human vaccine for hepatitis C.

## What do I need to do if I am exposed?

If you have a needle stick accident, both you and the source patient should be tested for Hepatitis C. If the patient is positive for Hepatitis C, the risk of transmission from a single needlestick is ~1.8%. If your initial testing is negative, you likely will require further testing in a couple of weeks to make sure you did not contract the disease.

## Diagnosis

Diagnosis is made through a detailed history and physical exam, and confirmed with blood testing to look for the Hepatitis C Virus, at the time of exposure and then again 2-4 weeks after.

## Treatment

Antiviral therapy is the cornerstone of treatment of chronic hepatitis C virus (HCV) infection. With current antiviral therapies, HCV is relatively easily treated and can be eliminated in almost all patients. Other general measures in the management of patients with chronic HCV include symptom management, dose adjustment of medications, and preventing complications of cirrhosis if present.

## Prophylaxis

There is no role for prophylactic antivirals, and no human vaccine currently exists.

## Additional Information

[www.cdc.gov/hepatitis/HCV/index.htm](http://www.cdc.gov/hepatitis/HCV/index.htm)



# Hepatitis D

## What is it?

Hepatitis D, also known as "delta hepatitis", is a viral infection of the liver caused by the Hepatitis D Virus (HDV). Hepatitis D is closely associated with the Hepatitis B Virus. Although HDV can replicate on its own, the simultaneous presence of HBV is required for complete assembly of the virus and secretion. HDV is uncommon in the United States. HDV is a defective pathogen and only occurs in people who are already infected with the Hepatitis B Virus because HDV is an incomplete virus that requires the helper function of HBV to replicate.

## What causes it?

Hepatitis D is caused by the Hepatitis D Virus (HDV), a small RNA genome in a lipoprotein envelope provided by HBV.

## How is it spread?

It is a bloodborne pathogen that is spread by percutaneous inoculation, sexual transmission or blood transfusions. It can be acquired either as a coinfection with HBV or as superinfection in people with HBV infection.

## What are the signs?

Clinical manifestations encompass a range of manifestations from fulminant liver failure to the asymptomatic carrier state. The severity of the clinical course is influenced by the strain of HDV genome and the immune status of the host. Symptoms include anorexia, nausea, jaundice, and right-upper-quadrant abdominal pain. Symptoms and jaundice generally disappear

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask. Always use caution with sharps; do not recap needles and dispose of sharps into designated containers immediately after use.

There is currently no vaccine for Hepatitis D, but it can be prevented in persons who are not already HBV-infected by Hepatitis B vaccination.

## What do I need to do if I am exposed?

If you have a needlestick accident, the source patient should be tested for Hepatitis D. If the patient is positive for Hepatitis D, you should confirm that you have been immunized against Hepatitis B and are a responder to the vaccine. The likelihood of exposure to Hepatitis D in the UW is very low.

## Diagnosis

Diagnosis is made through a detailed history and physical exam, and confirmed with blood testing to look for the Hepatitis D Virus. Testing will be at the time of exposure and then again 2-4 weeks after exposure.

## Treatment




The only drug approved at present for treatment of chronic Hepatitis D is interferon alfa. Unfortunately, only a minority of patients treated with interferon clear HDV infection. There is no specific treatment for acute infection with Hepatitis D, and care is primarily supportive.

## Prophylaxis

There is no role for prophylactic antivirals. The best protection comes through completion of the Hepatitis B vaccination series.

## Additional Information

<https://www.cdc.gov/hepatitis/hdv/index.htm>

Mode of Transmission	
	Feces
	Droplet
	Bloodborne

# Hepatitis E

## What is it?

Hepatitis E is one of the most common causes of acute viral hepatitis, a liver infection caused by the Hepatitis E virus (HEV). HEV is a self-limited disease that does not result in chronic infection.

## What causes it?

Hepatitis E is caused by a viral infection with the Hepatitis E Virus, HEV.

## How is it spread?

Transmission of Hepatitis E Virus (HEV) can occur through contaminated food and water, blood transfusions and through mother-to-child transmission. A large disease burden is in Asia and Africa. While rare in the United States, risk factors for HEV transmission include residence in or travel to areas with poor sanitation, household or sexual contact with another person with Hepatitis E.

## What are the signs?

There is generally an incubation period of 15-60 days. The vast majority of patients with acute HEV are symptomatic or minimally symptomatic. Clinical symptoms occur in 2-5% of patients with acute HEV. Jaundice is usually accompanied by malaise, anorexia, nausea, vomiting, abdominal pain, fever and liver enlargement. Other less common features include diarrhea, arthralgia, itching and rash.

## Prevention

Providers should use standard PPE and contact precautions, and wear a mask.

The best way to prevent Hepatitis E is to exercise strict hand hygiene practices and use PPE. Avoid eating contaminated food or drinking contaminated water. There is currently no human vaccine available. Boiling and chlorination of water will inactivate HEV. Avoiding raw pork and venison can reduce the risk of HEV genotype 3 transmission.

## What do I need to do if I am exposed?

There is no specific antiviral therapy for acute Hepatitis E. The mainstay of treatment is supportive therapy. Patients are typically advised to rest, get adequate nutrition and fluids, avoid alcohol, and check with their physician before taking any medications that can damage the liver, especially acetaminophen. Hospitalization is sometimes required in severe cases and should be considered for pregnant women.

## Diagnosis

Diagnosis is made through detailed history and physical exam, confirmed with blood testing to look for the Hepatitis E Virus. Testing may be performed at the time of exposure and then again 2-4 weeks after.

## Treatment

There is no specific treatment for acute infection with Hepatitis E, and care is primarily supportive.

## Prophylaxis

There is no role for prophylactic antivirals, and no human vaccine currently exists.

## Additional Information

<http://www.cdc.gov/hepatitis/HEV/index.htm>



# Histoplasmosis

## What is it?

Histoplasmosis is a lung infection caused by the fungus *Histoplasma capsulatum*. It causes fevers, chills, headache, muscle aches, anorexia, cough and chest pain.

## What causes it?

Histoplasmosis is caused by the fungus *Histoplasma capsulatum*. This fungus lives in the environment, particularly in soil that contains large amounts of bird or bat droppings. In the US, *Histoplasma* primarily lives in the central and eastern states, primarily around the Ohio and Mississippi River valleys. It is also found in parts of Central and South America, Africa, Asia and Australia.

## How is it spread?

*H. capsulatum* grows best in soil contaminated with bird or bat droppings. Sites commonly associated with exposure to *H. capsulatum* include chicken coops or farm building with large amounts of chicken droppings. Bird roost sites, caves and wood lots. Activities associated with exposure include excavation, construction, demolition, remodeling, wood cutting and exploring caves. The lungs provide the route of entry for the majority of cases. It may also be spread through transplanted organs or sharps injury while working with the organism in the laboratory.

## What are the signs?

There is generally an incubation period of weeks to months following exposure. Fever occurs in less than 5% of exposed individuals after low-level exposures. Asymptomatic pulmonary histoplasmosis is the most common syndrome following infection. In most patients, the illness presents as a subacute pulmonary infection. Symptoms are usually mild and include fever, cough, fatigue, chills, headache, chest pain and body aches.

## Prevention

Anyone can get Histoplasmosis if they've been in an area where *Histoplasma* lives in the environment. Histoplasmosis is often associated with activities that disturb soil, particularly soil that contains bird or bat droppings. Certain groups of people are at higher risk for developing the severe forms of histoplasmosis, primarily those with weakened immune systems. These include patients who have HIV/AIDS, have had an organ transplant, are taking medications such as corticosteroids or TNF-inhibitors, infants and adults aged 55 and older.

## What do I need to do if I am exposed?

If you have close contact with a patient suspected to have Histoplasmosis, you should be seen by your primary care physician for evaluation. Your doctor will examine you and determine your level of exposure and risk, and review the source patient's records to decide if further treatment is needed. There is no role for prophylactic antifungals, and no human vaccine currently exists.

## Diagnosis

Diagnosis is made through detailed history and physical exam, confirmed with blood stains, cultures and antigen tests specific for *Histoplasma*-specific antibodies.

## Treatment

Treatment is indicated for all patients with disseminated histoplasmosis. The major choice of antifungal medications are amphotericin B and itraconazole. Treatment is generally for 3 months - 1 year



## Prophylaxis

There is no role for prophylactic antifungals, and no human vaccine currently exists.

## Additional Information

<http://www.cdc.gov/fungal/diseases/histoplasmosis/>



Mode of Transmission	
	Airborne
	Droplet

# Legionellosis

## What is it?

Legionellosis is a respiratory disease caused by *Legionella* bacteria. Sometimes the bacteria cause a serious type of pneumonia (lung infection) called Legionnaires' disease. The bacteria can also cause a less serious infection called Pontiac fever that has symptoms similar to a mild case of the flu.

## What causes it?

*Legionella* is a type of bacterium found naturally in freshwater environments, like lakes and streams

## How is it spread?

After *Legionella* grows and multiplies in a building water system, that contaminated water then has to spread in droplets small enough for people to breathe in. People are exposed to *Legionella* when they breathe in mist (small droplets of water in the air) containing the bacteria.

## What are the signs?

Legionnaires' disease symptoms are similar to other types of pneumonia and it often looks the same on a chest x-ray.

Cough  
Shortness of breath  
Fever  
Muscle aches  
Headaches

Pontiac fever symptoms are primarily fever and muscle aches; it is a milder infection than Legionnaires' disease. Symptoms begin between a few hours to 3 days after being exposed to the bacteria and usually last less than a week. Pontiac fever is different from Legionnaires' disease because someone with Pontiac fever does not have pneumonia.

## Prevention

There are no vaccines that can prevent legionellosis.

Instead, the key to preventing legionellosis is making sure that the water systems in buildings are maintained in order to reduce the risk of growing and spreading *Legionella*. Examples of water systems that might spread *Legionella* include:

Hot tubs  
Hot water tanks and heaters  
Large plumbing systems  
Cooling towers (air-conditioning systems for large buildings)  
Decorative fountains

## What do I need to do if I am exposed?

Follow up closely with your doctor for further evaluation if you are concerned you were exposed. This can happen in the next few days and doesn't need to occur immediately unless symptoms develop.

## Diagnosis

Urine antigen testing and sputum testing

## Treatment

Antibiotics such as: macrolides, quinolones, ketolides, tetracyclines, rifampin

## Isolation and Decontamination



Minimizing *Legionella* growth in complex building water systems and devices, including potable water, hot tubs, decorative fountains, and cooling towers, is key to preventing infection. Timely identification and reporting of legionellosis cases is also important because this allows public health officials to quickly identify and stop potential clusters and outbreaks by linking new cases to previously reported ones.

## Prophylaxis

The key to preventing Legionnaires' disease is to make sure that building owners and managers maintain building water systems in order to reduce the risk of *Legionella* growth and spread. Routine maintenance of building and recreational water systems can help prevent disease.

## Additional Information

<http://www.cdc.gov/legionella/about/index.html>

Mode of Transmission	
	Airborne
	Droplet

# Leprosy

## What is it?

Hansen's disease (also known as leprosy) is a long-lasting infection caused by bacteria. The disease was once feared as a highly contagious and devastating disease. Now, however, the disease is very rare and easily treated. Early diagnosis and treatment usually prevent disability related to the disease.

Each year, about 150 people in the United States and 250,000 around the world get the illness.

## What causes it?

Leprosy is an infection caused by bacteria called *Mycobacterium leprae*. These bacteria grow very slowly and it may take up to 20 years to develop signs of the infection. The disease can affect the nerves, skin, eyes, and lining of the nose (nasal mucosa). The bacteria attack the nerves, which can become swollen under the skin. This can cause the affected areas to lose the ability to sense touch and pain, which can lead to injuries, like cuts and burns. Usually, the affected skin changes color and either becomes: lighter (or darker), often dry or flaky, with loss of feeling, OR reddish due to inflammation of the skin.

Due to the slow-growing nature of the bacteria and the long time it takes to develop signs of the disease, it is often very difficult to find the source of infection.

In the southern United States, some armadillos are naturally infected with the bacteria that cause Hansen's disease in people and it may be possible that they can spread it to people. However, the risk is very low and most people who come into contact with armadillos are unlikely to get Hansen's disease.

## How is it spread?

It is not known exactly how Hansen's disease spreads between people. Scientists currently think it may happen when a person with Hansen's disease coughs or sneezes, and a healthy person breathes in the droplets containing the bacteria. Prolonged, close contact with someone with untreated leprosy over many months is needed to catch the disease.

## What are the signs?

Symptoms mainly affect the skin, nerves, and mucous membranes (the soft, moist areas just inside the body's openings). The disease can cause: Skin lesions that may be faded/discolored; Growths on the skin; Thick, stiff or dry skin; Severe pain; Numbness on affected areas of the skin; Muscle weakness or paralysis (especially in the hands and feet); Eye problems that may lead to blindness; Enlarged nerves (especially those around the elbow and knee); Nosebleeds; Ulcers on the soles of feet

## Prevention

There is no vaccine. Use PPE and N95 mask and respiratory isolation equipment when in contact with infected person.

## What do I need to do if I am exposed?

Your chances of contracting Leprosy from an occupational exposure to an infected patient are low. You should use good standard and contact precautions, and be sure to wash thoroughly with soap and water as usual.

## Diagnosis

Hansen's disease can be recognized by appearance of patches of skin that may look lighter or darker than the normal skin. Sometimes the affected skin areas may be reddish. Loss of feeling in these skin patches is common. You may not feel a light touch or a prick with a needle. To confirm the diagnosis, a skin biopsy is taken to look for the bacteria under the microscope and may also rule out other skin diseases.

## Treatment

Leprosy is treated with a combination of antibiotics. Typically 2 or 3 antibiotics are used at the same time. These are dapsone with rifampicin, and clofazimine is added for some types of the disease. This strategy helps prevent the development of antibiotic resistance by the bacteria, which may otherwise occur due to length of the treatment. Treatment usually lasts between one to two years. The illness can be cured if treatment is completed as prescribed.

## Isolation and Decontamination

For general health reasons, avoid contact with armadillos whenever possible. If you had contact with an armadillo and are worried about getting Hansen's disease, talk to your healthcare provider. Your doctor will follow up with you over time and perform periodic skin examinations to see if you develop the disease. In the unlikely event that you have Hansen's disease, your doctor can help you get treatment.

## Prophylaxis

Prophylactic antibiotics are not recommended, and there is no currently available human vaccine.

## Additional Information

<https://www.cdc.gov/leprosy/>



# Leptospirosis

## What is it?

Leptospirosis is a bacterial disease that affects humans and animals. It is caused by bacteria of the genus *Leptospira*. In humans, it can cause a wide range of symptoms, some of which may be mistaken for other diseases. Some infected persons, however, may have no symptoms at all.

Leptospirosis occurs worldwide, but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, such as: farmers, mine workers, sewer workers, slaughterhouse workers, veterinarians and animal caretakers, fish workers, dairy farmers, military personnel.

The disease has also been associated with swimming, wading, kayaking, and rafting in contaminated lakes and rivers. As such, it is a recreational hazard for campers or those who participate in outdoor sports. The risk is likely greater for those who participate in these activities in tropical or temperate climates. In addition, the incidence of Leptospirosis infection among urban children appears to be increasing.

## What causes it?

It is caused by bacteria in the family *Leptospira*

## How is it spread?

The bacteria that cause leptospirosis are spread through the urine of infected animals, which can get into water or soil and can survive there for weeks to months

## What are the signs?

In humans, Leptospirosis can cause a wide range of symptoms, including: high fever, headache, chills, muscle aches, vomiting, jaundice (yellow skin and eyes), red eyes, abdominal pain, diarrhea and rash.

## Prevention

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine, or eliminating contact with potentially infected animals.

Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

## What do I need to do if I am exposed?

The time between a person's exposure to a contaminated source and becoming sick is 2 days to 4 weeks. Illness usually begins abruptly with fever and other symptoms. Leptospirosis may occur in two phases: After the first phase (with fever, chills, headache, muscle aches, vomiting, or diarrhea) the patient may recover for a time but become ill again. If a second phase occurs, it is more severe; the person may have kidney or liver failure or meningitis. The illness lasts from a few days to 3 weeks or longer. Without treatment, recovery may take several months.

## Diagnosis

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin, which should be given early in the course of the disease. Intravenous antibiotics may be required for persons with more severe symptoms. Persons with symptoms suggestive of leptospirosis should contact a health care provider.

## Treatment

Leptospirosis is treated with antibiotics, such as doxycycline or penicillin.

## Isolation and Decontamination




Do not handle or come in contact with urine, blood, or tissues from your infected pet before it has received proper treatment. If you need to have contact with animal tissues or urine, wear protective clothing, such as gloves and boots, especially if you are occupationally at risk (veterinarians, farm workers, and sewer workers). As a general rule, always wash your hands after handling your pet or anything that might have your pet's excrement on it. If you are cleaning surfaces that may be contaminated or have urine from an infected pet on them, use an antibacterial cleaning solution or a solution of 1 part household bleach in 10 parts water.

## Prophylaxis

The risk of acquiring leptospirosis can be greatly reduced by not swimming or wading in water that might be contaminated with animal urine, or eliminating contact with potentially infected animals. Protective clothing or footwear should be worn by those exposed to contaminated water or soil because of their job or recreational activities.

## Additional Information

<https://www.cdc.gov/leptospirosis/>

Mode of Transmission	
	Vomit
	Feces
	Contact

# Listeriosis

## What is it?

Listeriosis is a serious infection usually caused by eating food contaminated with the bacterium *Listeria monocytogenes*, and is an important public health problem in the United States.

## What causes it?

*Listeria monocytogenes* is a gram-positive bacteria which generally causes mild, self-limited infection in healthy adults, but potentially severe disease in at-risk populations.

## How is it spread?

Eating unpasteurized milk, deli meats, uncooked or undercooked vegetables.

## What are the signs?

A person with listeriosis usually has fever and muscle aches, sometimes preceded by diarrhea or other gastrointestinal symptoms. Almost everyone who is diagnosed with listeriosis has an "invasive" infection, in which the bacteria spread beyond the gastrointestinal tract. The symptoms vary with the infected person:

- Pregnant women: Pregnant women typically experience fever and other non-specific symptoms, such as fatigue and aches. However, infections during pregnancy can lead to miscarriage, stillbirth, premature delivery, or life-threatening infection of the newborn.
- People other than pregnant women: Symptoms can include headache, stiff neck, confusion, loss of balance, and convulsions in addition to fever and muscle aches.

## Prevention

Rinse raw produce, such as fruits and vegetables, thoroughly under running tap water before eating, cutting, or cooking. Even if the produce will be peeled, it should still be washed first.

Scrub firm produce, such as melons and cucumbers, with a clean produce brush.

Dry the produce with a clean cloth or paper towel.

Separate uncooked meats and poultry from vegetables, cooked foods, and ready-to-eat foods.

## What do I need to do if I am exposed?

If you become very sick with fever and muscle aches or stiff neck, or if you develop fever and chills while pregnant, consult your doctor immediately.

## Diagnosis

Listeriosis is usually diagnosed when a bacterial culture (a type of laboratory test) grows *Listeria monocytogenes* from a body tissue or fluid, such as blood, spinal fluid, or the placenta.

## Treatment

Listeriosis is treated with antibiotics.

## Isolation and Decontamination

As with any patient with diarrheal illness, be sure to use standard and contact precautions to help prevent person-to-person spread. Supervision of hand-washing by children may help decrease the spread as well.

## Prophylaxis

Outbreaks of *Listeria* infections in the 1990s were primarily linked to deli meats and hot dogs. Now, *Listeria* outbreaks are often linked to dairy products and produce. Investigators have traced recent outbreaks to soft cheeses, celery, sprouts, cantaloupe, and ice cream.

## Additional Information

<https://www.cdc.gov/listeria/>



# Lyme Disease

## What is it?

Lyme disease is an illness of the blood characterized by fevers, headaches, and rash.

## What causes it?

It is caused by a bacterium called *Borrelia burgdorferi*.

## How is it spread?

It is spread through the bite of infected ticks. The ticks feed on the blood of infected animals, and then bite humans, transmitting the bacteria through the bite.

## What are the signs?

After infected tick bite, there is an incubation period for a few days to a week, but sometimes as long as a month. After this, symptoms usually include fever, headache, body aches, fatigue, and a rash that spreads outwards over the course of several days. If it is left untreated, Lyme disease can lead to pain and swelling in the joints, inflammation or rupture of the tendons, facial paralysis, heart arrhythmias, or inflammation of the brain.

## Prevention

The main form of prevention is avoiding areas with ticks that can carry Lyme disease, primarily the Northeast and Midwest. If in these areas, wear long sleeves and pants while outdoors, and check yourself thoroughly for ticks. The ticks are very small, and can be easily missed. It is not transmitted person to person.

## What do I need to do if I am exposed?

If you have a tick bite and develop symptoms of Lyme disease, see your doctor as soon as you are able for evaluation and possible treatment.

## Diagnosis

Diagnosis is with blood tests. Treatment is with antibiotics, usually doxycycline.

## Treatment

People treated with appropriate antibiotics in the early stages of Lyme disease usually recover rapidly and completely. Antibiotics commonly used for oral treatment include doxycycline, amoxicillin, or cefuroxime axetil. People with certain neurological or cardiac forms of illness may require intravenous treatment with antibiotics such as ceftriaxone or penicillin.

## Isolation and Decontamination


There is no evidence that Lyme disease is transmitted from person-to-person. For example, a person cannot get infected from touching, kissing, or having sex with a person who has Lyme disease. Although no cases of Lyme disease have been linked to blood transfusion, scientists have found that the Lyme disease bacteria can live in blood that is stored for donation. Individuals being treated for Lyme disease with an antibiotic should not donate blood.

## Prophylaxis

Steps to prevent Lyme disease include using insect repellent, removing ticks promptly, applying pesticides, and reducing tick habitat. The ticks that transmit Lyme disease can occasionally transmit other tickborne diseases as well.

## Additional Information

<http://www.cdc.gov/lyme/>

Mode of Transmission
 Zoonotic

# Malaria

## What is it?

Malaria is a mosquito-borne disease caused by a parasite. People with malaria often experience fever, chills, and flu-like illness. Left untreated, they may develop severe complications and die. In 2016 an estimated 216 million cases of malaria occurred worldwide and 445,000 people died, mostly children in the African Region. About 1,700 cases of malaria are diagnosed in the United States each year. The vast majority of cases in the United States are in travelers and immigrants returning from countries where malaria transmission occurs, many from sub-Saharan Africa and South Asia.

## What causes it?

The natural history of malaria involves cyclical infection of humans and female *Anopheles* mosquitoes. In humans, the parasites grow and multiply first in the liver cells and then in the red cells of the blood. In the blood, successive broods of parasites grow inside the red cells and destroy them, releasing daughter parasites (“merozoites”) that continue the cycle by invading other red cells.

The blood stage parasites are those that cause the symptoms of malaria. When certain forms of blood stage parasites (gametocytes, which occur in male and female forms) are ingested during blood feeding by a female *Anopheles* mosquito, they mate in the gut of the mosquito and begin a cycle of growth and multiplication in the mosquito. After 10-18 days, a form of the parasite called a sporozoite migrates to the mosquito’s salivary glands. When the *Anopheles* mosquito takes a blood meal on another human, anticoagulant saliva is injected together with the sporozoites, which migrate to the liver, thereby beginning a new cycle.

Thus the infected mosquito carries the disease from one human to another (acting as a “vector”), while infected humans transmit the parasite to the mosquito. In contrast to the human host, the mosquito vector does not suffer from the presence of the parasites.

## How is it spread?

Outbreaks of locally transmitted cases of malaria in the United States have been small and relatively isolated, but the potential risk for the disease to re-emerge is present due to the abundance of competent vectors, especially in the southern states. At the request of the states, CDC assists in these investigations of locally transmitted mosquito-borne malaria.

“Airport” malaria refers to malaria caused by infected mosquitoes that are transported rapidly by aircraft from a malaria-endemic country to a non-endemic country. If the local conditions allow their survival, they can bite local residents who can thus acquire malaria without having traveled abroad.

## What are the signs?

People with malaria will have high fevers, shaking chills, body aches, and severe fatigue. They will often have cycles with several days of being ill and several days of being well. They can develop significant anemia and liver injury.

## Prevention

Prevention focuses on avoiding areas with the mosquitos that carry malaria and by protecting yourself from mosquito bites. Malaria is not native to the United States. There are antiparasitic drugs that you can take to prevent contracting malaria if you are traveling to a place with the disease.

## What do I need to do if I am exposed?

Malaria is spread through the blood; if you have a needle stick associated with a patient who is known to or found out to have malaria, you should see your doctor or go to the emergency room as you may be started on treatment to prevent contracting malaria. It is not spread through casual contact or droplets.

## Diagnosis

Clinical diagnosis is based on the patient’s symptoms and on physical findings at examination. The first symptoms of malaria (most often fever, chills, sweats, headaches, muscle pains, nausea and vomiting) are often not specific and are also found in other diseases (such as the “flu” and common viral infections). Likewise, the physical findings are often not specific (elevated temperature, perspiration, tiredness). In severe malaria (primarily caused by *Plasmodium falciparum*), clinical findings (confusion, coma, neurologic focal signs, severe anemia, respiratory difficulties) are more striking and may increase the index of suspicion for malaria.

Clinical findings should always be confirmed by a blood smear and laboratory test for malaria.

## Treatment

Treatment of malaria depends on many factors including disease severity, the species of malaria parasite causing the infection and the part of the world in which the infection was acquired. The latter 2 characteristics help determine the probability that the organism is resistant to certain antimalarial drugs. Additional factors such as age, weight, and pregnancy status may limit the available options for malaria treatment.

## Isolation and Decontamination

As with any patient exhibiting fever, headache and altered mental status, standard contact and respiratory precautions should be exercised. Malaria is not known to be spread by casual contact, so the risk of transmission without a vector should be low.





## Prophylaxis

Based on the risk assessment, specific malaria prevention interventions should be used by the traveler. Often this includes avoiding mosquito bites through the use of repellents or insecticide treated bed nets, and specific medicines to prevent malaria. If malaria prevention medicines will be needed for the traveler, the Malaria Information by Country Table lists the CDC-recommended options. For many destinations, there are multiple options available. Factors to consider are the patient’s other medical conditions, medications being taken (to assess potential drug-drug interactions), the cost of the medicines, and the potential side effects.

## Additional Information

[www.cdc.gov/malaria](http://www.cdc.gov/malaria)



Mode of Transmission	
	Airborne
	Droplet
	Feces
	Contact

# Polio

## What is it?

Poliomyelitis, often called polio is an infectious disease caused by the poliovirus that may result in severe muscle weakness and the inability to move.

## What causes it?

Poliovirus is a human enterovirus.

## How is it spread?

Poliovirus only infects humans. It is very contagious and spreads through person-to-person contact. The virus lives in an infected person's throat and intestines. It enters the body through the mouth and spreads through contact with the feces of an infected person and, though less common, through droplets from a sneeze or cough. An infected person may spread the virus to others immediately before and about 1 to 2 weeks after symptoms appear.

## What are the signs?

Most people who get infected with poliovirus (about 72 out of 100) will not have any visible symptoms. About 1 out of 4 people with poliovirus infection will have flu-like symptoms that may include: Sore Throat, Fever, Nausea, Headache, Stomach Pain.

These symptoms usually last 2 to 5 days then go away on their own. A smaller proportion of people with poliovirus infection will develop other more serious symptoms that affect the brain and spinal cord: Meningitis occurs in about 1 out of 25 people with poliovirus infection; Paralysis occurs in about 1 out of 200 people with poliovirus infection

## Prevention

The strategy to eradicate polio is based on preventing infection by immunizing every child to stop transmission and ultimately make the world polio free. There are two types of vaccine that can prevent polio: inactivated poliovirus vaccine (IPV) and oral poliovirus vaccine (OPV). Only IPV has been used in the United States since 2000; OPV is still used throughout much of the world.

Polio spreads from person to person invading the brain and spinal cord and causing paralysis (inability to move). Because polio has no cure, vaccination is the best way to protect people and is the only way to stop the disease from spreading. Today, polio continues to circulate in three countries: Afghanistan, Pakistan, and Nigeria.

## What do I need to do if I am exposed?

Present to the hospital for supportive care

## Diagnosis

Polio is diagnosed typically through a stool sample or swab of the pharynx that tests for polio antibodies. There is no cure, prevention is key.

## Treatment

While borders can't stop diseases from spreading, vaccines can. Fortunately, we have a good wall of protection against polio in the United States. Most of us have been vaccinated, and current polio vaccination coverage among young children in the United States is 93%.

## Isolation and Decontamination

If you suspect polio: Promptly isolate the patient to avoid disease transmission; Immediately report the suspected case to the health department. A confirmed paralytic poliomyelitis case needs to be reported to CDC within 4 hours of meeting notification criteria; Obtain specimens for diagnostic testing for poliovirus detection (polymerase chain reaction), viral isolation and intratypic differentiation as early in the course of illness as possible, including 2 stool specimens and 2 throat swab specimens at least 24 hours apart, ideally within 14 days of symptom onset.

## Prophylaxis

Polio vaccine provides the best protection against polio, or poliomyelitis, a crippling and potentially deadly disease. Almost all children (99 out of 100) who get all the recommended doses of polio vaccine will be protected from polio. Getting the recommended doses of the polio vaccine is an extremely important part of keeping the United States polio-free.

The first polio vaccine was available in the United States in 1955. Currently, the United States only uses inactivated poliovirus vaccine (IPV). IPV is given as a shot in the arm or leg and is extremely safe.

## Additional Information

<https://www.cdc.gov/polio/us/index.html>

# Psittacosis

## What is it?

Psittacosis is a kind of atypical pneumonia. It is rare, with only about 10 cases in the United States each year.

## What causes it?

It is caused by a bacterium called *Chlamydia psittaci*.

## How is it spread?

Psittacosis is spread to humans primarily from birds. Usually, a person inhales the bacteria from the dried excretions from pet birds or poultry. Rarely, it can be spread from person to person.

## What are the signs?

There is an incubation period of 1-2 weeks, after which patients develop sudden fever, severe headache, and cough. There are some rare but serious systemic complications including kidney injury, endocarditis, or neurological symptoms including meningitis. It can be especially dangerous in pregnancy.

## Prevention

Prevention primarily involves taking care around birds, including wearing gloves and a mask while cleaning cages. When caring for a patient with signs of psittacosis, respiratory precautions should be taken in addition to standard PPE. There is no vaccine.

## What do I need to do if I am exposed?

If you are exposed to a patient with psittacosis, you should monitor yourself for the symptoms above. If you develop fever, headache, or cough, you should see your doctor for evaluation and possible treatment. If you do not develop symptoms, there is nothing you need to do.

## Diagnosis

Diagnosis is with blood tests, though these can take some time before they turn positive.

## Treatment

Treatment is with antibiotics, usually doxycycline.

## Isolation and Decontamination

Patient isolation and prophylaxis of contacts are usually not indicated, as person-to-person transmission of *C. psittaci* is rare. Most states require clinicians to report cases of psittacosis in humans to the appropriate health authorities. Timely diagnosis and reporting may aid in identifying the source of the infection and controlling the spread of disease.

Educate patients about the importance of handling birds and cleaning bird cages safely. Refer birds suspected as the source of human infection to veterinarians for evaluation and treatment.

## Prophylaxis

While there is no vaccine to prevent psittacosis, there are things you can do to protect yourself and others. Buy pet birds only from a well-known pet store. If you own pet birds or poultry, follow good precautions when handling and cleaning birds and cages (see Safe Bird and Cage Care).

Getting psittacosis will not prevent you from future illness. If you get psittacosis, you may still get sick from it again in the future.

## Additional Information

[cdc.gov/pneumonia/atypical/psittacosis.html](https://www.cdc.gov/pneumonia/atypical/psittacosis.html)

# Rabies

## What is it?

Rabies is a rare but deadly infectious disease usually transmitted from animal to human through bite. It is very preventable, but once symptoms start it is very deadly.

## What causes it?

Rabies is caused by a virus. It is carried by certain mammals such as dogs, cats, raccoons, and bats. It is rare for it to be found in rodents such as rats, mice, squirrels, or rabbits, and not found in animals that are not mammals (reptiles, fish, birds).

## How is it spread?

Rabies is spread through saliva, usually by bite. It is not spread through casual contact or contact with blood or body fluids other than saliva or spinal fluid.

## What are the signs?

The incubation period can vary from a few weeks to months. Symptoms include fever, body aches, irritability, confusion, and hydrophobia (hatred of water). Eventually the confusion becomes encephalitis (swelling of the brain), coma, and eventually death. Symptoms progress over the course of several days to two weeks.

## Prevention

Pets should be vaccinated, and you should avoid contact with strange animals or pets that are behaving oddly. Do not engage animals on scene. For patients, avoid contact with saliva, and always use full PPI.

## What do I need to do if I am exposed?

There have been no verified human to human transmissions of rabies through contact or bite. If you are bitten by an animal on scene, wash the area thoroughly with soap and water as soon as it is safe to do so, and have the bite examined by a doctor as soon as you can to see if you need stitches or antibiotics, and if you will need a rabies vaccine and immunoglobulin.

## Diagnosis

Diagnosis: If you are bitten by an animal and the animal is recovered, it will either be kept in quarantine for 10 days to see if it develops symptoms, or euthanized for brain examination to see if it has rabies. If so, then you will need a series of vaccines. Either way you should be seen by a doctor as soon as you can, because if you do not receive treatment before symptoms start, rabies is almost always lethal. The vaccination is highly effective. You cannot spread rabies to others unless you have symptoms of rabies, and you do not have to isolate yourself from co-workers or family members.

## Treatment

For people who have never been vaccinated against rabies previously, postexposure anti-rabies vaccination should always include administration of both passive antibody and vaccine.

The combination of human rabies immune globulin (HRIG) and vaccine is recommended for both bite and nonbite exposures, regardless of the interval between exposure and initiation of treatment.

People who have been previously vaccinated or are receiving preexposure vaccination for rabies should receive only vaccine.

## Isolation and Decontamination

The only well-documented cases of rabies caused by human-to-human transmission occurred among eight recipients of transplanted corneas, and recently among three recipients of solid organs. Guidelines for acceptance of suitable cornea and organ donations, as well as the rarity of human rabies in the United States, reduce this risk.





In addition to transmission from cornea and organ transplants, bite and non-bite exposures inflicted by infected humans could theoretically transmit rabies, but no such cases have been documented. Casual contact, such as touching a person with rabies or contact with non-infectious fluid or tissue (urine, blood, feces) does not constitute an exposure and does not require postexposure prophylaxis. In addition, contact with someone who is receiving rabies vaccination does not constitute rabies exposure and does not require postexposure prophylaxis.

## Prophylaxis





The most important global source of rabies in humans is from uncontrolled rabies in dogs. Children are often at greatest risk from rabies. They are more likely to be bitten by dogs, and are also more likely to be severely exposed through multiple bites in high-risk sites on the body. Severe exposures make it more difficult to prevent rabies unless access to good medical care is immediately available.

## Additional Information

<http://www.cdc.gov/rabies/>

Mode of Transmission	
	Airborne
	Droplet
	Bloodborne
	Contact

# Rocky Mountain Spotted Fever

Mode of Transmission	
	Vomit
	Feces
	Zoonotic
	Biologic Weapon

## What is it?

Rocky Mountain spotted fever (RMSF) is a bacterial disease spread through the bite on an infected tick. Most people who get sick with RMSF will have a fever, headache, and rash. RMSF can be deadly if not treated early with the right antibiotic.

## What causes it?

It is caused by a bacteria called *Rickettsia rickettsii*.

## How is it spread?

RMSF is spread by several species of ticks in the United States, including the American dog tick (*Dermacentor variabilis*), Rocky Mountain wood tick (*Dermacentor andersoni*), and, in parts of the southwestern United States and Mexico, the brown dog tick (*Rhipicephalus sanguineus*). RMSF cases occur throughout the United States, but are most commonly reported from North Carolina, Tennessee, Missouri, Arkansas, and Oklahoma.

## What are the signs?

The incubation period after the tick bite is a few days to two weeks. Signs include fever, abdominal pain, nausea, vomiting, and body aches. A spotted rash including on the hands and feet usually develops after the first few days. The illness can be fatal, and treatment should be started as soon as possible.

## Prevention

Aside from normal PPE there are no special precautions to take when caring for a patient with RMSF. Wear long pants and sleeves when in a tick infested area, and afterwards check your skin carefully for ticks. Take care when removing ticks from others not to expose yourself to potentially infected blood.

## What do I need to do if I am exposed?

There is no vaccine or prophylaxis available. You do not need to do anything if you do not develop symptoms. If you begin to have fevers after a tick bite, or have symptoms like those listed above, you should go to the emergency room for evaluation since early treatment is the best way to prevent severe illness.

## Diagnosis

Diagnosis is with blood tests or skin biopsies, but these often do not test positive until after treatment should be started.

## Treatment

Treatment is with the antibiotic doxycycline.

## Isolation and Decontamination




Post-tick bite antibiotic prophylaxis is not recommended to prevent RMSF. People who were bitten by a tick should be advised to watch for signs and symptoms and see their health care provider if fever, rash, or other symptoms develop within two weeks of tick bite. Treatment for asymptomatic individuals is not currently recommended.

## Prophylaxis

There is no vaccine to prevent RMSF. Prevent illness by preventing tick bites, preventing ticks on your pets, and preventing ticks in your yard.

## Additional Information

<https://www.cdc.gov/rmsf/>

Mode of Transmission	
	Vomit
	Feces
	Zoonotic

# Salmonellosis

## What is it?

Salmonellosis is an intestinal illness typically caused by food poisoning. The CDC estimates *Salmonella* causes about 1.2 million illnesses, 23,000 hospitalizations, and 450 deaths in the United States every year. Food is the source for about 1 million of these illnesses.

## What causes it?

It is caused by a group of bacteria called *Salmonella*.

## How is it spread?

Humans typically get salmonella from food that's been contaminated by fecal matter, either when used as fertilizer or during the butchering process.

## What are the signs?

Symptoms include fever, abdominal pain and cramping, nausea, vomiting, and diarrhea, sometimes with blood. Symptoms typically last for a few days to a week, and then resolve on their own. Rarely, the bacteria can invade other parts of the body including the blood or the central nervous system.

## Prevention

If you have a patient with any diarrheal illness, be sure to use proper PPE, wash your hands with soap and water before eating, drinking, or touching your face, and disinfect all surfaces. Otherwise, avoid undercooked meat or eggs, and wash your hands well after handling animals, especially reptiles.

## What do I need to do if I am exposed?

You do not need to do anything if you do not develop symptoms. *Salmonella* typically gets better on its own. If you have symptoms, make sure to stay well-hydrated, and avoid preparing food or drink while you still have symptoms. If your symptoms become severe and you cannot tolerate fluids, you should see your doctor.

## Diagnosis

Diagnosis is with stool or blood cultures. Treatment for salmonella gastroenteritis is typically supportive with oral or IV rehydration.

## Treatment

Treatment for invasive salmonella is with antibiotics. Antibiotics are recommended only for patients who: Have a serious illness (such as severe diarrhea, high fever, bloodstream infection, or condition requiring hospitalization); Are considered at high risk for serious disease or complications (such as infants, adults over 65 years old, and people with weakened immune systems).

## Isolation and Decontamination

Do not handle or come in contact with urine, blood or tissues from an infected pet or animal before it has received proper treatment. If you need to have contact with animal tissues or urine, wear protective clothing such as gloves and boots, especially if you are occupationally at risk (veterinarians, farm workers, sewer workers). As a general rule, always wash your hands after handling any pet or substance that might have pet excrement on it. If you are cleaning surfaces that may be contaminated or have urine from an infected pet on them, use an antibacterial cleaning solution of 1 part household bleach in 10 parts water.



## Prophylaxis

Remember to follow the "Clean, Separate, Cook, and Chill" guidelines to help keep you and your family safe from *Salmonella*. Be especially careful to follow the guidelines when preparing food for young children, people with weakened immune systems, and older adults.

Pets and other healthy animals, including those at petting zoos, farms, fairs, and even schools and daycares, can carry *Salmonella* and other germs that make people sick. Wash your hands thoroughly with running water and soap after touching pets and other animals, or their food, water, poop, belongings (such as toys and bowls), or habitats (such as beds, cages, tanks, coops, stalls, and barns) of our feathery, furry, and scaly friends. Don't let children younger than age 5, people with weakened immune systems, or older adults touch high-risk animals (like turtles, frogs, chickens, ducks) or their belongings or habitats.

## Additional Information

<http://www.cdc.gov/salmonella/>

Mode of Transmission	
	Airborne
	Droplet

# Severe Acute Respiratory Syndrome (SARS)

## What is it?

Severe acute respiratory syndrome (SARS) is a viral respiratory illness caused by a coronavirus called SARS-associated coronavirus (SARS-CoV). SARS was first reported in Asia. In 2003 there was a large outbreak worldwide with high mortality before being contained. There have been no documented cases of SARS since 2004.

## What causes it?

SARS is caused by a virus in the coronavirus family. Coronaviruses are some of the viruses that can cause the common cold, but the SARS-associated coronavirus can cause severe disease.

## How is it spread?

SARS is spread through respiratory droplets, and typically is contracted after close contact with a person who has SARS. It is unknown whether the virus can spread through the air.

## What are the signs?

Patients with SARS will have symptoms similar to the flu, including high fevers, body aches, and cough, followed by pneumonia & significant respiratory distress.

## Prevention

Patients who have respiratory symptoms should have a mask placed to prevent the spread of respiratory droplets. Good hand washing and PPI are essential. There is no vaccine for SARS.

## What do I need to do if I am exposed?

If you have a patient who is found to have SARS, it will be important to watch for symptoms over the next couple weeks. If you do not have symptoms, you are not contagious. If you do develop symptoms, you should see your primary care doctor for testing. If you have severe symptoms especially with difficulty breathing, go to the emergency room. If you do not develop symptoms, there likely will be nothing special you will have to do.

## Diagnosis

Blood or sputum tests

## Treatment

Primarily Supportive Care

## Isolation and Decontamination



Effective communication among clinicians requesting emergency transport of a patient with possible or known SARS-CoV disease, EMS personnel, and receiving facilities is necessary to ensure the appropriate protection of healthcare workers. Prehospital care personnel should follow the updated CDC Standard Precautions recommendations to prevent the spread of respiratory infections. These include promoting respiratory hygiene/cough etiquette and using Droplet Precautions, in addition to Standard Precautions, for all patients with symptoms of a respiratory infection. When SARS is suspected in a patient needing emergency transport, **prehospital care providers and healthcare facilities should be notified in advance that they may be transporting or receiving a patient who may have SARS-CoV disease.**

## Prophylaxis

Persons who may have been exposed to SARS should be vigilant for fever (i.e., measure temperature twice daily) or respiratory symptoms for 10 days following exposure. During this time, in the absence of both fever and respiratory symptoms, persons who may have been exposed to SARS need not limit their activities outside the home and should not be excluded from work, school, out-of-home child care, church, or activities in other public areas. Exposed persons should notify their healthcare provider immediately if fever OR respiratory symptoms develop. Before arriving at the healthcare setting, exposed persons should notify the healthcare provider of the possible exposure to SARS so that the necessary precautions can be taken to prevent transmission to others in the healthcare setting.

## Additional Information

<http://www.cdc.gov/sars/>

Mode of Transmission	
	Vomit
	Feces

# Shigellosis

## What is it?

Shigellosis is an infectious disease caused by a group of bacteria called *Shigella*. Most who are infected with *Shigella* develop diarrhea, fever, and stomach cramps starting a day or two after they are exposed to the bacteria. Shigellosis usually resolves in 5-7 days. Some people who are infected may have no symptoms at all, but may still pass the *Shigella* bacteria to others. The spread of *Shigella* can be stopped by frequent and careful handwashing with soap and taking other hygiene measures.

## What causes it?

It is caused by a group of bacteria called *Shigella*.

## How is it spread?

*Shigella* is in the stool of sick people while they have diarrhea and for up to 1-2 weeks after the diarrhea has gone away. *Shigella* germs are very contagious; it takes just a small number of *Shigella* to make someone sick. People can get shigellosis when they put something in their mouths or swallow something that has come into contact with the stool of someone else who is sick with shigellosis. People could get sick by:

Getting *Shigella* germs on their hands and then touching your food or mouth. You can get *Shigella* germs on your hands after:

Touching surfaces contaminated with germs from stool from a sick person, such as toys, bathroom fixtures, changing tables or diaper pails; Changing the diaper of a sick child or caring for a sick person

Eating food that was prepared by someone who is sick with shigellosis; Swallowing recreational water (for example, lake or river water) while swimming or drinking water that is contaminated with stool (poop) containing the germ; Having exposure to stool during sexual contact with someone who is sick or recently (several weeks) recovered from shigellosis.

## What are the signs?

There is an incubation period of 1-2 days, after which patients develop fever, abdominal pain, and bloody diarrhea & abdominal cramping. Symptoms start to improve after about a week.

## Prevention

Use full PPE with any patient with diarrhea or infectious symptoms. Handwashing is the most important component of preventing contracting or spreading shigellosis.

## What do I need to do if I am exposed?

If you are exposed, you should monitor your symptoms over the next couple of days. If you develop symptoms, they are likely to get better within a week. You can work to prevent spreading shigellosis to others by practicing good hand hygiene. If your symptoms are severe, you should talk to your doctor on a non-emergent basis.

## Diagnosis

Diagnosis is with a stool test.

## Treatment

Treatment is usually supportive, though in severe cases antibiotics may be used.

## Isolation and Decontamination

As with any patient with diarrheal illness, be sure to use standard and contact precautions to prevent person-to-person spread. Supervision of hand washing by children may help decrease the spread.

## Prophylaxis

People usually get sick from *Shigella* bacteria after putting something in their mouth or swallowing something that has come into contact with the stool (poop) of someone else who is sick from *Shigella* bacteria. There is no vaccine to prevent shigellosis.

## Additional Information

<https://www.cdc.gov/shigella/>





# Tetanus

## What is it?

Tetanus is an infection caused by a bacterium called *Clostridium tetani*. Spores of tetanus bacteria are everywhere in the environment, including soil, dust, and manure. The spores develop into bacteria when they enter the body.

## What causes it?

It is caused by a bacterium that lives in the soil called *Clostridium tetani*.

## How is it spread?

The spores can get into the body through broken skin, usually through injuries from contaminated objects. Certain breaks in the skin are more likely to get infected with tetanus bacteria. These include: Wounds contaminated with dirt, poop (feces), or spit (saliva); Wounds caused by an object puncturing the skin (puncture wounds), like a nail or needle; Burns; Crush injuries; Injuries with dead tissue.

Rarely, tetanus has also been linked to breaks in the skin caused by: Clean superficial wounds (when only the topmost layer of skin is scraped off); Surgical procedures; Insect bites; Dental infections; Compound fractures (a break in the bone where it is exposed); Chronic sores and infections; Intravenous (IV) drug use; Intramuscular injections (shots given in a muscle).

## What are the signs?

Tetanus can have an extended incubation period after which patients experience fevers, body aches, sweats, headache followed by jaw pain, muscle spasms, and finally uncontrolled muscle tightening, sometimes with difficulty breathing and death.

## Prevention

Tetanus is preventable with the tetanus vaccine. This is part of the childhood vaccines. Adults should get booster shots every ten years, or sometimes after they have a deep cut or puncture wound.

## What do I need to do if I am exposed?

Tetanus cannot be transmitted from person to person. If you have a puncture wound or a deep cut, you should clean the wound thoroughly with water and talk to your doctor about getting a tetanus shot on a non-emergent basis.

## Diagnosis

Diagnosis is based on symptoms; there are no blood tests for tetanus.

## Treatment

Treatment is through prevention, with the vaccine, with immunoglobulins, antibiotics, and supportive care.

## Isolation and Decontamination

Tetanus is different from other vaccine-preventable diseases because it does not spread from person to person. The bacteria are usually found in soil, dust, and manure and enter the body through breaks in the skin — usually cuts or puncture wounds caused by contaminated objects.

Today, tetanus is uncommon in the United States, with an average of 30 reported cases each year. Nearly all cases of tetanus are among people who have never received a tetanus vaccine, or adults who don't stay up to date on their 10-year booster shots.

## Prophylaxis

Being up to date with your tetanus vaccine is the best tool to prevent tetanus. Protection from vaccines, as well as a prior infection, do not last a lifetime. This means that if you had tetanus or were vaccinated before, you still need to get vaccinated regularly to keep a high level of protection against this serious disease. Tetanus vaccines are recommended for people of all ages, with booster shots throughout life.

## Additional Information

<http://www.cdc.gov/tetanus/>



# Toxoplasmosis

## What is it?

Toxoplasmosis is a parasitic infection that in most people causes no symptoms, but it can be very dangerous for pregnant women or people with compromised immune systems.

## What causes it?

It is caused by a single-celled parasite called *Toxoplasma gondii*. Cats, sheep, and other animals are carriers.

## How is it spread?

It is spread by ingestion. It can be contracted by ingesting undercooked meat or through contact with cat feces (i.e. cleaning the litter box).

## What are the signs?

If a patient does develop symptoms, they are usually non-specific and include fever, fatigue, malaise, and swollen, tender lymph nodes. This can last for a month or more. Symptoms typically resolve then, though many people continue to carry the infection after that.

## Prevention

Toxoplasmosis is not readily transmissible from person to person. Take care around anyone with infectious symptoms. Avoid undercooked meat. If you are pregnant or planning to become pregnant, talk to your doctor about risks.

## What do I need to do if I am exposed?

If you are pregnant, planning to become pregnant, or immunocompromised, talk to your doctor on a non-urgent basis. Otherwise there should be nothing to do.

## Diagnosis

Diagnosis of toxoplasmosis is usually made by detection of *Toxoplasma*-specific IgG, IgM, IgA, or IgE antibodies. Serologic tests are sometimes unreliable in immunosuppressed patients. Because of the persistence of *Toxoplasma* cysts and antibody in asymptomatic chronic latent infections, immunosuppressed persons with both positive PCR and serologic results should have their diagnostic testing results interpreted in relation to clinical features of an active infection. A negative PCR does not rule out active infection. PCR can also be performed on amniotic fluid, which can be helpful in determining fetal infection following acute acquired infection of the mother.

Diagnosis can be made by direct observation of the parasite in stained tissue sections, cerebrospinal fluid (CSF), or other biopsy material. These techniques are used less frequently because of the difficulty of obtaining these specimens. Parasites can also be isolated from blood or other body fluids (for example, CSF) but this process can be difficult and requires considerable time.

## Treatment

Treatment includes anti-parasite medicines including pyrimethamine & sulfadiazine.

## Isolation and Decontamination

Toxoplasmosis is not passed from person-to-person, except in instances of mother-to-child (congenital) transmission and blood transfusion or organ transplantation.



## Prophylaxis

Cook food to safe temperatures. A food thermometer should be used to measure the internal temperature of cooked meat. Color is not a reliable indicator that meat has been cooked to a temperature high enough to kill harmful pathogens like *Toxoplasma*. Do not sample meat until it is cooked.

To reduce risk of toxoplasmosis from the environment: Avoid drinking untreated water; Wear gloves when gardening and during any contact with soil or sand because it might be contaminated with cat feces that contain *Toxoplasma*. Wash hands with soap and water after gardening or contact with soil or sand; Teach children the importance of washing hands to prevent infection; Keep outdoor sandboxes covered; Have someone else clean the litter box. (CDC Photo); Feed cats only canned or dried commercial food or well-cooked table food, not raw or undercooked meats; Ensure that the cat litter box is changed daily. The *Toxoplasma* parasite does not become infectious until 1 to 5 days after it is shed in a cat's feces.

## Additional Information

<http://www.cdc.gov/parasites/toxoplasmosis/>

Mode of Transmission	
 Contact	
 Feces	

# Typhoid Fever

## What is it?

It is an infection of the intestines and bloodstream. It affects an estimated 22 million people worldwide each year. In the United States, about 350 people are diagnosed with typhoid fever each year, most often after traveling outside of the United States to countries such as India, Bangladesh, and Pakistan. These cases do not include people who do not seek medical care, who are not tested for either disease, or whose disease is not reported to CDC.

## What causes it?

It is caused by a bacterium called *Salmonella typhi*.

## How is it spread?

It is spread from person to person, typically through water or food that has been contaminated with fecal matter. Typhoid fever and paratyphoid fever are common in many parts of the world, but not in industrialized regions such as the United States, Canada, Western Europe, Australia, and Japan. Areas of highest risk include parts of East and Southeast Asia, Africa, the Caribbean, and Central and South America.

## What are the signs?

Symptoms of typhoid fever are vague, and include high fever, fatigue, malaise, some abdominal discomfort, and occasionally a flat pink rash. Symptoms can become severe, and typhoid fever can sometimes be deadly. Even after symptoms improve, some people become carriers and continue to spread the bacteria for long afterwards.

## Prevention

Use full PPE with any patient with high fever, and wash your hands thoroughly with soap and water after. Avoid undercooked foods or food & water from unknown sources. There is a vaccination series available for those considering travel to countries where typhoid fever is common.

Carefully selecting what you eat and drink when you travel is important. This is because the typhoid fever vaccines do not work 100% of the time, and there is no paratyphoid fever vaccine. Avoiding risky foods will also help protect you from other illnesses, including travelers' diarrhea, cholera, dysentery, and hepatitis A.

## What do I need to do if I am exposed?

If you had an exposure to typhoid fever, you should call your doctor on a non-urgent basis. If you begin to develop symptoms like those above, you should go to the emergency room.

## Diagnosis

Diagnosis is with stool or blood tests looking for the *Salmonella Typhi* or *Salmonella Paratyphi*.

## Treatment

Treatment is with antibiotics.

## Isolation and Decontamination

People who do not get treatment can continue to have fever for weeks or months, and can develop complications. As many as 30% of people who do not get treatment die from complications of the infection.



Even if symptoms seem to go away, patients may still be carrying *Salmonella Typhi* or *Salmonella Paratyphi*. If so, the illness could return, or they could pass the bacteria to other people. Health care workers and those who handle food or care for small children, might be barred (prevented) legally from going back to work until a doctor has determined they no longer carry the bacteria.

## Prophylaxis

Get vaccinated against typhoid fever if you plan on traveling to an endemic area. Find out how to stay safe when it comes to foods and drinks. Typhoid vaccines lose effectiveness after several years. If you were vaccinated in the past, ask your doctor if it is time for a booster vaccination. Taking antibiotics will not prevent typhoid fever; they only help treat it.

## Additional Information

<https://www.cdc.gov/typhoid-fever/>

Mode of Transmission	
 Contact	
 Feces	

# Vibriosis

## What is it?

Vibriosis is a diarrheal illness contracted from seafood or seawater. Vibriosis causes an estimated 80,000 illnesses and 100 deaths in the United States every year. People with vibriosis become infected by consuming raw or undercooked seafood or exposing a wound to seawater. Most infections occur from May through October when water temperatures are warmer.

## What causes it?

It is caused by a group of bacteria called *Vibrio*, most commonly the species *Vibrio parahaemolyticus*.

## How is it spread?

*Vibrio* species are spread in seafood and in contaminated sea water. Eating raw seafood such as oysters can cause a diarrheal illness, while exposure to open sores on the skin can cause a skin infection. Many people like to eat oysters and other shellfish raw. Large outbreaks have occurred even when counts of *V. parahaemolyticus* in oysters from implicated harvest sites were very low.

## What are the signs?

Vibriosis has an incubation period of about 24 hours, after which illness is characterized by fever, abdominal cramping and pain, watery diarrhea, nausea, and vomiting. Symptoms are self-limited and last about 3 days.

## Prevention

Use full PPE when you have a patient with a diarrheal illness. Afterwards clean and disinfect all surfaces, and wash hands thoroughly with soap and water. Otherwise, avoid raw or undercooked seafood.

## What do I need to do if I am exposed?

You do not need to seek care after treating a patient with vibriosis. If you do develop symptoms, you may contact your regular doctor on a non-urgent basis.

## Diagnosis

A clinician may suspect vibriosis if a patient has watery diarrhea and has recently eaten raw or undercooked seafood, especially oysters, or when a wound infection occurs after exposure to seawater. Infection is diagnosed when *Vibrio* bacteria are found in the stool, wound, or blood of a patient who has symptoms of vibriosis.

## Treatment

Treatment is supportive.

## Isolation and Decontamination

Use standard and contact precautions when treating a patient with known or suspected Vibriosis. Good hand washing and surface decontamination are recommended, as per standard.


Hot sauce and lemon juice don't kill *Vibrio* bacteria. Drinking alcohol while eating oysters doesn't kill *Vibrio* bacteria either. Cooking oysters properly is the only way to kill the harmful bacteria.

## Prophylaxis

Don't eat raw or undercooked oysters or other shellfish. Cook them before eating. Always wash your hands with soap and water after handling raw shellfish. Avoid contaminating cooked shellfish with raw shellfish and its juices. Stay out of brackish or salt water if you have a wound (including cuts and scrapes), or cover your wound with a waterproof bandage if there's a possibility it could come into contact with brackish or salt water, raw seafood, or raw seafood juices. Brackish water is a mixture of fresh and sea water. It is often found where rivers meet the sea. Wash wounds and cuts thoroughly with soap and water if they have been exposed to seawater or raw seafood or its juices.

## Additional Information

[www.cdc.gov/vibrio/index.html](http://www.cdc.gov/vibrio/index.html)

Mode of Transmission
 Zoonotic

# Yellow Fever

## What is it?

Yellow Fever is a tropical viral disease affecting the liver and kidneys, causing fever and jaundice.

## What causes it?

Yellow fever virus is an RNA virus that belongs to the genus *Flavivirus*. It is related to West Nile, St. Louis encephalitis, and Japanese encephalitis viruses. Yellow fever virus is transmitted to people primarily through the bite of infected *Aedes* or *Haemagogus* species mosquitoes.

## How is it spread?

Vectorborne transmission occurs via the bite of an infected mosquito, primarily *Aedes* or *Haemagogus* spp. Humans infected with YFV experience the highest levels of viremia and can transmit the virus to mosquitoes shortly before onset of fever and for the first 3–5 days of illness.

## What are the signs?

Asymptomatic or clinically inapparent infection is believed to occur in most people infected with YFV. For people who develop symptomatic illness, the incubation period is typically 3–6 days. The initial illness presents as a nonspecific influenza-like syndrome with sudden onset of fever, chills, headache, backache, myalgias, prostration, nausea, and vomiting. Most patients improve after the initial presentation. After a brief remission of hours to a day, approximately 15% of patients progress to a more serious or toxic form of the disease, characterized by jaundice, hemorrhagic symptoms, and eventually shock and multisystem organ failure.

## Prevention

The best way to prevent mosquito borne diseases, including yellow fever, is to avoid mosquito bites and to get vaccinated

## What do I need to do if I am exposed?

If you think you may have been exposed to Yellow Fever, you should call your doctor on a non-emergency basis and monitor for the development of illness. Initial symptoms of yellow fever include sudden onset of fever, chills, severe headache, back pain, general body aches, nausea and vomiting, fatigue, and weakness. Most people improve after these initial symptoms. However, roughly 15% of people will have a brief period of hours to a day without symptoms and will then develop a more severe form of yellow fever disease. In severe cases, a person may develop high fever, jaundice (a condition that involves yellow discoloration of the skin and the whites of the eyes), bleeding (especially from the gastrointestinal tract), and eventually shock and failure of many organs. Roughly 20-50% of people who develop severe illness may die.

## Diagnosis

The preliminary diagnosis is based on the patient's clinical features, places and dates of travel, and activities. Laboratory diagnosis is best performed by

- Serologic assays to detect virus-specific IgM and IgG antibodies.
- Virus isolation or nucleic acid amplification tests

## Treatment

There are no specific medications to treat YFV infections; treatment is directed at symptomatic relief or life-saving interventions

## Isolation and Decontamination

If after returning from travel you have symptoms of yellow fever (usually about a week after being bitten by an infected mosquito), protect yourself from mosquito bites for up to 5 days after symptoms begin. This will help prevent spreading yellow fever to uninfected mosquitoes that can spread the virus to other people.



## Prophylaxis

The most effective way to prevent infection from Yellow Fever virus is to prevent mosquito bites. Mosquitoes bite during the day and night. Use insect repellent, wear long-sleeved shirts and pants, treat clothing and gear, and get vaccinated before traveling, if vaccination is recommended for you. Yellow fever vaccine is recommended for people who are 9 months old or older and who are traveling to or living in areas at risk for yellow fever virus in Africa and South America.

For most people, a single dose of yellow fever vaccine provides long-lasting protection and a booster dose of the vaccine is not needed. However, travelers going to areas with ongoing outbreaks may consider getting a booster dose of yellow fever vaccine if it has been 10 years or more since they were last vaccinated.

## Additional Information

<https://www.cdc.gov/yellowfever/>

Mode of Transmission	
	Feces
	Contact

# Yersiniosis

## What is it?

Yersiniosis is an infection caused most often by eating raw or undercooked pork contaminated with *Yersinia enterocolitica* bacteria. The CDC estimates *Y. enterocolitica* causes almost 117,000 illnesses, 640 hospitalizations, and 35 deaths in the United States every year. Children are infected more often than adults, and the infection is more common in the winter.

## What causes it?

It is caused by *Yersinia enterocolitica*, a kind of bacteria.

## How is it spread?

Yersiniosis is spread by eating undercooked meat, usually pork. It can also be spread in the feces of a patient with yersiniosis.

## What are the signs?

There is typically an incubation period from a few days to a few weeks. After that, symptoms include fever, abdominal pain, and bloody diarrhea. Symptoms will typically last a few days to over a week. In rare cases, the disease can become severe, requiring hospitalization.

## Prevention

If you have a patient with Yersiniosis, use full PPE and clean all surfaces thoroughly. Human to human transmission is rare, and typically through contact with fecal matter. Wash your hands thoroughly with soap and water prior to eating. Otherwise, avoid eating raw or undercooked pork or unpasteurized dairy.

## What do I need to do if I am exposed?

You do not need to do anything if you do not develop symptoms. There is no vaccine, and the disease typically gets better on its own. If you do develop symptoms, you can go to your primary care doctor on a non-urgent basis.

## Diagnosis and Treatment

Yersiniosis usually is diagnosed by detecting the organism in the stool of an infected person. Many laboratories do not routinely test for *Yersinia*, so it is important to notify laboratory personnel when yersiniosis is suspected so that special tests can be done. The organism can also be recovered from other sites, including the throat, lymph nodes, joint fluid, urine, bile, and blood.

## Treatment

Treatment is supportive; antibiotics are sometimes used in severe cases.

## Isolation and Decontamination



Use standard and contact precautions when treating a patient with known or suspected Yersiniosis. Good hand washing and surface decontamination are recommended, per standard.

## Prophylaxis

Take increased food handling precautions when preparing a dish that uses pork intestines, such as chitlins – or any time you handle raw pork. **Young children are at high risk for infection.** They can become infected when people preparing pork do not wash their hands carefully before touching children or items children put in their mouths, such as toys, bottles, and pacifiers.

## Additional Information

<https://www.cdc.gov/yersinia/>

Mode of Transmission	
 Zoonotic	
 Contact	

# Zika

## What is it?

Zika is an arthropod-borne flavivirus transmitted to people primarily through the bite of a infected *Aedes* species mosquito, and is related to other flaviviruses including dengue virus, yellow fever virus and West Nile Virus.

## What causes it?

Zika is a disease caused by the Zika virus. It is an illness that is usually mild with symptoms lasting up to a week. However, Zika virus infection during pregnancy can cause serious birth defects including microcephaly and other severe brain defects.

## How is it spread?

Community exposures are primarily the result of mosquito bites, although other types of transmission can occur including sexual contact and blood transfusion. Outbreaks of Zika virus infection have occurred in Africa, Southeast Asia, Pacific Islands, several islands of the Caribbean and the Americas.

## What are the signs?

The majority of cases of Zika are asymptomatic. Approximately 20% of individuals do develop symptoms occurring within 2-12 days after being bitten by an infected mosquito. Symptoms include acute onset of low-grade fever with maculopapular rash, arthralgia (particularly the joints of hands and feet), or conjunctivitis and typically persists a few days to a week. Guillain-Barre syndrome has also been associated with Zika infections.

## Prevention

Special precautions should be considered for women who are pregnant or may become pregnant. In addition, Zika virus can be transmitted sexually from an infected individual to their partner. Zika virus infection has been associated with congenital microcephaly, fetal losses and potential fetal ophthalmic abnormalities among offspring of women infected during pregnancy. Research is ongoing to clarify questions of causation.

## What do I need to do if I am exposed?

For skin exposure, immediately and thoroughly wash exposed skin surfaces with the approved antibacterial scrub for 15 minutes. For splashes to the eyes or mucus membranes, flush (preferably at an eyewash station) for 15 minutes.

After initial first aid, all exposures should be reported to your Service Infection Control Officer, and follow up arranged. If an exposure occurs after business hours, please report as soon as possible after business hours resume.

## Diagnosis

Diagnosis of zika virus should be confirmed by RT-PCR performed on serum drawn within 7 days post symptom onset, and on urine collected within 21 days of onset. Zika virus IgM serology can be performed on specimens collected  $\geq 4$  days after symptom onset, but if negative should be repeated  $>14$  days post onset. The presence of one or more of the following symptoms would be sufficient to warrant testing: skin rash, fever, arthralgia or conjunctivitis.

## Treatment

No specific antiviral treatment is available for Zika virus disease. Treatment is generally supportive and can include rest, fluids, and use of analgesics and antipyretics. Because of similar geographic distribution and symptoms, patients with suspected Zika virus infections also should be evaluated and managed for possible dengue or chikungunya virus infection. Aspirin and other non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided until dengue can be ruled out to reduce the risk of hemorrhage. People infected with Zika, chikungunya, or dengue virus should be protected from further mosquito exposure during the first few days of illness to prevent other mosquitoes from becoming infected and reduce the risk of local transmission.

## Isolation and Decontamination

Zika is primarily spread through mosquito bites, but it can also be spread through sex and from a pregnant woman to her fetus. There have been no confirmed cases of spread through blood transfusions in the US. There is no evidence that the Zika virus is spread to people from contact with animals other than mosquitoes.

## Prophylaxis







Based on the risk assessment, mosquito bites should be avoided as much as possible. Often this includes using insect repellants or insecticide treated bed nets. Sexual transmission of Zika can be prevented by using condoms or abstaining from intercourse with someone who is known or suspected of having the virus. No prophylaxis is available following exposure to the infective agent or for treatment after development of disease.

## Additional Information

<https://www.cdc.gov/zika/>



# Dane County Area Hospital Infection Control Contacts

<p><b>UnityPoint Health Meriter Hospital</b></p>	<p>UnityPoint Health Meriter            Attention: Infection Control Program and EMS Liaison            202 S. Park Street            Madison, WI 53715-1507            Phone 608-417-6516</p>	 <p><b>UnityPoint Health</b> Meriter</p>
<p><b>SSM Health St. Mary's Hospital - Madison</b></p>	<p>St. Marys Hospital Medical Center            Attention: Infection Control Program and EMS Liaison            700 S. Park Street            Madison, WI 53715            Phone 608-258-5055</p>	 <p><b>SSMHealth.</b> St. Mary's Hospital</p>
<p><b>University of Wisconsin Hospital</b></p>	<p>University of Wisconsin Hospital and Clinics            Attention: Infection Control Program and EMS Liaison            600 Highland Avenue            Madison, WI 53792-5158            Phone 608-263-7096</p>	 <p><b>University of Wisconsin</b> Hospital and Clinics</p>
<p><b>VA Hospital</b></p>	<p>William S. Middleton Veteran Memorial Hospital            Attention: Infection Control Program and EMS Liaison            2500 Overlook Terrace            Madison, WI 53705            Phone 608-256-1901</p>	
<p><b>Stoughton Hospital</b></p>	<p>Stoughton Hospital            Attention: Infection Control Program and EMS Liaison            900 Ridge Street            Stoughton, WI 53589            Phone 608-873-2348</p>	 <p><b>Stoughton Hospital</b> <i>Trusted care. Close to home.</i></p>
<p><b>Sauk Prairie Hospital</b></p>	<p>Sauk Prairie Memorial Hospital            Attention: Infection Control Program and EMS Liaison            80 First Street            Prairie du Sac, WI 53578            Phone 608-643-3311</p>	 <p><b>SAUK PRAIRIE MEMORIAL</b></p>

# Abbreviations

<b>ABHR</b>	Alcohol Based Hand Rub
<b>ASPR</b>	Office of the Assistant Secretary for Preparedness and Response
<b>C. Diff</b>	<i>Clostridium difficile</i>
<b>CDC</b>	Centers for Disease Control and Prevention
<b>CPAP</b>	Continuous Positive Airway Pressure
<b>CPR</b>	Cardiopulmonary Resuscitation
<b>CSF</b>	Cerebrospinal Fluid
<b>E. coli</b>	<i>Escherichia coli</i>
<b>EEE</b>	Eastern Equine Encephalitis
<b>EMS</b>	Emergency Medical Services
<b>EPA</b>	Environmental Protection Agency
<b>ET Tube</b>	Endotracheal Tube
<b>EVD</b>	Ebola Virus Disease
<b>GABHS</b>	Group A beta-hemolytic streptococcus
<b>HAV</b>	Hepatitis A Virus
<b>HBIG</b>	Hepatitis B Immunoglobulin
<b>HBV</b>	Hepatitis B Virus
<b>HCPS</b>	Hantavirus Cardiopulmonary Syndrome
<b>HCV</b>	Hepatitis C Virus
<b>HDV</b>	Hepatitis D Virus
<b>HEV</b>	Hepatitis E Virus
<b>HFRS</b>	Hemorrhagic Fever with Renal Syndrome
<b>HIB</b>	Haemophilus influenzae type b
<b>HIC</b>	Healthcare Infection Control
<b>HIV</b>	Human Immunodeficiency Virus

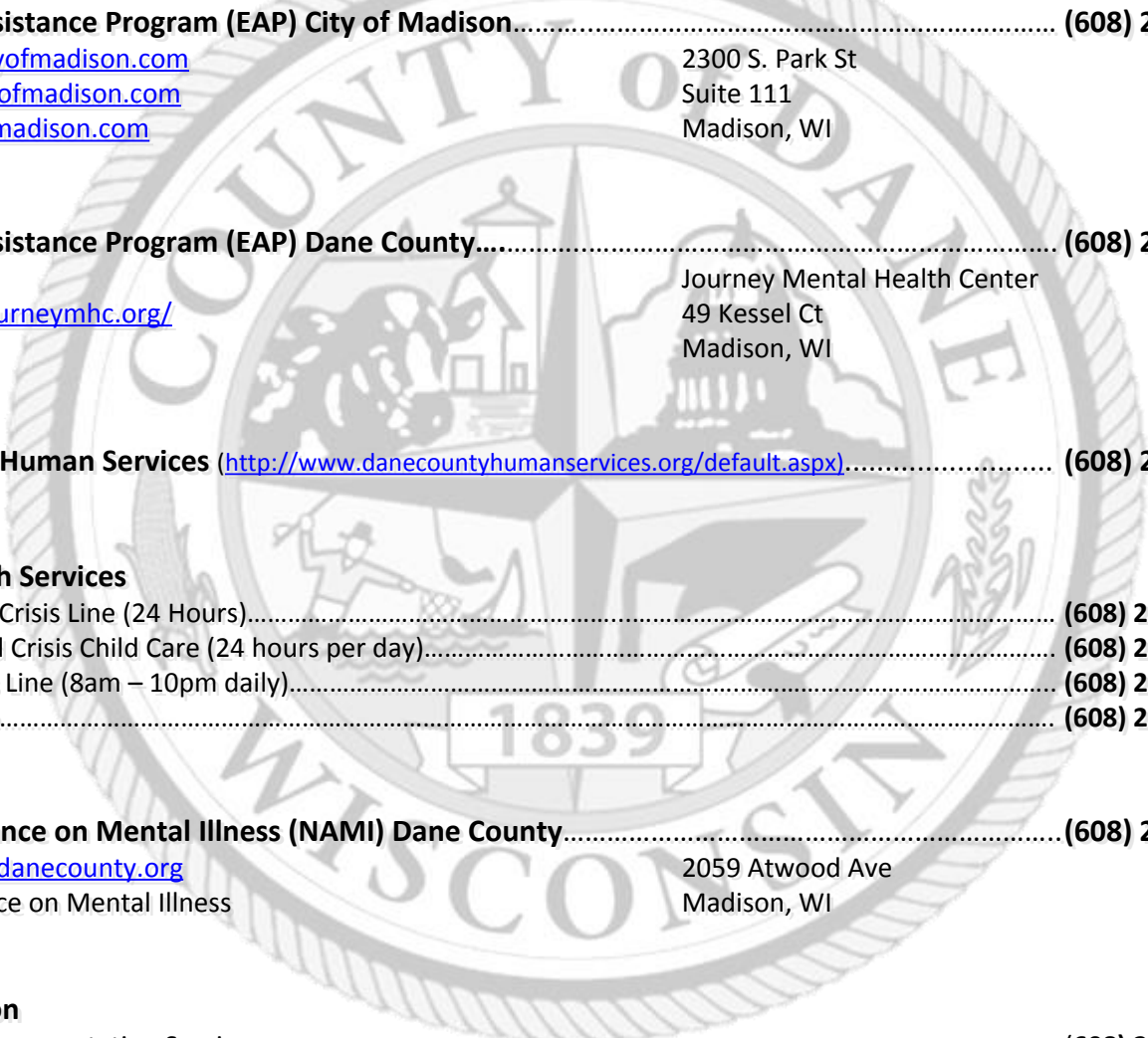
<b>HPS</b>	Hantavirus Pulmonary Syndrome
<b>HRIG</b>	Human Rabies Immunoglobulin
<b>IPV</b>	Inactivated Polio Virus
<b>MIC</b>	Minimum Inhibitory Concentration
<b>MLD</b>	Minimum Lethal Dose
<b>MMR</b>	Measles, Mumps and Rubella Vaccine
<b>MRSA</b>	Methicillin-Resistant <i>Staphylococcus aureus</i>
<b>N-95</b>	Filters 95% of airborne particles
<b>PEP</b>	Post Exposure Prophylaxis
<b>MMR</b>	Measles, Mumps and Rubella Vaccine
<b>PEP</b>	Post Exposure Prophylaxis
<b>PPE</b>	Personal Protective Equipment
<b>RMSF</b>	Rocky Mountain Spotted Fever
<b>RNA</b>	Ribonucleic Acid
<b>SARS</b>	Severe Acute Respiratory Syndrome
<b>SEB</b>	Staphylococcal Enterotoxin B
<b>SIRS</b>	Systemic Inflammatory Response Syndrome
<b>TB</b>	Tuberculosis
<b>TRACIE</b>	Technical Resources, Assistance Center and Information Exchange
<b>TSS</b>	Toxic Shock Syndrome
<b>TSST</b>	Toxic Shock Syndrome Toxin
<b>USAMRIID</b>	U.S. Army Medical Research Institute of Infectious Diseases
<b>VHF</b>	Viral Hemorrhagic Fever
<b>VRE</b>	Vancomycin-Resistant Enterococcus
<b>WHO</b>	World Health Organization

# Madison and Dane County Responder Resources

“In case you haven’t felt it today... **You are appreciated.**  
In case you wanted to quit today... **Don’t. You are needed.**  
In case you need to talk but feel no one will listen... **There are many who will.**  
In case you haven’t heard it today... **THANK YOU”**

**Call 2-1-1 any time for information about almost anything related to health and human services.**

You can also visit <http://www.211wisconsin.org> or <http://www.referweb.net/uwdc/>



<b>Employee Assistance Program (EAP) City of Madison</b> .....	<b>(608) 266-6561</b>
<a href="mailto:tmartinez@cityofmadison.com">tmartinez@cityofmadison.com</a>	2300 S. Park St
<a href="mailto:hkrueger@cityofmadison.com">hkrueger@cityofmadison.com</a>	Suite 111
<a href="mailto:samos@cityofmadison.com">samos@cityofmadison.com</a>	Madison, WI
<b>Employee Assistance Program (EAP) Dane County</b> .....	<b>(608) 280-2644</b>
Karen Smith	Journey Mental Health Center
<a href="http://www.journeymhc.org/">http://www.journeymhc.org/</a>	49 Kessel Ct
	Madison, WI
<b>Dane County Human Services</b> ( <a href="http://www.danecountyhumanservices.org/default.aspx">http://www.danecountyhumanservices.org/default.aspx</a> ).....	<b>(608) 242-6200</b>
<b>Mental Health Services</b>	
Mental Health Crisis Line (24 Hours).....	<b>(608) 280-2600</b>
Emergency and Crisis Child Care (24 hours per day).....	<b>(608) 244-5700</b>
Parental Stress Line (8am – 10pm daily).....	<b>(608) 241-2221</b>
Recovery Dane.....	<b>(608) 237-1661</b>
<b>National Alliance on Mental Illness (NAMI) Dane County</b> .....	<b>(608) 249-7188</b>
<a href="mailto:contact@namidanecounty.org">contact@namidanecounty.org</a>	2059 Atwood Ave
National Alliance on Mental Illness	Madison, WI
<b>Transportation</b>	
Dane County Transportation Services.....	<b>(608) 242-6486</b>
<a href="http://danecountyhumanservices.org/Transportation/key_phone_numbers.aspx">http://danecountyhumanservices.org/Transportation/key_phone_numbers.aspx</a>	
Madison Metro Transit and Paratransit	
<a href="https://cityofmadison.com/metro/">https://cityofmadison.com/metro/</a> and <a href="https://www.cityofmadison.com/metro/paratransit/">https://www.cityofmadison.com/metro/paratransit/</a>	
BadgerCare / Medicaid.....	<b>(608) 907-1493</b>

**Medical Emergency : Call 9-1-1**