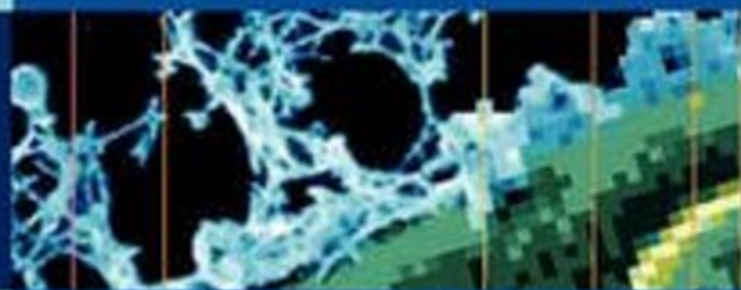


Vincent E. Friedewald



# Clinical Guide to Bioweapons and Chemical Agents

 Springer

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 Springer

Vincent E. Friedewald, MD  
University of Notre Dame  
Notre Dame, Indiana

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*To my loving wife, Julie, and our precious family,  
Natalie, Vincent III, and Jake*

# About the Author

Dr. Friedewald is a graduate of the University of Notre Dame (BS) and the University of Texas Southwestern Medical School (MD). He completed his residency in internal medicine and cardiovascular diseases at Baylor College of Medicine in Houston, Texas. He is Board-certified in Internal Medicine and Cardiology.

For over 25 years, Dr. Friedewald practiced internal medicine and cardiology, initially in 1971 as Director of Diagnostic Laboratories at the Arizona Heart Institute in Phoenix. In 1976 he assumed the position of Chief of Cardiology and Chairman of the Department of Internal Medicine at the Honolulu Medical Group at Queen's Medical Center in Honolulu. He returned to Houston in 1982 to practice cardiology as a member of the faculty at Baylor and serve as Director of the Cardiac Noninvasive Laboratory and the Cardiac Rehabilitation Program at the Kelsey-Seybold Clinic.

His initial medical research was in the development of echocardiography, which was the basis for his *The Textbook of Echocardiography*, and computer-based analysis of cardiac monitoring systems, including electrocardiography, exercise testing, and vectorcardiography. In recent years, he has focused on studies of the evolutionary role of informational media and the impact of electronic media on human behavior; electronic publishing; voice recognition technology medical applications; and medication adherence by patients.

Dr. Friedewald has faculty appointments at the University of Notre Dame (Research Professor, College of Science and Senior Research Fellow in Ethics) and the University of Texas Health Sciences Center at Houston (Clinical Professor of Internal Medicine). He is Assistant Editor of *The American Journal of Cardiology*.

Since February, 2002, Dr. Friedewald has been Medical Director of Argus1, a Web-based program for the early detection of biological and chemical attack and other naturally-occurring and accidental public health threats. Argus1 is used for point-of-care decision support by physicians, physicians' assistants, nurses, first responders

(police, fire, emergency medical specialists), in hospital emergency departments, medical clinics, school clinics, health departments, and other institutions and agencies responsible for individual and community health.

# Foreword

When I began collaborating with the author's father, Vincent Friedewald, Sr. in the early 1980s, I could not have imagined the form that this project would eventually take. The project we collaborated on – developing a computerized approach to medical diagnosis – was already hugely innovative for its time. As personal computers began to come into popular use, Friedewald, Sr. envisioned a software program that would enable physicians to key in patient symptoms and get back an accurate diagnosis. The program that he helped develop, called *Med-Diatec*, was tested at the Baylor College of Medicine, where I was then serving as Chair of the Department of Medicine. It was an exciting project to work on, right at the dawn of the computer age, before anyone knew to what extent computer technology would become integrated into our daily lives. What made the project even more remarkable was how far it had progressed from its previous incarnation. Long before computers were to enter homes and offices, in 1953 Friedewald, Sr. patented a cleverly designed system of interlocking index cards, each containing various symptoms and signs to aid the physician in the diagnostic process.

More than five decades later, his son, Vincent Friedewald, Jr., has compiled an authoritative guide for general practitioners and clinicians in the event of a bioterrorist attack or public health crisis. Inspired by his father's visionary work and drawn from the original computer database of diseases and symptoms, this book by Friedewald, Jr. is an invaluable resource. Systematically organized according to infections and poisons, complications, and bodily systems, it is designed to facilitate prompt, efficient responses in the event of an emergency. After the unfortunate events of September 11, 2001, our world changed in ways that no one could have foreseen. Like his father before him, Vincent Friedewald, Jr. has created a resource that is both a testament to the past and a handbook for the future.

Antonio M. Gotto, Jr., MD, DPhil  
The Stephen and Suzanne Weiss Dean  
and Provost for Medical Affairs  
Weill Cornell Medical College



# Preface

## Tularemia and the First Medical Computer

The first medical computer was invented in 1944 by my father, Vincent Friedwald, Sr., MD <<http://www.argus1.com/?medicalcomputer>> (Figure 1).

While studying for internal medicine board examinations during service in the United States Navy in World War II, it struck my dad that standard textbooks had limited value in the patient care setting, because they were organized according to diseases – not by patient symptoms or physical findings, which are the starting point for every diagnosis. He translated key diagnostic data of each condition onto 3- × 5-inch white index cards, 1 card for each disease. As the stack of cards grew, he envisioned a machine (Figure 2) which, through an intricate construction of holes punched in the cards (Figures 3–6), would provide differential diagnoses according to matching symptoms, signs, and other diagnostic information keyed into the machine. After discharge from the military, he pursued his dream of a medical diagnosis machine while practicing internal medicine in the small West Texas town of Big Spring. In 1948 he applied for patent protection of the machine – *the first medical computer*. The sample disease in the patent application was Tularemia (Figure 3), which he had researched as a student at St. Louis University Medical School in the mid-1930s. Tularemia would be 1 of 5 conditions to be classified as category “A” biological weapons in a new threat to civilization 50 years after the patent application.

On May 12, 1953, he was awarded Patent number 2,638,215 by the U.S. Patent Office for a “Card Sorting Mechanism” (Figure 7). Like many dreams, however, his vision of a medical computer would lay dormant – but not forever.

In 1980, unable to continue active medical practice due to disability from the disease polymyalgia rheumatica, he resurrected his dream. He shared the index cards – stored in faded cardboard shoe boxes for almost 30 years – with Mr. Robert Burns, a pioneer



Figure 1. Dr. Vincent Friedewald, Sr., with his wife, Eleanor, and their son, Vincent Jr., the author.

specialist in medical information technology in Houston, and together they converted the original database of over 800 diseases and 1,000 signs and symptoms into a software program named *Med-Diatec* (“Medical Diagnostic Technology”). He also collaborated with Dr. Antonio Gotto, then Chair of the Department of Medicine at Baylor College of Medicine, and several other members of the faculty at Baylor to expand and test the database.

On September 10, 1990, with his medical computer at last a working reality, he and my mother, Eleanor – his ardent supporter for over 50 years – passed away.

(Continued on page xix)

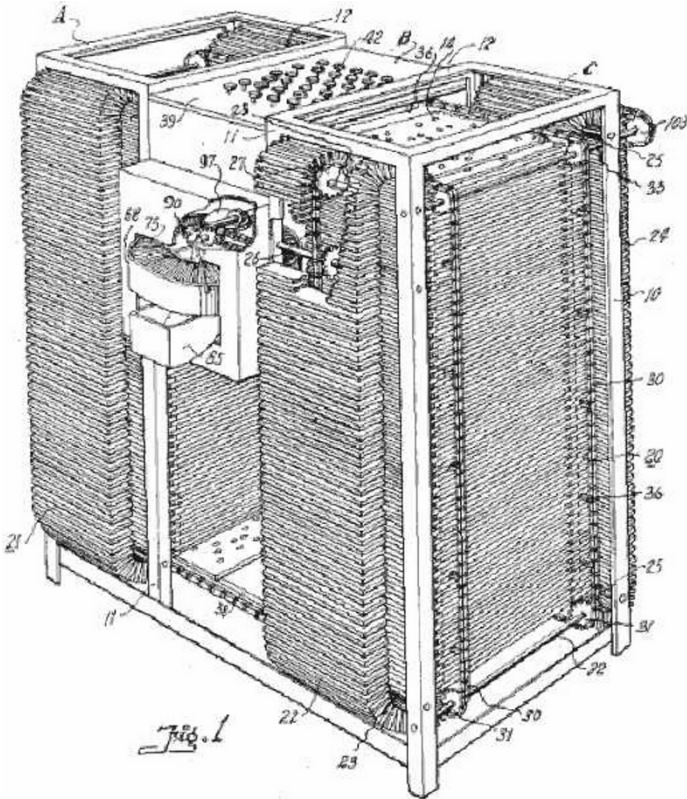


Fig. 1

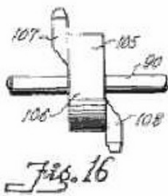


Fig. 16

Inventor  
*Vincent E. Friedewald*  
 By *Ahley & Ahley*  
 Attorneys

Figure 2. The first medical computer: diagnostic card-sorting machine designed by Dr. Friedewald, Sr.

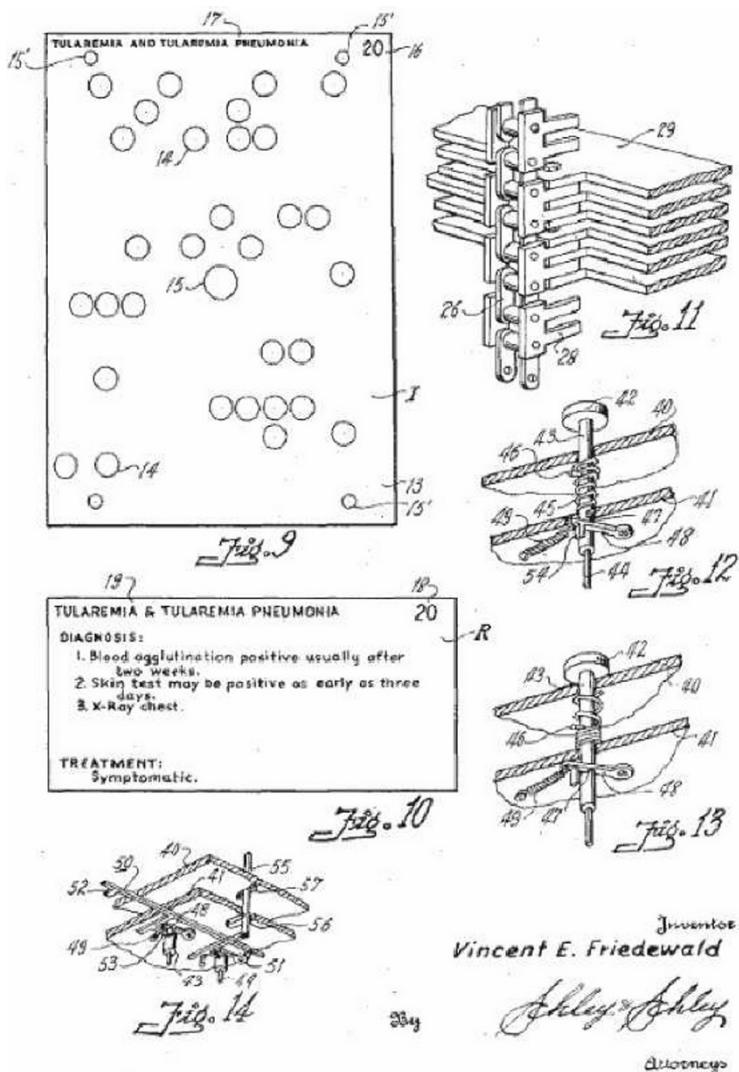
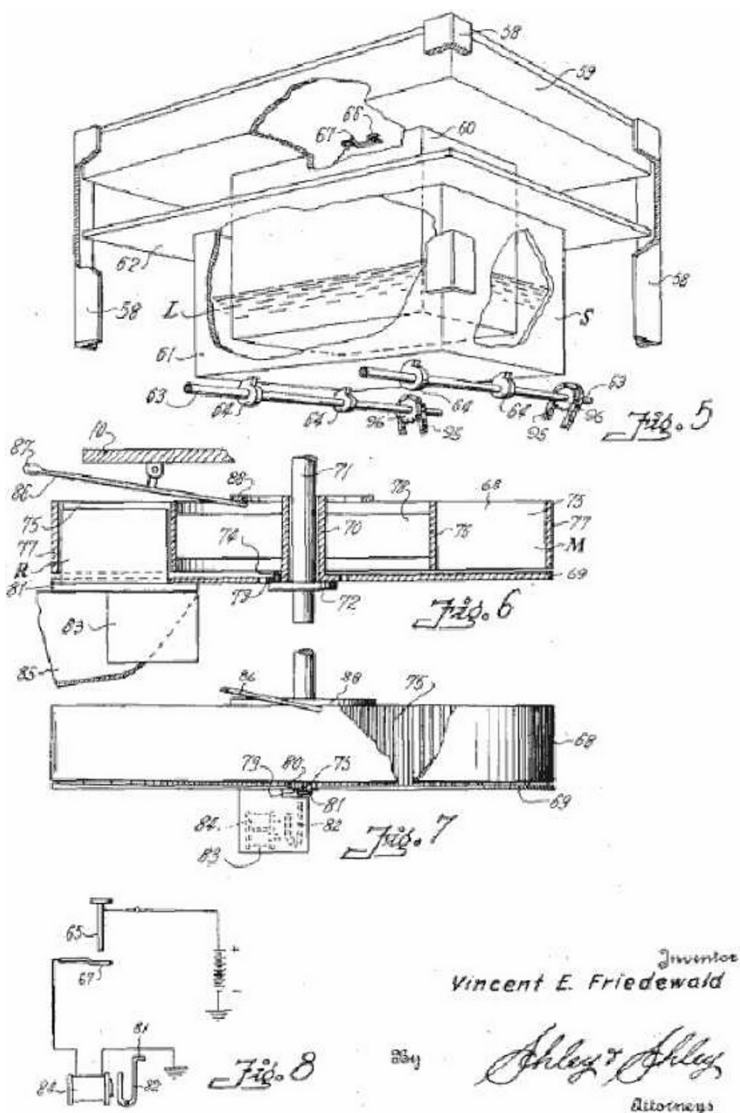


Figure 3. Punch-holed disease plate for card-sorting machine. Note that the disease sample for the patent application is “TULAREMIA AND TULAREMIA PNEUMONIA,” how a Category A weapon of bioterrorism.



Inventor  
 Vincent E. Friedewald

Attorneys  
 Shley & Shley

Figure 4. Punch hole design.

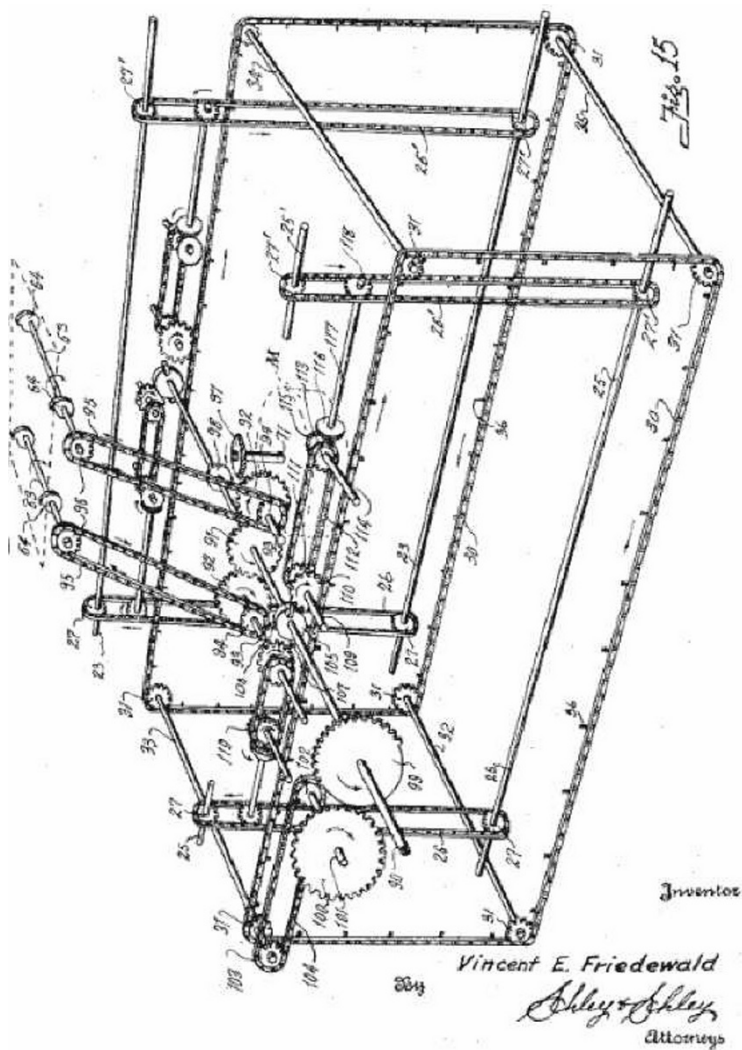


Figure 5. Cog system.

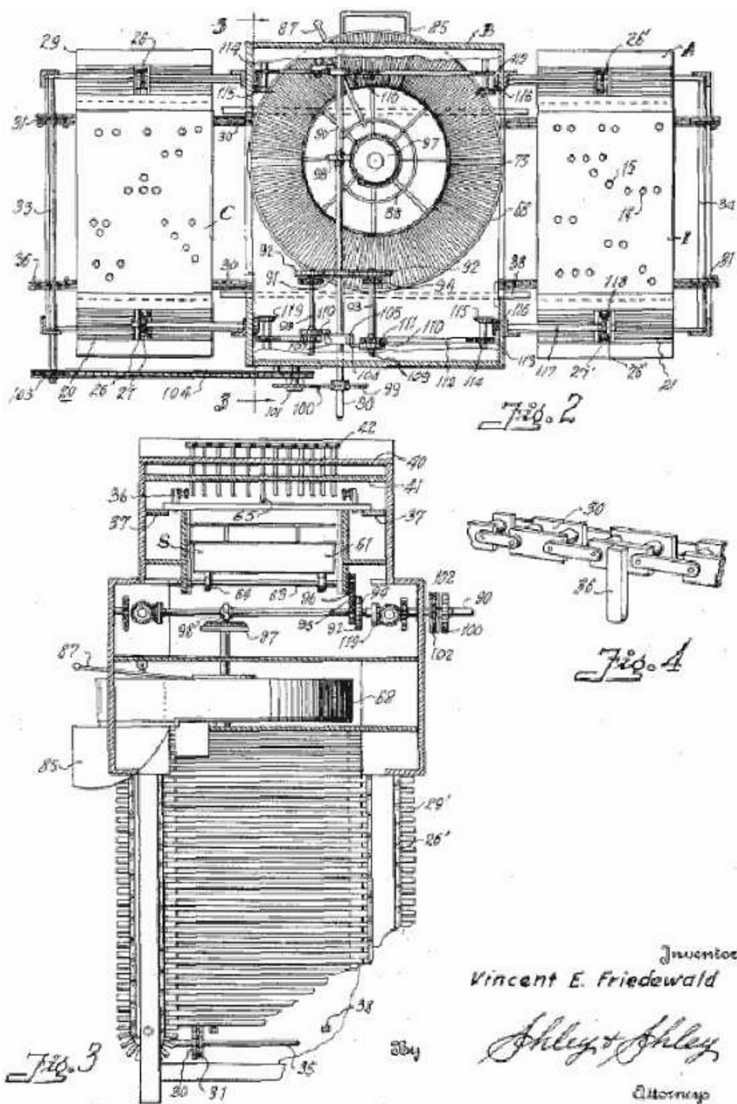


Figure 6. Card-sorting mechanism.

Inventor  
 Vincent E. Friedewald  
*Vincent E. Friedewald*  
 Attorney

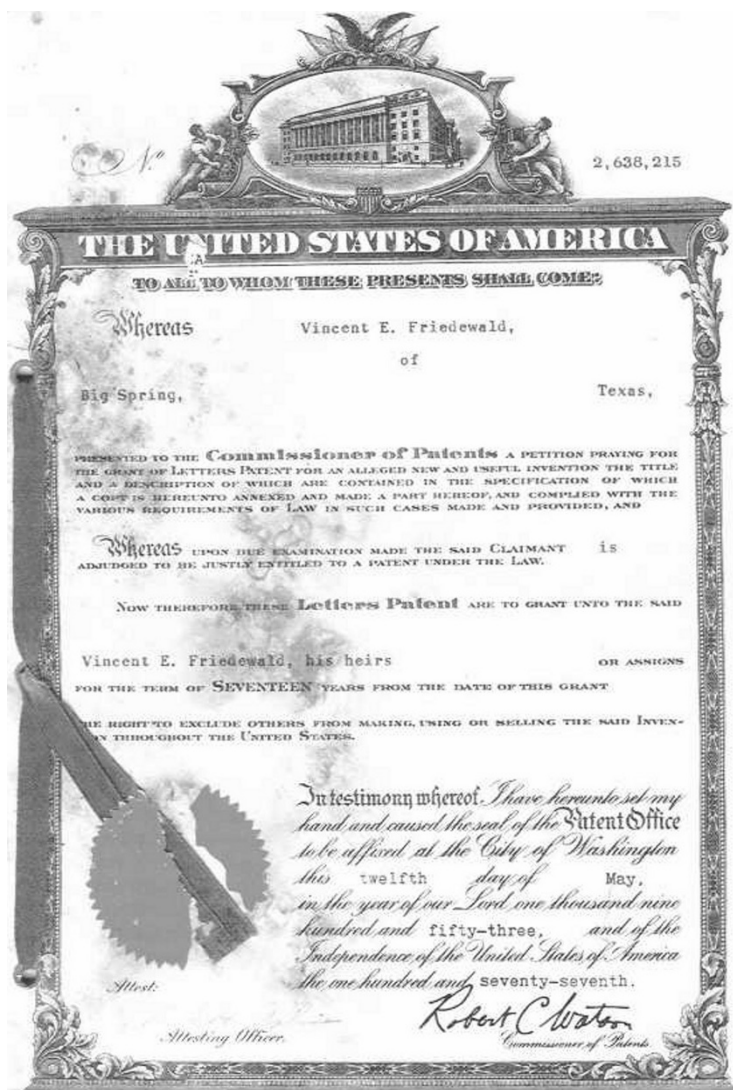


Figure 7. Cover of patent award number 2,638,215 to Dr. Friedewald, Sr, May 12, 1953.



My dad's original machine is now a Web-based software program, *Argus1* – named for the Greek god of surveillance – for point-of-care diagnosis and disease management. The *Clinical Guide to Bioweapons and Chemical Agents* is derived from the Argus1 database, which had its beginning on index cards in 1944 somewhere in a jungle or swamp during a war most of us know only from history books. The *Clinical Guide* is written for healthcare specialists' use in pandemics, select disease outbreaks, and another war we pray will never happen.

*Vincent E. Friedewald*

# Contents

About the Author .....	vii
Foreword by <i>Antonio M. Gotto Jr.</i> .....	ix
Preface .....	xi
Using the <i>Guide</i> .....	xxvii
Limitations of the <i>Guide</i> .....	xxxvii

## Section One

<b>Clinical Guide—Infections</b> .....	<b>1</b>
Anthrax .....	3
Avian Influenza .....	10
Bolivian Hemorrhagic Fever .....	15
Botulism .....	19
Brucellosis .....	25
Campylobacteriosis .....	30
Chickenpox .....	34
Cholera .....	39
<i>Clostridium Perfringens</i> Gastroenteritis .....	43
Crimean – Congo Hemorrhagic Fever .....	46
Cryptosporidiosis .....	51
Dengue .....	55
<i>E Coli</i> 0157:h7 .....	60
Eastern Equine Encephalitis .....	63
Ebola Hemorrhagic Fever .....	67
Epsilon Toxin – <i>Clostridia Perfringens</i> .....	72
Giardiasis .....	75
Glanders .....	79
Hantavirus Pulmonary Syndrome .....	84
Hemorrhagic Fever with Renal Syndrome .....	88
Infectious Hepatitis – Acute .....	92
Infectious Mononucleosis .....	96
Influenza .....	100

Lassa Fever .....	104
Legionellosis .....	109
Leptospirosis .....	114
Listeriosis .....	120
Lyme Disease .....	124
Lymphocytic Choriomeningitis .....	129
Malaria .....	133
Marburg Hemorrhagic Fever .....	138
Melioidosis .....	142
Meningococemia .....	146
Monkeypox .....	151
Mumps .....	155
OMSK Hemorrhagic Fever .....	159
Parvovirus B19 .....	163
Plague .....	167
Psittacosis .....	172
Q Fever .....	177
Rift Valley Fever .....	182
Rocky Mountain Spotted Fever .....	186
Rubella – Acquired .....	191
Rubeola .....	195
Salmonellosis .....	199
SARS .....	203
Shigellosis .....	206
Smallpox .....	210
Staphylococcus Food Poisoning .....	215
Streptococcal Pharyngitis .....	218
Trichinellosis .....	222
Tularemia .....	227
Typhoid Fever .....	232
Typhus – Epidemic .....	237
Typhus – Murine .....	242
Typhus – Scrub .....	246
Venezuelan Equine Encephalitis .....	250
Viral Gastroenteritis .....	254
Viral Rhinitis .....	257
West Nile Fever .....	261
Western Equine Encephalitis .....	266
Yellow Fever .....	270
Yersiniosis .....	274

**Section Two**

<b>Clinical Guide—Poisons</b> .....	<b>279</b>
Ammonia Poisoning .....	281
Arsenic Poisoning .....	285
Arsine Poisoning .....	289
Barium Poisoning .....	293
Benzene Poisoning .....	297
Brevetoxin Poisoning .....	301
Bromine Poisoning .....	304
BZ Poisoning .....	308
Carbon Monoxide Poisoning .....	312
Chlorine Poisoning .....	317
Colchicine Poisoning .....	321
Cyanide Poisoning .....	325
Digitalis Poisoning .....	330
Elemental Mercury Poisoning—Acute .....	334
Ethylene Glycol Poisoning .....	338
Lewisite Poisoning .....	342
Methyl Bromide Poisoning .....	346
Methyl Isocyanate Poisoning .....	350
Nicotine Poisoning .....	354
Opioid Poisoning .....	358
Organophosphate Poisoning .....	362
Osmium Tetroxide Poisoning .....	367
Phosgene Poisoning .....	371
Phosphine Poisoning .....	375
Radiation Poisoning .....	380
Ricin Poisoning .....	384
Riot Control Agents Poisoning .....	388
Sarin Poisoning .....	391
Sodium Monofluoroacetate Poisoning .....	396
Sulfuryl Fluoride Poisoning .....	399
Sulfur Mustard Poisoning .....	403
Super Warfarin Poisoning .....	407
Tabun Poisoning .....	410
Tetrodotoxin Poisoning .....	414
Thallium Poisoning .....	418
Trichothecene Poisoning .....	422
VX Poisoning .....	426

**Section Three****Clinical Guide—Acute Complications . . . . . 431**

Adrenal Failure . . . . .	433
Arthritis . . . . .	435
Congestive Heart Failure . . . . .	437
Corneal Injury . . . . .	440
Dehydration . . . . .	442
Disseminated Intravascular Coagulation . . . . .	444
Guillain – Barré Syndrome . . . . .	446
Hemolytic Anemia . . . . .	449
Hepatic Failure . . . . .	451
Hyperkalemia . . . . .	453
Meningitis/Encephalitis . . . . .	455
Myocarditis . . . . .	458
Noncardiac Pulmonary Edema . . . . .	461
Orchitis . . . . .	463
Osteomyelitis . . . . .	465
Pancreatitis . . . . .	467
Pericarditis . . . . .	469
Pneumonia . . . . .	471
Renal Failure . . . . .	474
Respiratory Failure . . . . .	477
Rhabdomyolysis . . . . .	479
Thrombocytopenia . . . . .	481

**Section Four****Differential Diagnosis by System . . . . . 483**

Cardiovascular . . . . .	485
Coagulation . . . . .	485
Gastrointestinal . . . . .	486
Hematopoietic/Immune . . . . .	487
Liver/Biliary Tract/Pancreas . . . . .	487
Lymphatic . . . . .	488
Musculoskeletal . . . . .	488
Nervous . . . . .	489
Optic . . . . .	490

---

Oropharynx .....	491
Renal/Genitourinary .....	492
Respiratory – Lower .....	492
Respiratory – Upper .....	493
Skin .....	493
<b>Section Five</b>	
<b>Symbols and Abbreviations.....</b>	<b>495</b>
Abbreviations.....	497
Symbols .....	498

# Using the Guide

The *Clinical Guide to Bioweapons and Chemical Agents* is a point-of-care reference for the diagnosis and initial treatment of selected infectious agents and poisons that have been transmitted intentionally (biological, chemical, or radiation terrorism), by accident, or as part of natural public health outbreaks.

The *Guide* format is mainly comprised of key words and phrases, making it usable at the patient point-of-care, where rapid retrieval of information is important. The format throughout is consistent, and the content is targeted at information relevant to patient management in the setting of emergent clinical care.

## The Conditions

There are 3 classes of conditions in the *Guide*:

- Section 1. Infections: conditions listed in the United States Centers for Disease Control (CDC) *Emergency Preparedness and Response: Bioterrorism Agents/Diseases*. In addition, many public health diseases are included that may require differentiation from terrorist biological events, such as Avian Influenza, Chickenpox and West Nile Fever.
- Section 2. Poisons: conditions listed in the United States Centers for Disease Control *Chemical Emergencies*.
- Section 3. Complications: acute, often life-threatening conditions that occur secondary to infections and poisonings. A patient can present for care for the first time with the complication of a condition, which can add to the difficulty in making the primary diagnosis. Only relevant diagnostic information is provided because specific treatment varies according to the primary etiologic agent.

## Sections 1 and 2 – Infections and Poisons

There are 23 sections in each Infection and Poison.

## Weapon

“No” states that the condition has not been labeled as a possible terrorist agent, but may require differentiation from a bioweapon.

### **CDC Bioterrorism Category:** \_

Category A: high-priority agents include organisms that pose a threat to national security because they:

- can be easily disseminated or transmitted from person to person
- result in high mortality rates and have the potential for major public health impact
- might cause public panic and social disruption
- require special action for public health preparedness

Category B: second highest priority agents include those that:

- are moderately easy to disseminate
- result in moderate morbidity rates and low mortality rates
- require specific enhancements of CDC’s diagnostic capacity and enhanced disease surveillance

Category C: emerging pathogens that could be engineered for mass dissemination in the future because of:

- availability
- ease of production and dissemination
- potential for high morbidity and mortality rates and major public health impact

### **CDC Hazardous Chemical Category:** \_

Designation of hazardous chemicals that may be used as terrorist weapons:

- Biotoxins
- Blister agents/vesicants
- Blood agents
- Choking/lung/pulmonary agents



- Incapacitating agents
- Long-acting anticoagulants
- Metals
- Nerve agents
- Organic solvents
- Radiation
- Toxic alcohols

**Alternate Names:** other names, which differ among geographical areas sometimes confusing disease identification and reporting.

Example (Bolivian Hemorrhagic Fever):

Black typhus

Machupo virus

South American hemorrhagic fever

**Etiology:** the infectious or chemical agent. When known and relevant to clinical understanding, a brief description of the disease process is also described.

Example (Anthrax):

*Bacillus anthracis*

Spores germinate to bacillary form, multiply in macrophages, release toxins causing edema, hemorrhage, and tissue necrosis; tissue damage caused by release of toxins – protective antigen, lethal toxin, edema toxin

## **Transmission**

“Source”: natural or military origins of the agent.

“Entry”: means of agent entry into the body (inhalation, ingestion, contact, bite, injection).

“Human-to-Human”: whether transmission of the condition can occur directly from one human to another human (“Yes” or “No”) without an intervening vector.

Example (Q Fever):

Source:	Infected dust and other materials from many animals, including sheep, cattle, goats, rodents, ticks
Entry:	Contact Inhalation
Human-to-Human:	Rare

**Predisposing/Comorbid Conditions:** preexisting diseases and other factors that increase the likelihood of contracting the condition and/or may cause a more serious clinical course.

Example (Influenza):

- Chronic obstructive pulmonary disease
- Heart disease
- Third-trimester pregnancy

## Demographics

“Locations”: where the condition naturally occurs. “Global” means all geographical areas are vulnerable.

“Populations”: persons especially prone to contract the condition with accidental (poisons) or natural (infections) transmission. “All” means that all population groups are vulnerable.

“Calendar”: time of year the condition naturally exists or peaks. “Year-round” means there is no predilection for time of natural occurrence.

Example (Rift Valley Fever):

Location:	Africa, Arabian peninsula
Populations:	Livestock workers, veterinarians, anyone exposed to mosquitoes in endemic area
Calendar:	Year-round

**Systems:** body anatomical or physiological systems *mainly* affected by the condition. Most conditions of the severity used in terrorist attacks, however, affect multiple systems, and the systems listed *should not be regarded as restrictive*; rather, these lists should be used *only* as general guides to aid in rapid diagnosis.

Example (Ebola Hemorrhagic Fever):

Coagulation  
Gastrointestinal  
Nervous  
Optic  
Skin

**Incubation (Infections) or Time to Clinical Onset (Poisons):** usual time interval from exposure to the infection or chemical until the *first* onset of symptoms.

Example (Lassa Fever):

1-3 WEEKS

**Signs/Symptoms:** physical findings (signs) and complaints (symptoms). The anatomical or physiological part of the body is to the left of the hyphen and the abnormality is to the right of the hyphen.

Example: “Chest, ant – pain, pleuritic”

Medical terms for abnormalities are in parentheses.

Example: “Eyes, pupils – dilation (mydriasis)”

**Differentiation:** select conditions that are clinically similar. *This list is not intended to be complete*, and varies with time of year, geographic location, and other concurrent diseases in the community.

Example (Tularemia):

*Includes, but not limited to:*

Atypical pneumonia  
Bacterial pneumonia  
Influenza  
Other causes of infectious  
    lymphadenopathy and  
    dermatopathy  
Q fever

**Complications:** conditions that may occur secondarily. Diagnostic features of some complications are described in the chapter, “Complications”. *This list is not intended to be complete.*

Example (Cholera):

*Include, but not limited to:*

- Hypoglycemia
- Hypovolemic shock
- Metabolic acidosis
- Noncardiac pulmonary edema
- Pneumonia
- Renal failure
- Sepsis
- Spontaneous abortion

**Laboratory:** tests that *may* be abnormal and are usually performed in clinical laboratories or available from specialized laboratories. The test sample and item measured is to the left of the hyphen, the abnormality on the right of the hyphen, and the medical term is in parenthesis. Test results greatly vary among patients, and interpretation must be made only in the overall clinical context of each case.

Example: “Blood WBC – increased (leukocytosis)”

**ECG:** electrocardiographic abnormalities, if any.

Example: “ST segment – depressed”

**Imaging:** abnormalities that may be detected by radiography, magnetic resonance imaging, computed tomography, ultra-sound, or other imaging modalities.

Example: Lungs, parenchyma – nodule, solitary

**Other Tests:** specialized tests performed when a specific diagnosis is considered.

Example: Liver biopsy – granulomas, inflammation

**Treatment – Nonpharmacologic:** non-drug therapies. Details such as frequency and duration are variable and are beyond the scope of

the *Guide*. Readers should refer to current treatment guidelines and to the *Clinical Guide* Web site for links to specific conditions.

Example (Dengue):

- Fluids and electrolytes
- Fresh plasma
- Oxygen
- Plasma expanders

**Treatment – Pharmacologic:** generic drug therapies. Details such as frequency and duration are variable and are beyond the scope of the *Guide*. Readers should refer to current treatment guidelines and to the *Clinical Guide* Web site for links to specific conditions.

Example (Q Fever):

- Antibiotics
  - Chloramphenicol
  - Quinolones
  - Rifampin
  - Tetracycline

**Treatment – Surgical/Invasive:** treatments using invasive procedures.

Example (Radiation Poisoning):

- Bone marrow transplant
- Burn care

**Precautions:** select strategies to protect first-responders and other caregivers, who should refer to current guidelines for further details, as this list is not all-inclusive.

Example (Phosgene Poisoning):

- Protective clothing: yes
- Site decontamination: yes
- Other: SCBA

**Primary Prevention:** select strategies for prevention in vulnerable populations. Readers should refer to current guidelines for additional strategies, as this list is not all-inclusive.

Example (Plague):

- Vaccine: yes
- Animal reservoir control
- Environmental control
- Post-exposure antibiotic prophylaxis
- Avoid travel to endemic/epidemic areas or take appropriate precautions when doing so

**Course:** usual patient outcomes, with and without treatment, and mortality.

Example (Anthrax):

*Untreated*

- Cutaneous – 20% fatal
- Gastrointestinal – 25–60% fatal
- Inhalational – 100% fatal

*Treated*

- Cutaneous – mortality
- Gastrointestinal – unknown
- Inhalational – 60% cured in post 9-11 cases, but much higher mortality in prior series of natural outbreaks

**Notes:** bracketed numbers in all sections are referenced here, with additional information about specific items that may be useful in diagnosis and treatment.

Example (Smallpox):

- [14] May occur on palms and soles, which is unusual in chickenpox

▲ This symbol denotes a special threat to patients, emergency responders, laboratory personnel, or caregivers.

☠ This symbol denotes an item relating to mortality.

## Updates

A Web address (URL) unique to each condition is displayed. Readers are encouraged to go to this Web site to view timely updates on conditions in the *Guide*.

Example: (Lassa Fever)

“<http://www.argusl.com/?lassa>”

The general directory site is “<http://www.argusl.com/?home>”

### Section 3—Acute Complications

This section provides signs and symbols of selected complications of the conditions in Sections 1 and 2, and key tests that may aid in their diagnoses.

# Limitations of the *Guide*

1. Reporting methodologies vary and some entities have been much better studied than others. Thus, the clinical findings of some conditions in the *Guide* are likely incomplete.
2. Many of the conditions are rarely – if ever – seen outside of relatively small geographic areas among restricted populations. Exactly how these conditions would be clinically manifest if they occurred in other larger and distant populations with different genetic codes, diets, and environments is speculative.
3. Agents disseminated as weapons might present unique diagnostic and treatment challenges from the same naturally-transmitted conditions. (For example, the anthrax event in the USA in 2001 involved a child < 1 year of age, the first such reported infection in that age group)
4. There are probably more – yet to be identified – infections and poisonings that could be used as terrorist weapons than are in the *Guide*.



# Anthrax

## Weapon

CDC Bioterrorism Category: A

## Alternate Names [20]

Cutaneous anthrax [C]

Gastrointestinal anthrax [G]

Inhalational anthrax [I]

Woolsorter's disease [I]

## Etiology

*Bacillus anthracis* [6]

Spores germinate to bacillary form, multiply in macrophages, release toxins causing edema, hemorrhage, and tissue necrosis; tissue damage caused by release of toxins – protective antigen, lethal toxin, edema toxin [29]

## Transmission

Source: Spores from infected animals, esp cattle and sheep

Entry: Contact [C]  
Inhalation [I]  
Ingestion [G]

Human-to-Human: No

## Predisposing/Comorbid Conditions

Open skin lesion [C]

Lung disease [I]

## Demographics

Location: Global

Populations: All [31]

Calendar: Year-round

## Systems

Gastrointestinal  
Lymphatic  
Musculoskeletal  
Nervous  
Oropharynx  
Respiratory – lower  
Skin

## Incubation

Cutaneous: 1-12 days  
Gastrointestinal: Indeterminate  
Inhalation: 1-60 days

## Signs/Symptoms [17, 24]

Abdomen, RLQ – mass [34]  
Abdomen – fluid (ascites) [G]  
Abdomen – pain [1]  
Appetite – reduced (anorexia)  
Bowel movements – blood or black (melena) [G]  
Bowel movements – diarrhea [G]  
Breathing – difficult, rest (rest dyspnea) [I]  
Breathing – rapid (tachypnea) [I]  
Breath sounds, basilar – decreased  
Breath sounds – crackling (rales) [I]  
Chest, ant – pain, pleuritic [1]  
Chest, local – percussion dullness [I]  
Chest – pain, pleuritic [1]  
Chills  
Cough – nonproductive [I]  
Cough – productive [16]  
Extremities, upper unilat – edema [21]  
Face – edema [C] [14]  
Fatigue  
Head – pain (headache)  
Heart rate – rapid (tachycardia) [15]  
Joints – pain (arthralgia)  
Lymph nodes, regional – enlarged [2]  
Lymph nodes, gen – enlarged  
Mentation – confusion

Mentation – weakness (malaise)  
Mood – lethargy  
Mouth, mucosa – edema [G]  
Mouth – ulcers [G]  
Muscles – pain (myalgia)  
Muscles – weak  
Nausea  
Neck, post – stiff (meningismus)  
Nose – drainage (rhinorrhea, coryza) [23]  
Skin, single lesion – draining [C]  
Skin, single lesion – edematous [C] [12, 13]  
Skin, single lesion – red (erythematous) [C]  
Skin, single lesion – itching, burning [C] [11]  
Skin, single lesion – macule/papule [C] [8]  
Skin, single lesion – necrosis [C] [3]  
Skin, single lesion – ulcer [C]  
Skin, single lesion – vesicle [C]  
Skin color, local – red (erythema) [C]  
Speech, voice – hoarse [G]  
Swallowing – difficult (dysphagia) [G]  
Sweating – night  
Sweating – increased (hyperhidrosis)  
Temperature, body – elevated (fever) [22]  
Throat – edema [G]  
Throat – sore  
Tongue – ulcers [G]  
Vomiting  
Vomiting – blood (hematemesis) [G]

## Differentiation

*Includes, but not limited to:*

Brown recluse spider bite  
Cat-scratch disease  
Cellulitis  
Congestive heart failure [19]  
Cowpox  
Cutaneous diphtheria  
Influenza  
Orf

Plague  
Rickettsial infection  
Staphylococcal disease  
Tularemia  
Upper respiratory infection

### Complications

*Include, but not limited to:*

Atrial fibrillation [23]  
Hemorrhagic meningitis  
Hemorrhagic necrotizing mediastinitis [I] [7]  
Hyperkalemia  
Hypocalcemia  
Hypoglycemia  
Microangiopathic hemolytic anemia [21]  
Respiratory failure [I]  
Subarachnoid hemorrhage  
Shock

### Laboratory [32] ▲

Blood arterial pH – decreased (acidosis)  
Blood arterial pO<sub>2</sub> – decreased (hypoxia)  
Blood bacterial culture – positive  
Blood bacterial stain – positive  
Blood creatinine – increased  
Blood immunoabsorbent assay – positive  
Blood liver enzymes – increased  
Blood sodium – decreased  
Blood serum creatinine, total – increased  
Blood WBC – left shift  
Blood WBC total – increased (leukocytosis) [28]  
CSF bacterial culture – positive  
CSF bacterial stain – positive  
CSF – blood  
CSF RBC – increased  
Pleural fluid, bacterial culture – positive  
Pleural fluid, bacterial stain – positive  
Pleural fluid – blood  
Skin lesion, bacterial culture – positive  
Skin lesion, bacterial stain – positive

Sputum bacterial culture – positive  
Sputum bacterial stain – positive

## ECG

Abnormalities – NS  
Voltage, gen – decreased [33]

## Imaging [I] [18, 25]

Heart, pericardium – fluid  
Hilar adenopathy – bilateral  
Lungs, hilar lymph nodes – enlarged  
Lungs, parenchyma – consolidation  
Lungs, parenchyma – infiltrates  
Lungs, peribronchi – thickened  
Lungs, pleura – fluid  
Mediastinum – enlarged [10]

## Other Tests

Skin lesion punch biopsy [C] [26]  
Thoracentesis – hemorrhagic pleural effusion [I]

## Treatment – Nonpharmacologic

Fluids and electrolytes  
Ventilation

## Treatment – Pharmacologic

Antibiotics [27]  
Chloramphenicol  
Doxycycline  
Erythromycin  
Fluroquinolones  
Penicillin

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions [32] ▲

Airborne  
Protective clothing [5]  
Site decontamination

Spore contact ▲  
Standard

## Primary Prevention

Vaccine: yes [4]  
Postexposure prophylaxis  
Ciprofloxacin  
Doxycycline  
Standard  
Transmission barriers [32] ▲

## Course

### Untreated

Cutaneous – 20% fatal ☠  
Gastrointestinal – 25–60% fatal ☠  
Inhalational – 100% fatal ☠

### Treated [9]

Cutaneous – mortality <10%  
Gastrointestinal – unknown  
Inhalational – 60% cured in post 9-11 cases, but much higher mortality in prior series of natural outbreaks

## Notes

- [1] May resemble acute abdomen
- [2] Tender
- [3] Depressed, painless black eschar
- [4] 2 doses AVA vaccine effective for aerosol exposure
- [5] Mask: US military m17 & m40 protect against 1-5 um particles
- [6] Large aerobic, gram-positive sporulating rod
- [7] Necropsy finding, virtually diagnostic of anthrax
- [8] Esp face, arms, hands
- [9] Variable depending on when therapy started
- [10] Due to hyperdense, enlarged mediastinal adenopathy and diffuse mediastinal edema
- [11] May resemble mosquito bite
- [12] Gelatinous, nonpitting
- [13] May be pronounced on face
- [14] Skin lesion may be small or absent
- [15] May be disproportionate to fever or symptoms

- [16] Not typical, but reported with blood-tinged sputum in 2001 USA outbreak
- [17] Based on 2001 USA outbreak, clinical presentation of intentional infection may vary from classical descriptions
- [18] Noncontrast CT may be more useful than contrast CT to detect hyperdense adenopathy
- [19] Initial treatment of case reported in 2001 USA outbreak
- [20] “Anthrax” derived from greek *anthrakos* for “coal,” in reference to black eschar typical of cutaneous form
- [21] Reported in infant in 2001 USA outbreak
- [22] May be minimal, as in some cases in 2001
- [23] Uncommon, reported in 1 case of inhalational form in 2001
- [24] Includes signs/symptoms of inhalational form in 2001
- [25] Some form of abnormality present in 10/10 inhalational forms in 2001; pleural effusion most common (8/10)
- [26] Obtain prior to antibiotic when possible
- [27] Antibiotics that show in vitro effectiveness and may be considered if for any reason penicillin, fluoroquinolones, or tetracyclines cannot be used, or for augmentation, include: chloramphenicol, clindamycin, extended-spectrum penicillins, macrolides, aminoglycosides, vancomycin, cefazolin, other first-generation cephalosporins
- [28] May be normal
- [29] Active infection occurs with toxin release from bacillary form
- [30] Within envelopes delivered by mail
- [31] Reported childhood cases rare
- [32] BSL-3 standards ▲
- [33] When pericardial effusion present
- [34] Due to mesenteric adenopathy

<http://www.argus1.com/?anthrax>

## Updates

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# Avian Influenza

## Weapon

No

## Alternate Names

Bird flu

## Etiology

Influenza virus A subtype H5N1

Intracellular viral replication in upper and lower respiratory tract within 24 hours after infection; present in secretions for 3-5 days; edema and hyperemia of upper and lower respiratory cells, esp bronchial epithelial cells, with loss of cilia; extends to alveolar cells in pneumonia

## Transmission

Source: Birds – wild and domestic  
Entry: Inhalation  
Human-to-Human: Rare [5] ▲

## Predisposing/Comorbid Conditions

NA

## Demographics [5]

Location: Influenza A H5N1 infections in Republic of Korea, Vietnam, Japan, Tapei China, Thailand, Cambodia, Hong Kong, Laos, Indonesia, People's Republic of China; other types reported in past in Virginia (H5N2 Shenandoah Valley, 2002; H7N7 Netherlands, 2003; H7N3, Canada, 2004)

Populations: All, esp persons exposed to poultry [4]

Calendar: Year-round



## Systems

Gastrointestinal  
Musculoskeletal  
Optic  
Oropharynx  
Respiratory – lower  
Respiratory – upper

## Incubation

Up to 10 days

## Signs/Symptoms [2]

Abdomen – pain  
Appetite – reduced (anorexia)  
Bowel movements – diarrhea  
Chest, ant – pain, pleuritic  
Chills  
Cough – nonproductive  
Cough – productive  
Dizziness (lightheaded)  
Eyes, conjunctivae – injected  
Eyes, motion – painful  
Eyes, tears (lacrimation) – excess  
Eyes, vision – light sensitivity, increased (photophobia)  
Face, parotid glands – enlarged  
Fatigue  
Head – pain (headache)  
Joints – pain (arthralgia)  
Lymph nodes, ant cervical – enlarged  
Mentation – weakness (malaise)  
Muscles – pain (myalgia)  
Muscles – stiffness  
Muscles – tender  
Nausea  
Nose, mucosa – inflamed  
Nose – congested  
Nose – drainage (rhinorrhea, coryza)  
Temperature, body – elevated (fever)  
Throat – dry  
Throat – injected

Throat – sore  
Voice – hoarse  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Numerous other viral and bacterial infectious diseases with malaise, headache, fever, myalgia, sore throat, early in course.

### **Complications [2]**

*Include, but not limited to:*

Encephalopathy/encephalitis  
Guillain-Barré syndrome  
Myelitis  
Myocarditis  
Myositis  
Pericarditis  
Pneumonia – bacterial  
Pneumonia – viral  
Reye’s syndrome  
Rhabdomyolysis  
Toxic shock syndrome

### **Laboratory [1] ▲**

Blood lymphocytes – decreased (lymphopenia)

### **ECG**

NA in absence of myocarditis, pericarditis, or other complications [2]

### **Imaging**

NA in absence of pulmonary or other complications [2]

### **Other Tests**

NA in absence of complications [2]

### **Treatment – Nonpharmacologic**

Fluids and electrolytes

## Treatment – Pharmacologic

Antivirals [3]

Symptomatic [6] ▲

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

See [1] ▲

## Primary Prevention

Avoidance/control of infected animals and secretions

## Course

Variable

More severe in elderly and persons with preexisting conditions

Often fatal ☠ [5]

## Notes

- [1] CDC: “Highly pathogenic avian influenza A (H5N1) is classified as a select agent and must be worked with under BSL 3+ laboratory conditions. This includes controlled access double door entry with change room and shower, use of respirators, decontamination of all wastes, and showering out of all personnel. Laboratories working on these viruses must be certified by the US Department of Agriculture. The same BSL 3+ laboratory guidelines are recommended for conducting virus isolation for SARS-CoV. CDC does not recommend that virus isolation studies on respiratory specimens from patients who meet the above criteria be conducted unless stringent BSL 3+ conditions can be met. Therefore, respiratory virus cultures should not be performed in most clinical laboratories and such cultures should not be ordered for patients suspected of having H5N1 infection.” ▲
- [2] Mainly based on data derived from common influenza, but case reports to date indicate that respiratory involvement may be more prominent in Avian influenza
- [3] Uncertain, variable efficacy; consult current guidelines
- [4] Contact with wild birds, ducks, chickens, turkeys, or (unproven) infected humans
- [5] To publication date ▲
- [6] Avoid aspirin and aspirin-containing products for febrile infections in children <19 yrs due to association with Reye’s syndrome



# Bolivian Hemorrhagic Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

Black typhus  
Machupo virus  
South American hemorrhagic fever

## Etiology

Machupo virus [5]

## Transmission

Source: Rodents, esp vesper mouse  
Entry: Inhalation  
Contact  
Human-to-Human: Yes (uncommon)

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Bolivia  
Populations: All  
Calendar: Year-round, peak April-July

## Systems

Circulatory  
Coagulation  
Nervous

## Incubation

7-16 days

## Signs/Symptoms [4]

- Abdomen – pain
- Appetite – reduced (anorexia)
- Arterial press – low
- Back – pain [3]
- Bowel movements, stool – blood or black (hematochezia) (melena)
- Bowel movements – constipation
- Dizziness (lightheaded)
- Eyes, retroorbital – pain
- Eyes, vision – light sensitivity, increased (photophobia)
- Face – flushed
- Head – pain (headache)
- Heart rate – slow (bradycardia)
- Mentation – weakness (malaise)
- Mouth, mucosa – petechiae
- Muscles – pain (myalgia)
- Muscles – tremors, intention
- Nausea
- Nose – blood (epistaxis) [1]
- Skin, upper body – flushed, erythematous
- Skin – rash, petechiae [2]
- Temperature, body – elevated (fever)
- Tendon reflexes, gen – reduced or absent
- Throat – red, injected
- Urine – blood (hematuria)
- Vomiting
- Vomiting – blood (hematemesis) [1]

## Differentiation

*Includes, but not limited to:*

- Lassa fever
- Lymphocytic choriomeningitis
- Other causes of encephalitis
- Other viral hemorrhagic fevers

## Complications

- Shock

**Laboratory [6] ▲**

- Blood culture – positive
- Blood IgM enzyme assay – positive
- Blood platelets – decreased (thrombocytopenia)
- Blood WBC – decreased (leukopenia)
- Urine – casts, cellular
- Urine protein – present (proteinuria)
- Urine RBC – present (hematuria, microhematuria)

**ECG**

- NA in absence of complications

**Imaging**

- NA in absence of complications

**Other Tests**

- NA in absence of complications

**Treatment – Nonpharmacologic**

- Fluids and electrolytes

**Treatment – Pharmacologic**

- Immune plasma
- Ribavirin

**Treatment – Surgical/Invasive**

- NA

**Precautions**

- Standard

**Primary Prevention**

- Vaccine: no
- Rodent control

**Course**

- Mortality 15-30% ☠





# Botulism

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

Foodborne botulism (F)

Infant botulism

Intestinal botulism (I)

Wound botulism (W)

## Etiology

Toxin of *clostridium botulinum* [9]

Disseminates from initial body site via blood and lymphatics to nerve terminals, blocking release of acetylcholine at neuromuscular junctions, ganglionic nerve endings, and postganglionic parasympathetic and sympathetic nerve endings

## Transmission

Sources [21]: (I) Toxins produced in large intestine following ingestion of spore-contaminated food or soil  
(F) Ingestion of food contaminated with preformed toxin [20]  
(W) Toxins formed in wounds under anaerobic conditions

Entry: Ingestion  
Contact

Human-to-Human: No

## Predisposing/Comorbid Conditions [18]

Abscess [26]

Altered GI flora

Illicit IV and subcutaneous drug use

Post-surgery  
Wounds

## Demographics

Populations: All  
Locations: Global  
Calendar: Year-round

## Systems [17]

Gastrointestinal  
Nervous  
Optic

## Incubation

Hours

## Signs/Symptoms [11, 23, 25]

Abdomen – distention  
Abdomen – pain [1, 2]  
Appearance, gen – “floppy”  
Bladder, urinary – distention  
Bowel movements – constipation [2, 24] ▲  
Bowel movements – diarrhea [13]  
Bowel sounds – decreased/absent (ileus, adynamic)  
Breathing, rest – difficult (rest dyspnea)  
Breathing – irregular  
Cranial nerve III – palsy  
Cranial nerve IV – palsy  
Cranial nerve VI – palsy  
Dizziness (lightheadedness)  
Extremities – pain, shooting (paresthesias)  
Eyes, gaze – paralysis  
Eyes, lids – drooping (ptosis) [6]  
Eyes, motion – jerky (nystagmus) [6]  
Eyes, motion – wandering (strabismus) [6]  
Eyes, pupil reaction – sluggish [6]  
Eyes, pupils – dilation (mydriasis) [6]  
Eyes, vision – blurred  
Eyes, vision – double (diplopia)  
Face, muscles bilat – weak/paralyzed [6]

Mentation – conscious  
Mentation – fatigue  
Gait – ataxic  
Head – pain (headache)  
Heart rate – slow (bradycardia) [12]  
Mood – anxious  
Mood – lethargic  
Mouth – dry (xerostomia)  
Muscles, tone – decreased (hypotonia) [6]  
Muscles – paralysis [3, 6]  
Muscles – weak [6]  
Nausea  
Neck, muscle control – decreased/absent  
Speech, voice – changed (dysphonia)  
Speech – disturbed (dysphasia)  
Speech – inarticulate (dysarthria)  
Swallowing – difficult (dysphagia)  
Temperature, body – normal [8]  
Tendon reflexes – decreased/absent [6]  
Throat, gag reflex – absent  
Throat – injected  
Throat – sore  
Tongue – enlarged (macroglossia)  
Tongue – weakness  
Vomiting

### **Differentiation [22] ▲**

*Includes, but not limited to:*

Acute abdomen  
Anticholinergic poisoning  
Carbon monoxide poisoning  
Chemical/drug poisoning [14]  
Diphtheria  
Food poisoning [15]  
Guillain-Barré syndrome [5] ▲  
Lambert-Eaton myasthenic-myotonic syndrome  
Myasthenia gravis  
Organophosphate poisoning  
Poliomyelitis  
Stroke

Tetanus  
Tick paralysis

### **Complications**

*Include, but not limited to:*

Pneumonia  
Respiratory failure

### **Laboratory [16]**

Blood toxin – positive [7]  
Gastric aspirate toxin – positive [F] [7]  
Stool toxin – positive [7]  
Wound culture – positive [W]  
Wound toxin – positive [W] [7]

### **ECG**

Rate – slow (sinus bradycardia) [12]

### **Imaging**

NA in absence of complications

### **Other Tests**

Continuous cardiac and respiratory monitoring with suspected diagnosis  
EMG – characteristic low amplitude pattern in affected muscles  
Rapid detection environmental tests

### **Treatment – Nonpharmacologic**

Fluids and electrolytes  
Gastric and colonic lavage [F]  
Respiratory support

### **Treatment – Pharmacologic [27]**

Antitoxin [28]  
Guanidine

### **Treatment – Surgical/Invasive**

NA in absence of complications

## Precautions

Standard

## Primary Prevention

Vaccine: yes

Do not feed honey to infants under 1 year ▲

Proper food preparation and preservation

## Course

Variable

Treated mortality <5%

Untreated often fatal ☠

## Notes

- [1] Cramping
- [2] May be severe
- [3] Descending, flaccid
- [4] Reduced amplitude evoked potentials; increased amplitude with rapid repetitive nerve stimulation
- [5] Most common misdiagnosis ▲
- [6] Neurologic abnormalities symmetrical
- [7] Obtain before giving antitoxin
- [8] Differentiation from many other infections
- [9] Spore-forming anaerobe with 7 toxins (A-G)
- [10] Esp honey and home-canned foods
- [11] Onset varies according to type
- [12] Rate may be normal
- [13] Occurs early in course
- [14] Carbon monoxide, barium carbonate, methyl chloride, methyl alcohol, organic phosphate compounds, atropine, aminoglycosides, neomycin, streptomycin, kanamycin, gentamicin
- [15] Many other forms, i.e., salmonellosis, *clostridium perfringens*, staphylococci, etc
- [16] Most tests to exclude other etiologies
- [17] Toxin absorbed through skin wound or intestinal or lung mucosa and carried via blood to neuromuscular junctions, blocking acetylcholine release beginning in bulbar musculature
- [18] Intestinal form usually occurs in infants or adults with prior GI disease



# Brucellosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Cyprus fever  
Gibraltar fever  
Malta fever  
Mediterranean fever  
Rock fever  
Undulant fever

## Etiology

*B mellitensis* (most cases)  
*B abortus*  
*B suis*  
*B canis*

Phagocytized, multiply and spread in lymphatics within WBCs and macrophages to regional lymph nodes, then into bloodstream in systemic acute infection; chronic reaction to form granulomas, esp in liver, spleen and other reticuloendothelial tissue, with fibrosis and calcification after healing.

## Transmission

Sources:	Cattle, goats, dogs, pigs, sheep, deer, horses, camels, moose, rabbits, chickens, infected human milk
Entry:	Ingestion [7] Contact Inhalation Organ transplantation
Human-to-Human:	Rare except breast feeding

## Predisposing/Comorbid Conditions

Skin abrasion

## Demographic

- Populations: All, esp occupations in contact with infected animals, such as butchers and veterinarians
- Location: Global
- Calendar: Year-round

## Systems

- Gastrointestinal
- Liver/biliary tract/pancreas
- Lymphatic
- Musculoskeletal
- Nervous

## Incubation

- 5-60 days

## Signs/Symptoms [2]

- Abdomen – pain
- Appetite – reduced (anorexia)
- Back, cervical – pain
- Back, lumbar – pain
- Bowel movements – constipation [4]
- Bowel movements – diarrhea [3]
- Chills
- Head – pain (headache)
- Joints – pain (arthralgia)
- Liver – enlarged (hepatomegaly)
- Lymph nodes – enlarged
- Mentation – fatigue
- Mentation – feeling of weakness (malaise)
- Mood – depressed
- Mood – labile
- Mood – restless/irritable
- Muscles – pain (myalgia)
- Sleep – disturbed (insomnia)
- Spleen – enlarged (splenomegaly)
- Sweating – increased (hyperhidrosis)
- Temperature, body – elevated (fever) [8]
- Weight – loss



## Differentiation

*Includes, but not limited to:*

- Chronic fatigue syndrome [5]
- Influenza
- Other causes of systemic infection

## Complications [9]

*Include, but not limited to:*

- Anemia
- Arthritis
- Bleeding
- Chronic brucellosis
- Endocarditis [1]
- Epididymo-orchitis
- Episcleritis
- Genitourinary infection
- Hepatitis
- Leukopenia
- Meningoencephalitis
- Myelitis
- Neuropathy
- Osteomyelitis
- Papilledema
- Prostate infection
- Pulmonary infection
- Radiculitis
- Splenic abscess
- Thrombocytopenia
- Uveitis

## Laboratory [6] ▲

- Blood culture – positive
- Blood Hgb, Hct – decreased (anemia)
- Blood IgG antibodies – increased
- Blood liver enzymes – increased
- Blood platelets – decreased (thrombocytopenia)
- Blood WBC – decreased (leukopenia)
- Bone marrow culture – positive
- CSF culture – positive

Tissue biopsy culture – positive  
Urine culture – positive

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

NS

### **Treatment – Pharmacologic**

Combined doxycycline and rifampin, streptomycin, or gentamycin

### **Treatment – Surgical/Invasive**

Abscess drainage

NA except for complication, esp abscess drainage, splenectomy

### **Precautions**

Careful handling of all specimens [6] ▲

### **Primary Prevention**

Vaccine: no

Animal immunization

Pasteurization

### **Course**

Full recovery usual in 2-3 weeks

Rarely fatal [1]

### **Notes**

- [1] Endocarditis is most common cause of death ☠
- [2] Typically there may be many symptoms, but few physical signs
- [3] At onset only, with constipation predominant thereafter



# Campylobacteriosis

## Weapon

No

## Alternate Names

*Campylobacter enteritis*

## Etiology

*Campylobacter jejuni* [1]

## Transmission

Source: Contaminated food (esp poultry), water, animals (esp cats, puppies)

Entry: Ingestion

Human-to-Human: Rare

## Predisposing/Comorbid Conditions

More severe in immune compromise

## Demographic

Location: Global

Populations: All, esp infants and young adults  
Males>females

Calendar: Summer>winter

## Systems

Gastrointestinal

## Incubation

2-5 days

## Signs/Symptoms

Abdomen – cramps

Abdomen – pain [3]  
Abdomen – tenderness  
Bowel movements, stool – blood or black (hematochezia)  
(melena)  
Bowel movements, stool – mucoid  
Bowel movements – diarrhea  
Head – pain (headache) [2]  
Muscles – pain (myalgia) [2]  
Nausea  
Temperature, body – elevated (fever) [2]  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Appendicitis  
Gastroenteritis – other causes  
Pancreatitis

### **Complications**

*Include, but not limited to:*

Arthritis [5]  
Dehydration  
Endocarditis [4] [5]  
Guillain-Barré syndrome [5]  
Meningitis [5]  
Sepsis with secondary infection of gallbladder, pancreas, bone  
[5]  
Toxic megacolon

### **Laboratory**

Stool blood – positive  
Stool culture – positive  
Stool direct identification of bacteria  
Stool mucus – increased  
Stool WBC – increased

### **ECG**

NS in absence of complications

### **Imaging**

NS in absence of complications

**Other Tests**

NS in absence of complications

**Treatment – Nonpharmacologic**

Fluids and electrolytes

**Treatment – Pharmacologic [6]**

Antibiotics

Aminoglycoside

Erythromycin

Fluroquinolone

Tetracycline

**Treatment – Surgical/Invasive**

NA in absence of complications

**Precautions**

Handwashing, other barrier techniques ▲

**Primary Prevention**

Avoid contaminated water

Handwashing after handling raw poultry

Milk pasteurization

Prevention of kitchen cross-contamination

Thorough cooking of poultry products

**Course**

Recovery usual, with some cases of relapse reported

**Notes**

- [1] Most common bacterial cause of diarrhea in USA
- [2] Prodromal period of 1-2 days preceding diarrhea
- [3] May be severe, more prominent than diarrhea, resembling appendicitis, pancreatitis
- [4] ESP *c fetus*
- [5] ESP immune compromise, i.e., AIDS, cancer
- [6] For severe symptoms, early in course

<http://www.argus1.com/?campy>

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## Updates

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# Chickenpox

## Weapon

No

## Alternate Names

Varicella

VZV

## Etiology

Varicella-zoster virus

Viral replication in mucosal cells of upper respiratory tract followed by viremia and skin infection

## Transmission [11]

Source: Infected human vesicular fluid, upper respiratory tract secretions

Entry: Inhalation  
Maternal – fetal

Human-to-Human: Yes

## Predisposing/Comorbid Conditions

More severe in immune compromise (i.e., leukemia, lymphoma, HIV, corticosteroids treatment)

## Demographic

Location: Global

Populations: All [10]

Calendar: Temperate climate peak in late winter – early spring

## Systems [8]

Oropharynx



Respiratory – upper  
Skin

## Incubation

10-21 days

## Signs/Symptoms

Anorectum – vesicles  
Appetite – reduced (anorexia)  
Chest – cough, acute, NS [6]  
Eyes, conjunctivae – vesicles  
Head – pain (headache)  
Lymph nodes, post cervical – enlarged [1]  
Lymph nodes, suboccipital – enlarged [1]  
Mouth, mucosa – vesicles  
Muscles – pain (myalgia)  
Nose – drainage (rhinorrhea, coryza)  
Skin – itching (pruritus)  
Skin – rash, crusting [3]  
Skin – rash, macular/papular [2, 3]  
Skin – rash, pustular [3]  
Skin – rash, vesicular [3, 4]  
Swallowing – pain (odynophagia) [5]  
Temperature, body – elevated (fever) [12]  
Throat – sore  
Vagina – vesicles  
Voice – hoarse [6]

## Differentiation

*Includes, but not limited to:*

Drug rash  
Enterovirus infection  
Erythropoietic porphyria  
Generalized herpes in immune compromise  
Guttate psoriasis  
Impetigo  
Insect bites  
Rickettsialpox  
Secondary syphilis  
Smallpox

## Complications

*Include, but not limited to:*

- Arthritis – septic
- Benign cerebellar ataxia
- Dehydration
- Disseminated intravascular coagulation
- Encephalitis
- Fetal malformations
- Guillain-Barré syndrome
- Intracranial vasculitis
- Myocarditis
- Nephritis
- Optic neuritis
- Osteomyelitis
- Pneumonia – interstitial
- Pyoderma
- Reye's syndrome [7]
- Secondary bacterial skin infection
- Thrombocytopenia
- Transverse myelitis
- Vasculitis

## Laboratory

- Blood serology – positive

## ECG

- NA in absence of complications

## Imaging [9]

- NA in absence of complications

## Other Tests

- Skin culture for secondary infection

## Treatment – Nonpharmacologic

- Skin hygiene
- Trim nails

## Treatment – Pharmacologic [13]

- Acetaminophen

Acyclovir  
Antipruritics

### Treatment – Surgical/Invasive

NA in absence of complications

### Precautions

Isolation until encrustation of skin lesions ▲  
Standard

### Primary Prevention

Vaccine: yes  
Varicella-zoster immune globulin (VZIG)

### Course

Full recovery usual  
More severe in adults and immune compromise  
Self-limited

### Notes

- [1] Secondary to scalp lesions
- [2] Accompanied by evanescent flush
- [3] Begins on head, quickly spreading to trunk and arms; palms and soles of feet rare; occurs in crops
- [4] On red areola; more prominent in adults
- [5] Due to throat vesicles
- [6] Due to laryngotracheitis
- [7] Less common with aspirin avoidance
- [8] Initial viral replication in mucosal cells of upper respiratory tract, followed by viremia and skin infection; reactivation as herpes zoster in later years
- [9] Chest x-ray when pneumonia suspected: diffuse nodular infiltrates, hilar adenopathy, pleural effusion
- [10] In temperate climates, usually children; in tropics, usually adults
- [11] Contagious 1-2 days before symptom onset until rash is fully encrusted
- [12] Concurrent with rash onset
- [13] Avoid aspirin-related products, which cause Reye's syndrome ▲

<http://www.argus1.com/?chick>



# Cholera

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

NA

## Etiology

*V. cholerae* (gram-neg bacteria)

Toxin binds to GI epithelial cells causing excessive fluid secretion and sodium and water malabsorption

## Transmission

Source: Infected water, undercooked fish or vegetables washed in contaminated water  
Entry: Ingestion  
Human-to-Human: Yes (fecal-oral)

## Predisposing/Comorbid Conditions

Blood group type O  
*H pylori* infection

## Demographics

Location: Global  
Populations: Impoverished and children under age 5 years most often affected where disease is common; disaster victims  
Calendar: Year-round, peak in hot seasons

## Systems

Gastrointestinal

## Incubation

1-7 days

**Signs/Symptoms [3, 4]**

Abdomen – cramps  
Abdomen – distension [6]  
Arterial pressure – decreased  
Arterial pulse, amplitude – decreased/absent  
Bowel movements – diarrhea [1]  
Bowel sounds – decreased/absent (ileus, adynamic) [6]  
Bowel sounds – increased  
Breathing – rapid, deep (tachypnea)  
Consciousness – loss, prolonged (coma)  
Eyes – dry  
Eyes – sunken  
Heart, rate – rapid (tachycardia)  
Heart sounds, intensity – decreased  
Mentation – anxious  
Mentation – apathy  
Mentation – fatigue  
Mentation – sleepy (somnia)  
Mood – depressed  
Mood – lethargic  
Mouth – dry (xerostomia)  
Muscles – cramps  
Nausea  
Seizures  
Skin turgor – decreased  
Thirst – excessive  
Urine volume – decreased (oliguria)  
Voice – hoarse  
Vomiting

**Differentiation**

*Includes, but not limited to:*

All other causes of gastroenteritis

**Complications**

*Include, but not limited to:*

Hypoglycemia  
Hypovolemic shock  
Metabolic acidosis  
Noncardiac pulmonary edema

Pneumonia  
Renal failure  
Sepsis  
Spontaneous abortion

### Laboratory

Blood arterial pH – decreased (acidosis)  
Blood concentration – increased  
Blood culture – positive  
Blood glucose – decreased [7]  
Blood glucose – increased  
Blood potassium – decreased (hypokalemia) [2]  
Stool bacterial stain – positive  
Stool culture – positive  
WBC – increased (leukocytosis)

### ECG

NS changes

### Imaging

NA in absence of complications

### Other Tests

NA in absence of complications

### Treatment – Nonpharmacologic

Fluids and electrolytes

### Treatment – Pharmacologic [5]

Antibiotics  
Doxycycline  
Tetracycline

### Treatment – Surgical/Invasive

NA in absence of complications

### Precautions

Enteric  
Standard





# ***Clostridium Perfringens***

## **Gastroenteritis**

### **Weapon**

No [2]

### **Alternate Names**

Food poisoning

### **Etiology**

*Clostridium perfringens*

### **Transmission**

Source:	Contaminated food and water
Entry:	Ingestion
Human-to-Human:	No

### **Predisposing/Comorbid Conditions**

NA

### **Demographics**

Location:	Global
Populations:	All
Calendar:	Year-round

### **Systems**

Gastrointestinal

### **Incubation**

6-24 hours

### **Signs/Symptoms**

Abdomen – pain  
Appetite – decreased (anorexia)

Bowel movements – diarrhea  
Nausea [1]

### **Differentiation**

*Includes, but not limited to:*

Other causes of gastroenteritis and food poisoning

### **Complications**

*Include but not limited to:*

Dehydration  
Necrotizing enteritis  
Septicemia

### **ECG**

NA in absence of complications

### **Laboratory**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

Fluids and electrolytes

### **Treatment – Pharmacologic**

NS

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

Standard

### **Primary Prevention**

Food handling and preparation



# Crimean – Congo Hemorrhagic Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

Central Asian hemorrhagic fever

## Etiology

Bunyaviridae virus

Generalized vascular damage and endothelial lesions, followed by disseminated intravascular coagulation and formation of microthrombi with subsequent tissue infarction

## Transmission

Source:	Ticks, large and small animals including birds and livestock; human blood/secretions; infected animals
Entry:	Insect bite Ingestion
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Rural Asia, Eastern Europe, Africa
Populations:	Farmers, veterinarians, laboratory personnel
Calendar:	Seasonal variations correlate with tick activity

## Systems

Cardiovascular  
Coagulation

Gastrointestinal  
Liver/biliary tract/pancreas  
Nervous  
Oropharynx  
Reticuloendothelial

## Incubation

2-7 days

## Signs/Symptoms [1]

Abdomen, epigastrium – pain  
Abdomen, RUQ – pain  
Abdomen – pain  
Appetite – decreased (anorexia)  
Back – pain  
Bowel movements – diarrhea  
Bowel movements – blood or black (melena)  
Breath sounds – crackling (rales) [2]  
Chills  
Dizziness (lightheaded)  
Eyes, conjunctivae – injected  
Eyes, vision – light sensitivity, increased (photophobia)  
Eyes – pain  
Face – flushed  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Heart rate – slow (bradycardia)  
Liver – enlarged (hepatomegaly)  
Lymph nodes – enlarged  
Mentation – confusion  
Mentation – sleepiness (somnolence)  
Mentation – weakness (malaise)  
Mood – depressed  
Mood – labile  
Mood – lethargic  
Mood – restless/irritable  
Mouth, gingiva – bleeding  
Mouth, mucosa – petechiae  
Mouth, palate – petechiae  
Muscles – pain (myalgia)

Nausea  
Neck, post – pain  
Neck, post – stiff (meningismus)  
Nose – bleeding (epistaxis)  
Skin – ecchymoses  
Skin – rash, petechiae  
Sputum – blood (hemoptysis)  
Temperature, body – elevated (fever)  
Throat – injected  
Throat – petechiae  
Throat – sore  
Urine – blood (hematuria)  
Vomiting  
Vomiting – blood (hematemesis)

### **Differentiation**

*Includes, but not limited to:*

Clotting disorders  
Encephalitis  
Other viral hemorrhagic fevers

### **Complications**

*Include, but not limited to:*

Anemia  
Circulatory collapse  
Disseminated intravascular coagulation  
Hepatic failure  
Massive hemorrhage  
Renal failure

### **Laboratory [3] ▲**

Blood fibrinogen – decreased  
Blood IgG antibodies – positive  
Blood IgM antibodies – positive  
Blood liver enzymes – increased  
Blood platelets – decreased (thrombocytopenia)  
Blood PTT – increased  
Blood WBC – decreased (leukopenia)

### **ECG**

Rate – increased (sinus tachycardia)

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Blood replacement

Fluids and electrolytes

## Treatment – Pharmacologic

Ribavirin

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Handling specimens [3] ▲

Standard

## Primary Prevention

Vaccine: no

Tick control/avoidance

## Course

*Untreated*

Mortality 30% ☠

## Notes

- [1] Course typically consists of initial phase with abrupt onset of signs and symptoms lasting 3-5 days, followed by overtly hemorrhagic phase
- [2] Pulmonary edema
- [3] BSL-4 procedures ▲

<http://www.argus1.com/?crimean>





# Cryptosporidiosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Crypto

## Etiology

*Cryptosporidium parvum*

Oocytes enter brush border of intestinal epithelium, develop into merozoites and multiply, impairing absorption of glucose, electrolytes, water, and fats, and vitamin B12 in severe cases

## Transmission

Source:	Water and food contaminated by feces from humans and domestic animals
Entry:	Ingestion
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

Immune compromise

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Gastrointestinal  
Respiratory [10]

## Incubation

2-14 days [9]

**Signs/Symptoms [1, 8]**

- Abdomen – cramps
- Abdomen – flatulence
- Abdomen – pain
- Abdomen – pain, after meals
- Appetite – decreased (anorexia)
- Bowel movements – diarrhea [2]
- Breathing – difficult, rest (dyspnea) [10]
- Muscles – pain (myalgia)
- Nausea
- Temperature, body – elevated (fever) [3]
- Vomiting
- Weight – loss

**Differentiation**

*Includes, but not limited to:*

- All other forms of gastroenteritis

**Complications**

*Include, but not limited to:*

- Cholangitis [4]
- Cholecystitis [4]
- Growth retardation
- Malnutrition [11]
- Pancreatitis [4]

**Laboratory [6] ▲**

- Blood, antibodies – present
- Blood concentration – increased (hemoconcentration)
- Blood potassium – decreased
- Stool oocytes – positive

**ECG**

- NS abnormalities [5]

**Imaging**

- Gallbladder – dilated [7]
- Lungs – infiltrates [10]

**Other Tests**

- Small bowel biopsy – oocytes in epithelium

**Treatment – Nonpharmacologic**

Fluids and electrolytes  
Lactose-free diet

**Treatment – Pharmacologic**

Antimotility agents

**Treatment – Surgical/Invasive**

NA in absense of complications

**Precautions**

Handling of specimens [6] ▲  
Standard

**Primary Prevention**

Vaccine: no  
Contaminated water treatment/avoidance  
Hygiene

**Course**

Clinical course lasts up to 14 days  
Longer and sometimes fatal in immunocompromised patients ☠

**Notes**

- [1] Onset may be severe in some cases, esp in immune compromise
- [2] May be profuse, very watery; sometimes mucoid
- [3] Often afebrile
- [4] Esp in immune compromise
- [5] Due to electrolyte abnormalities
- [6] High incidence of transmission to health care workers when protective measures not taken ▲
- [7] Gallbladder imaging indicated if cholecystitis suspected
- [8] Carriers are often asymptomatic
- [9] Highly variable
- [10] Children, AIDS
- [11] Esp in developing countries

<http://www.argus1.com/?crypto>



# Dengue

## Weapon

No

## Alternate Names

Breakbone fever  
Dandy fever  
Dengue fever  
Dengue hemorrhagic fever [H]  
Dengue shock syndrome [S]  
Philippine hemorrhagic fever [H]  
Southwest hemorrhagic fever [H]  
Thai hemorrhagic fever [H]

## Etiology

Dengue virus (a *Flaviridae* virus)

Virus replicates in target organs such as local lymph nodes and liver, then released as a viremia, infecting WBC and lymphatic system and increasing vascular permeability causing massive fluid leakage

## Transmission

Source: Mosquitoes, mainly *a aegypti*  
Entry: Insect bite  
Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographic

Location: Global, esp tropics  
Populations: All  
Calendar: Year-round

## Systems

Coagulation  
Liver/biliary tract/pancreas  
Musculoskeletal  
Nervous  
Optic  
Oropharynx  
Skin

## Incubation

4-7 days

## Signs/Symptoms

Abdomen – pain  
Appetite – decreased (anorexia)  
Arterial press – low  
Arterial pulse press – narrow  
Back, lumbar – pain  
Bones – pain  
Bowel movements, stool – blood or black (melena)  
Chills  
Cough – NS, acute  
Eyes, conjunctivae – injected  
Eyes, light sensitivity – increased (photophobia)  
Eyes, retroorbital – pain  
Eyes – tender  
Face – flushed  
Fatigue  
Head, frontal – pain  
Head – pain (headache) [1]  
Heart rate – slow relative to fever (relative bradycardia)  
Joints – pain (arthralgia)  
Liver – enlarged (hepatomegaly)  
Liver – tender  
Lymph nodes, gen – enlarged  
Menses, flow – increased (menorrhagia)  
Mentation – confusion  
Mood – depressed [2]  
Mood – lethargic  
Mood – restless, irritable

Mouth, gingiva – bleeding  
Mouth, mucosa – ulcers  
Mouth, soft palate – vesicles [3]  
Muscles – pain (myalgia)  
Muscles – paralysis  
Muscles – weak [2]  
Nausea  
Neck, post – stiff (meningismus)  
Nose – blood (epistaxis)  
Nose – drainage (rhinorrhea)  
Seizures  
Sense of taste – altered  
Sense of taste – bitter  
Skin – rash, macular [4]  
Skin – rash, petechiae  
Skin – rash, purpura  
Skin – rash, desquamating  
Skin – red (erythema)  
Skin – sensation increased (hyperesthesia)  
Sleep – disturbed (insomnia)  
Sputum – blood (hemoptysis)  
Stools – black (melena)  
Temperature, body – elevated (fever) [5]  
Throat – sore  
Urine – blood (hematuria)  
Vomiting  
Vomiting – blood (hematemesis)  
Weight – loss

## Differentiation

*Includes, but not limited to:*

Hepatitis  
Influenza  
Leptospirosis  
Malaria  
Other viral hemorrhagic fevers  
Scrub typhus

## Complications

*Include, but not limited to:*

Circulatory collapse [6]

Encephalitis  
Gastric bleeding [7]  
Hepatitis  
Myocarditis  
Neuropathy  
Rhabdomyolysis

### **Laboratory**

Blood concentration – increased  
Blood liver enzymes – increased  
Blood platelets – decreased (thrombocytopenia)  
Blood serology – positive  
Blood WBC – decreased (leukopenia)

### **Imaging**

Abdomen – ascites  
Lungs, pleura – fluid (pleural effusion)

### **Other Tests**

Cell culture  
Fluorescent antibody test  
Tourniquet test – positive

### **Treatment – Nonpharmacologic**

Fluids and electrolytes  
Fresh plasma  
Oxygen  
Plasma expanders

### **Treatment – Pharmacologic**

Avoid aspirin ▲  
NS

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

Standard

### **Primary Prevention**

Vaccine: in development  
Vector control





# E Coli 0157:h7

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

EHEC Shiga-producing *E coli*

STEC

Verotoxin-producing *E coli*

VTEC

## Etiology

Toxins from (*E coli*) serotype 0157:h7 [7]

Bacteria adhere to intestinal epithelial cells with destruction of microvilli

## Transmission

Source: Cattle, deer, human-contaminated water and food [2]

Entry: Ingestion

Human-to-Human: Yes (fecal-oral)

## Predisposing/Comorbid Conditions

NA

## Demographic

Location: Global

Populations: All, esp children under age 5 years and elderly

Calendar: Year-round

## Systems

Gastrointestinal

Renal/Genitourinary

## Incubation

2-8 days

## Signs/Symptoms

- Abdomen – pain
- Bowel movements – blood or black (hematochezia) (melena)
- Bowel movements – diarrhea [1]
- Nausea
- Vomiting

## Differentiation

*Includes, but not limited to:*

- Other causes of diarrhea [3]

## Complications

*Include, but not limited to:*

- Hemolytic uremic syndrome [4]
- Thrombotic thrombocytopenic purpura

## Laboratory

- Stool blood – positive
- Stool culture – positive [5]

## ECG

- NA in absence of complications

## Imaging

- NA in absence of complications

## Other Tests

- NA in absence of complications

## Treatment – Nonpharmacologic

- Fluids and electrolytes

## Treatment – Pharmacologic

- Avoid antidiarrheal agents ▲
- NS

## Treatment – Surgical/Invasive

- NA

## Precautions

- Standard, esp enteric



# Eastern Equine Encephalitis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

EEE

## Etiology

Eastern equine encephalitis alphavirus family togaviridae

## Transmission

Source: Mosquitoes, esp *aedes*, *coquillettidia*, *culex* species  
Entry: Mosquito bite  
Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Eastern USA, esp around freshwater swamps on Atlantic Coast, Gulf Coast, Great Lakes  
Populations: All in infected areas, esp ages <15 years and >50 years  
Calendar: Year-round

## Systems

Nervous

## Incubation

3-15 days after mosquito bite

**Signs/Symptoms [2]**

- Abdomen – pain
- Body, gen – edema
- Bowel movements, control – decreased/absent
- Bowel movements – diarrhea
- Chills
- Consciousness – loss, prolonged (coma)
- Cranial nerve VII – palsy
- Eyes, motion general – jerky (nystagmus)
- Eyes, periorbital – edema
- Eyes, vision – light sensitivity, increased (photophobia)
- Face – edema
- Gait – ataxic
- Head – pain (headache)
- Joints – pain (arthralgia)
- Mentation – confusion
- Mentation – delirium
- Mentation – feeling of weakness (malaise)
- Mood – labile
- Mood – lethargic, slowed
- Mood – restless, irritable
- Muscles, movement – jerks (myoclonus)
- Muscles, movement – spontaneous/involuntary
- Muscles – pain (myalgia)
- Muscles – paralysis [1]
- Muscles – weak [1]
- Nausea
- Neck, post – pain
- Neck, post – stiff (meningismus)
- Seizures
- Sign: Babinski's
- Signs/symptoms, nervous system – multiple other
- Speech – absent (aphonia) or loss (aphasia)
- Temperature, body – elevated (fever)
- Tendons, reflexes – decreased
- Tendons, reflexes – increased
- Throat – sore
- Urination, spontaneous control – decreased/absent (urinary incontinence)
- Vomiting

## Differentiation

*Includes, but not limited to:*

Other encephalitides

## Complications

Mild-severe permanent neurologic damage in about 50% of survivors

## Laboratory

Blood IgM-specific antibodies – present

Blood sodium – decreased [4]

Blood WBC – increased (leukocytosis)

CSF IgM-specific antibodies – present

CSF pressure – increased

CSF protein – increased

CSF WBC – increased

## ECG

NA in absence of complications

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic

NS

## Treatment – Surgical/Invasive

NA

## Precautions

Standard





# Ebola Hemorrhagic Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

African hemorrhagic fever

## Etiology

Ebola virus (filovirus)

Primarily infects lymphatic system, testes, ovaries, liver, with secondary severe effects on blood coagulation

## Transmission

Source:	Infected human blood, secretions, organs, semen; (?) Monkeys and chimpanzees in/ from jungles
Entry:	Contact Ingestion
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Africa, Asia [8]
Populations:	All, esp monkey handlers, laboratory personnel
Calendar:	Year-round

## Systems

- Coagulation
- Gastrointestinal
- Nervous
- Optic
- Skin

## **Incubation**

3-21 days

## **Signs/Symptoms**

Abdomen – pain

Abdomen – tender

Appetite – decreased (anorexia)

Bowel movements – diarrhea

Bowel movements – blood or black (hematochezia) (melena)

Breathing – rapid (tachypnea)

Chest, gen – pain

Chills

Cough, acute NS

Eyes, conjunctivae – injected

Eyes – burning, itching

Head – pain (headache)

Heart rate – increased (tachycardia)

Hiccups [1]

Joints – pain (arthralgia)

Lymph nodes, gen – enlarged (lymphadenopathy)

Mentation – apathy

Mentation – confusion

Mentation – fatigue

Mouth, gingiva – bleeding

Mouth, mucosa – hemorrhage

Mouth, mucosa – ulcers

Muscles – pain (myalgia)

Nausea

Nose – blood (epistaxis)

Skin, color – yellow (jaundice)

Skin – rash, desquamating [2]

Skin – rash, maculopapular [3]

Sputum – blood (hemoptysis)

Swallowing – difficult (dysphagia)

Swallowing – pain (odynophagia)

Temperature, body – elevated (fever)

Throat – sore

Vagina – blood

Vomiting

Vomiting – blood (hematemesis)

## Differentiation

*Includes, but not limited to:*

- Malaria
- Other viral hemorrhagic fevers
- Rickettsial diseases
- Typhoid fever

## Complications

*Include, but not limited to:*

- Abortion
- Blindness
- Disseminated intravascular coagulation (DIC)
- Hepatic failure
- Massive hemorrhage
- Myocarditis
- Orchitis
- Pancreatitis
- Renal failure
- Shock
- Transverse myelitis
- Uveitis

## Laboratory [11] ▲

- Blood amylase – increased
- Blood creatinine – increased
- Blood culture – positive
- Blood ELISA IgG antibodies – positive [6]
- Blood liver enzymes – increased
- Blood lymphocytes – decreased (lymphopenia)
- Blood platelets – decreased (thrombocytopenia)
- Blood prothrombin time – increased
- Blood WBC – decreased (leukopenia)
- Blood WBC – left shift [4]
- Semen culture – positive
- Urine protein – present

## ECG

- NA in absence of complications [5]

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic

Heparin for DIC

Immune serum transfusion [12]

Replace blood clotting factors

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions [11] ▲

Airborne

Avoid direct contact with victim or body secretions [9] ▲

## Primary Prevention

Vaccine: in development

Barrier techniques ▲

Disposal of infected human fluids ▲

Quarantine and handling of monkeys from Africa ▲

## Course

20-90% fatal ☠

## Notes

- [1] Esp fatal cases
- [2] About day 5
- [3] Esp trunk, back
- [4] Early in course
- [5] I.e., myocarditis
- [6] Week 2
- [7] Through contact with infected blood, organs, secretions, semen



# Epsilon Toxin – *Clostridia Perfringens*

*Note: there is no available documentation on the effect of epsilon toxin on humans. It is produced by type b and type d strains of C. perfringens, which uncommonly infect humans, but can cause disease in animals; this is the basis for concern that this substance could be used as a bio-chemical weapon involving the body systems listed. ▲*

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

NA

## Etiology

Epsilon toxin of *C perfringens*

## Transmission

Source:	Uncertain
Entry:	Uncertain
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	NA
Populations:	All
Calendar:	NA

## Systems [1]

Gastrointestinal

Nervous  
Respiratory – lower

### **Time to Clinical Onset**

ND

### **Signs/Symptoms**

ND

### **Differentiation**

ND

### **Complications**

ND

### **Laboratory**

ND

### **Imaging**

ND

### **Other Tests**

ND

### **Treatment – Nonpharmacologic**

ND

### **Treatment – Pharmacologic**

ND

### **Treatment – Surgical/Invasive**

ND

### **Precautions**

ND

### **Primary prevention**

ND





# Giardiasis

## Weapon

No

## Alternate Names

*Giardia* enteritis

Lambliasis

## Etiology

*Giardia lamblia* (*G intestinalis*)

## Transmission

Source: Contaminated water, uncooked food, and other sources contaminated by infected human and animal excreta [7]

Entry: Ingestion

Human-to-Human: Yes (fecal-oral)

## Predisposing/Comorbid Conditions

Decreased gastric acidity

Immune deficiency

Prior gastric surgery

## Demographics

Location: Global

Populations: All

Calendar: Year-round

## Systems

Gastrointestinal

## Incubation

7-14 days

**Signs/Symptoms [3]**

- Abdomen – cramps
- Abdomen – flatulence
- Abdomen – fullness
- Abdomen – pain
- Appearance, gen – wasting (cachexia)
- Appetite – reduced (anorexia)
- Bowel movements, stool – fatty (steatorrhea) [2]
- Bowel movements – constipation [10]
- Bowel movements – diarrhea [1]
- Joints – pain (arthralgia) [6]
- Mentation – fatigue
- Mentation – weakness (malaise)
- Nausea
- Skin – rash, itching (urticaria) [10]
- Temperature, body – increased (fever) [10]
- Vomiting
- Weight – loss

**Differentiation**

*Includes, but not limited to:*

- Other causes of gastroenteritis

**Complications**

*Include, but not limited to:*

- Dehydration
- Vitamin malabsorption

**Laboratory**

- Blood ELISA assay – positive
- Stool cysts – positive [4]

**ECG**

- NA in absence of complications

**Imaging**

- NA in absence of complications

**Other Tests**

- Duodenal aspiration and biopsy

## Treatment – Nonpharmacologic

Fluids and electrolytes

## Treatment – Pharmacologic [5]

Albendazole  
Furazolidone  
Metronidazole  
Nitazoxanide  
Paromomycin  
Quinacrine  
Tinidazole

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Enteric [8] ▲

## Primary Prevention

Avoid contaminated sources  
Standard

## Course [9]

Variable duration – weeks to months  
Rarely fatal

## Notes

- [1] Often explosive, watery
- [2] Stools greasy, foul-smelling
- [3] Most infected persons have no symptoms
- [4] May be missed due to intermittent shedding, requiring multiple samples until positive; stools negative for blood, pus, mucous
- [5] Reduces symptoms and prevents infection spread
- [6] Reactive arthritis – uncommon
- [7] Cysts remain viable outside host for long periods in water and uncooked food
- [8] Strict handwashing and other techniques around infected persons ▲
- [9] May recur after full therapeutic course
- [10] Uncommon



# Glanders

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Farcy [2]

## Etiology

*Burkholderia mallei* (*pseudomonas mallei*) [4]

## Transmission

Source:	Equids (horses, mules, donkeys), goats, dogs, cats
Entry:	Contact Inhalation
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

Broken skin

## Demographic

Locations:	Global [3]
Populations:	Veterinarians, horse handlers, laboratory personnel, butchers
Calendar:	Year-round

## Systems

Lymphatic  
Musculoskeletal  
Oropharynx  
Skin

## **Incubation**

1-5 days

## **Signs/Symptoms**

Abdomen – pain  
Appetite – decreased (anorexia)  
Bowel movements – diarrhea  
Breathing – difficult (dyspnea)  
Chest – pain, pleuritic  
Chills  
Cough – acute, NS  
Eyes, light sensitivity – increased (photophobia)  
Eyes, tears (lacrimation) – increased  
Head – pain (headache)  
Lymph nodes, neck – enlarged  
Lymph nodes, regional – enlarged  
Mentation – confusion  
Mentation – weakness (malaise)  
Mouth, mucosa – ulcers  
Muscles – abscess  
Muscles – pain (myalgia)  
Nose, drainage – increased (rhinorrhea, coryza)  
Nose, mucosa – ulcers  
Skin – nodule [1, 2]  
Skin – rash, papular [2]  
Skin – rash, pustular [2]  
Skin – ulcer, single [2]  
Spleen – enlarged (splenomegaly)  
Sweating – nocturnal (night sweats)  
Temperature, body – elevated (fever)  
Throat – sore

## **Differentiation**

*Includes, but not limited to:*

All other causes of pneumonia  
All other septicemias  
All other skin infections

## Complications

*Include, but not limited to:*

- Brain abscess
- Liver abscess
- Orchitis
- Osteomyelitis
- Meningitis
- Pneumonia
- Spleen abscess

## Laboratory [5] ▲

- Blood culture – positive
- Blood lymphocytes – increased (lymphocytosis)
- Blood serology – positive
- Blood WBC – increased (leukocytosis)
- Skin culture – positive
- Sputum culture – positive
- Urine culture – positive

## ECG

NS in absence of complications

## Imaging

- Pneumonia
  - Lungs – cavitations
  - Lungs – infiltrates, bilat
  - Lungs – nodules, miliary

## Other Tests

NS in absence of complications

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic [6]

- Antibiotics
  - Amoxicillin
  - Ceftazidime
  - Ceftriaxone

Doxycycline  
Gentamycin  
Trimethoprim – sulfa

## Treatment – Surgical/Invasive

Abscess drainage

## Precautions

Handling specimens [5] ▲

## Primary Prevention

Vaccine: no

Animal control

Prophylactic antibiotic with exposure [7]

## Course

Untreated mortality almost 100% ☠

## Notes

- [1] With nodular lymphangitic cord extending to regional lymph nodes
- [2] Termed “farcy” when localized to skin
- [3] Eradicated in most areas of world, except Africa
- [4] Gram neg aerobe
- [5] BSL-3 procedures; agent is highly infectious with exposure to only a few organisms ▲
- [6] Relative efficacies uncertain; protocols vary according to infection site and whether local or systemic
- [7] Efficacy uncertain

<http://www.argus1.com/?glanders>





# Hantavirus Pulmonary Syndrome

## Weapon

CDC Bioterrorism Category: C

## Alternate Names

HPS

## Etiology

Hantavirus, family Bunyaviridae

Pulmonary vascular endothelial damage with fluid extravasation and necrosis of surrounding tissue

## Transmission

Source:	Rodent excreta or saliva
Entry:	Skin contact Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

Broken skin

## Demographics

Locations:	Europe, Asia, N America
Populations:	All, esp Native Americans, hikers, campers
Calendar:	Year-round, esp autumn

## Systems

Respiratory – lower

## Incubation

1-5 weeks

## Signs/Symptoms

Abdomen – pain  
Appetite – decreased (anorexia)  
Arterial pressure – decreased (hypotension) [7]  
Breathing – difficult, rest (rest dyspnea)  
Breathing – rapid (tachypnea)  
Chest – rales  
Chest – tightness  
Chills  
Cough – acute NS  
Dizziness (lightheaded)  
Mentation – fatigue  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Joints – pain (arthralgia)  
Muscles – pain (myalgia) [2]  
Nausea  
Spleen – enlarged (splenomegaly)  
Temperature, body – elevated (fever)  
Vomiting

## Differentiation

*Includes, but not limited to:*

Acute respiratory distress syndrome (ARDS)  
Congestive heart failure  
Influenza  
Other causes of pulmonary edema  
Pneumonia

## Complications

*Include, but not limited to:*

Noncardiac pulmonary edema  
Respiratory failure  
Shock

## Laboratory [4] ▲

Blood arterial pO<sub>2</sub> – decreased (hypoxia)  
Blood creatinine – increased [3]  
Blood creatine kinase – increased

Blood ELISA antibodies – positive  
Blood Hgb, Hct – increased [5]  
Blood LDH – increased [8]  
Blood liver enzymes – increased  
Blood lymphocytes – atypical  
Blood platelets – decreased (thrombocytopenia) [1]  
Blood prothrombin time – increased [1]  
Blood PTT – increased [1]  
Blood urea nitrogen – increased [3]  
Blood WBC – increased (leukocytosis)  
Blood WBC – left shift  
Urine protein – present (proteinuria)

## **ECG**

NS abnormalities

## **Imaging**

Lungs, interstitium – edema (Kerley B lines)  
Lungs, parenchyma general – infiltrates  
Lungs, pleura – fluid (pleural effusion)  
Lungs, vasculature – congested

## **Other Tests**

NA in absence of complications

## **Treatment – Nonpharmacologic**

Fluid replacement [6] ▲  
Mechanical ventilation  
Oxygen [10]  
Volume replacement

## **Treatment – Pharmacologic**

Ribivarin [9]

## **Treatment – Surgical/Invasive**

NA in absence of complications

## **Precautions**

BSL-4 procedures ▲



# Hemorrhagic Fever with Renal Syndrome

## Weapon

CDC Bioterrorism Category: C

## Alternate Names

Epidemic hemorrhagic fever  
Hemorrhagic nephrosonephritis  
HFRS  
Korean hemorrhagic fever  
Nephropathica epidemica

## Etiology

Virus of genus *hantavirus*

Vascular endothelial damage and hemorrhagic necrosis of adrenal medulla, anterior pituitary, right atrium; retroperitoneal gelatinous edema

## Transmission

Source:	Rodents
Entry:	Contact Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Europe, Asia
Populations:	All, esp persons engaged in outdoor activities (soldiers, farmers, campers, etc)
Calendar:	Year-round

## Systems

Cardiovascular  
Coagulation  
Renal/Genitourinary

## Incubation

2-40 days (average 2 weeks)

## Signs/Symptoms

Abdomen – pain [1]  
Appetite – decreased (anorexia)  
Arterial press – elevated [5, 7]  
Arterial press – low [2, 6] ▲  
Back – pain  
Chills  
Cough – acute NS  
Dizziness (lightheaded)  
Eyes, conjunctivae – injected  
Eyes, periorbital – edema  
Eyes, vision – blurred  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Mentation – fatigue  
Mentation – nonspecific changes  
Mentation – weakness (malaise)  
Mouth, palate – injected  
Mouth, palate – petechiae  
Muscles – pain (myalgia) [4]  
Nausea  
Skin, axillae – petechiae  
Skin, face – flushed [3]  
Skin, upper body – flushed, erythematous [3]  
Skin – temperature, cool [2]  
Spleen – enlarged (splenomegaly)  
Temperature, body – elevated (fever)  
Throat – injected  
Urine volume – decreased (oliguria) [2, 5]  
Urine volume – increased (diuresis) [6]  
Vomiting

## Differentiation

*Includes, but not limited to:*

- Acute abdomen
- Leptospirosis
- Meningococemia
- Other causes of renal failure
- Poststreptococcal nephritis
- Rickettsial infection

## Complications

*Include, but not limited to:*

- Noncardiac pulmonary edema
- Shock

## Laboratory [9] ▲

- Blood concentration – increased (hemoconcentration)
- Blood creatinine – increased
- Blood electrolytes – abnormal
- Blood IgG-specific antibodies – present
- Blood IgM-specific antibodies – present
- Blood lymphocytes – atypical
- Blood platelets – decreased (thrombocytopenia)
- Blood urea nitrogen (BUN) – increased
- Blood WBC – increased (leukocytosis)
- Blood WBC – left shift
- Urine protein – present

## ECG

- Dysrhythmias – atrial [8]
- P wave – abnormal [8]

## Imaging

- NA in absence of complications

## Other Tests

- NA in absence of complications

## Treatment – Nonpharmacologic

- Fluids and electrolytes





# Infectious Hepatitis – Acute

## Weapon

No

## Alternate Names

Viral hepatitis

## Etiology

Hepatitis viruses A-E

## Transmission

Source:	Blood Body fluids Excrement
Entry [10]:	Ingestion Maternal – fetal Parenteral Sexual contact
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

Varies with type and includes HIV and pregnancy

## Demographics

Location:	Global
Populations:	All, esp IV drug users, persons with multiple sex partners, daycare children, and healthcare workers
Calendar:	Year-round

## Systems

Liver/Biliary tract/Pancreas

## Incubation

2 weeks – 6 months depending on agent

## Signs/Symptoms [1, 2]

Abdomen – pain

Abdomen – tender

Appetite – reduced (anorexia)

Bowel movements – constipation

Bowel movements – diarrhea

Chills

Cough – nonproductive [3]

Eyes, conjunctivae – yellow

Eyes, vision – light sensitivity, increased (photophobia) [3]

Fatigue

Head – pain (headache)

Joints – pain (arthralgia)

Liver – enlarged (hepatomegaly)

Mentation – weakness (malaise)

Muscles – pain (myalgia)

Nausea

Nose – drainage (rhinorrhea, coryza) [3]

Sense of taste – decreased [9]

Skin, color – yellow (jaundice)

Skin – itching (pruritus)

Skin – rash, papular

Skin – rash, pruritic

Skin – rash, vesicular

Spleen – enlarged (splenomegaly)

Stools – light

Temperature, body – elevated (fever) [4]

Throat – sore [3]

Urine – dark

Vomiting

## Differentiation

*Includes, but not limited to:*

Acute fatty liver of pregnancy

Bile duct obstruction

Budd-Chiari syndrome

Drug-induced hepatitis

- Hellp syndrome [5]
- Immunologic disorders
- Influenza (early stage)
- Ischemic hepatitis
- Other causes of jaundice
- Other causes of liver failure
- Other liver infections [6]
- Wilson's disease

### **Complications**

*Include, but not limited to:*

- Acute liver failure
- Aseptic meningoencephalitis
- Cholestatic liver injury
- Chronic liver failure
- Liver carcinoma
- Liver cirrhosis

### **Laboratory**

- Blood albumin – decreased
- Blood bilirubin – increased
- Blood IgG-specific antibodies – present
- Blood IgM-specific antibodies – present
- Blood liver enzymes – increased
- Blood prothrombin time – increased

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

Liver biopsy

### **Treatment – Nonpharmacologic**

- Avoid alcohol in acute phase
- NS

### **Treatment – Pharmacologic [7] ▲**

NS

### **Treatment – Surgical/Invasive**

Liver transplant for rare cases of liver failure

## Precautions [8]

Enteric

Proper disposal/sterilization of parenteral instruments

## Primary Prevention

Vaccine: Hepatitis A, B

Avoidance of infected blood and other body fluids [11] ▲

## Course

Variable with type and comorbid conditions

Recovery usual

## Notes

- [1] Many cases asymptomatic, with liver enzyme rise only manifestation
- [2] In acute phase, all hepatitis types are similar in clinical manifestations
- [3] Initial symptoms “flu-like,” last a few days
- [4] Usually low-grade
- [5] “Hemolysis, elevated liver enzymes, low platelets” syndrome; a pregnancy complication
- [6] Brucellosis, cytomegalovirus, Epstein-Barr (infectious mononucleosis), HIV, leptospirosis, Lyme disease, Q fever, syphilis, yellow fever
- [7] Discontinue and avoid drugs except as necessary during acute phase, esp narcotics and hypnotics ▲
- [8] Pending identification of type; thereafter dictated by transmission routes for specific infecting agent
- [9] Food, cigarettes
- [10] Varies with type of hepatitis
- [11] Includes screening for infected blood and blood products prior to transfusion ▲

<http://www.argus1.com/?hepatitisacute>

## Updates

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# Infectious Mononucleosis

## Weapon

No

## Alternate Names

Glandular fever  
Kissing disease  
Mono  
Monocytic angina  
Pfeiffer's disease

## Etiology

Ebstein-Barr virus (EBV)

## Transmission

Source: Human saliva  
Transmission: Ingestion  
Blood transfusion  
Human-to-human: Yes

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global  
Populations: All [10]  
Calendar: Year-round

## Systems

Liver/Biliary tract/Pancreas  
Lymphatic  
Oropharynx

## Incubation

4-6 weeks

## Signs/Symptoms [12]

Abdomen, LUQ – pain [3]  
Abdomen, LUQ – tenderness [3]  
Abdomen – pain [11] ▲  
Appetite – decreased (anorexia)  
Eyes, lids – swollen (edema)  
Head – pain (headache)  
Liver – enlarged (hepatomegaly) [4]  
Lymph nodes, epitrochlear – enlarged [7]  
Lymph nodes, gen – enlarged [5]  
Lymph nodes, post cervical – enlarged [7]  
Lymph nodes, tonsillar – enlarged  
Lymph nodes, tonsillar – exudate  
Mentation – fatigue  
Mentation – weakness (malaise)  
Mouth, palate – petechiae [8]  
Muscles – pain (myalgia)  
Nausea  
Skin – rash, macular/papular [9]  
Spleen – enlarged (splenomegaly) [6, 11] ▲  
Spleen – tender [11] ▲  
Temperature, body – elevated (fever)  
Throat – exudate  
Throat – injected  
Throat – sore

## Differentiation

*Includes, but not limited to:*

Lymphocytic leukemia  
Other forms of hepatitis  
Streptococcal pharyngitis

## Complications

*Include, but not limited to:*

Airway impairment  
Encephalitis  
Gullain-Barré syndrome  
Hemolytic anemia

Interstitial pneumonia  
Meningitis  
Myocarditis  
Orchitis  
Pancreatitis  
Parotitis  
Pericarditis  
Reye's syndrome  
Spleen rupture  
Transverse myelitis

### **Laboratory**

Blood alkaline phosphatase – increased  
Blood bilirubin – increased  
Blood EBV-specific antibodies – positive  
Blood heterophile antibody – positive  
Blood liver enzymes – increased  
Blood lymphocytes – atypical [1]  
Blood lymphocytes – increased (lymphocytosis)  
Blood platelets – decreased (thrombocytopenia) [2]  
Blood WBC – decreased (leukopenia)

### **ECG**

NA in absence of complications, esp myocarditis/pericarditis

### **Imaging**

NA in absence of complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

Avoid trauma to spleen  
Bed rest – acute phase

### **Treatment – Pharmacologic**

Corticosteroids for airway impairment and other complications

### **Treatment – Surgical/Invasive**

Surgery for spleen rupture



## Precautions

Standard

## Primary Prevention

Vaccine: no

## Course

Usual resolution – 1-4 weeks

## Notes

- [1] Antigenically altered T lymphocytes; also found in cytomegalovirus infection, drug reactions, herpes virus, malaria, mumps, mycoplasma, rubella, rubeola, serum sickness, toxoplasmosis, tuberculosis, typhoid, viral hepatitis
- [2] Mild, seldom clinically significant
- [3] Due to splenic enlargement; may be presenting complaint
- [4] 10%
- [5] 90%
- [6] 50%
- [7] Differentiation from other causes of lymphadenopathy
- [8] Esp at hard-soft palate junction
- [9] May be precipitated by ampicillin or amoxicillin
- [10] Esp severe in older persons and in immune compromise
- [11] Palpate abdomen carefully to avoid spleen rupture ▲
- [12] May be asymptomatic, esp young children

<http://www.argus1.com/?infmono>

## Updates

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# Influenza

## Weapon

No

## Alternate Names

Flu

Grippe

## Etiology

Influenza virus (types A,B,C)

Causes intracellular viral replication in upper and lower respiratory tract within 24 hours after infection; present in secretions for 3-5 days; edema and hyperemia of upper and lower respiratory cells, esp bronchial epithelial cells, with loss of cilia; extends to pulmonary alveolar cells in pneumonia

## Transmission

Source: Human and nonhuman animals

Entry: Inhalation

Contact

Human-to-Human: Yes

## Predisposing/Comorbid Conditions

Chronic obstructive pulmonary disease

Heart disease

Third-trimester pregnancy

## Demographic

Locations: Global

Populations: All, esp severe in infants and aged

Calendar: Year-round, with regional variations including winter month increase in northern latitudes

## Systems

Gastrointestinal  
Musculoskeletal  
Optic  
Oropharynx  
Respiratory – upper

## Incubation

1-5 days

## Signs/Symptoms [8]

Abdomen – pain [5]  
Appetite – decreased (anorexia)  
Bowel movements – diarrhea  
Chest, ant – pain, pleuritic  
Chills  
Cough – nonproductive  
Cough – productive  
Dizziness (lightheaded)  
Eyes, conjunctivae – injected  
Eyes, light sensitivity – increased (photophobia)  
Eyes, motion – painful  
Eyes, tears (lacrimation) – increased  
Face, parotid glands – enlarged [1]  
Face – flushed  
Head – pain (headache)  
Joints – pain (arthralgia)  
Lymph nodes, ant cervical – enlarged  
Mentation – fatigue  
Mentation – weakness (malaise)  
Muscles – pain (myalgia)  
Muscles – stiff  
Muscles – tender  
Nausea  
Nose, drainage – increased (rhinorrhea, coryza)  
Nose, mucosa – inflamed  
Nose – congested  
Temperature, body – elevated (fever)  
Throat – dry  
Throat – injected

Throat – sore  
Voice – hoarse  
Vomiting

### **Differentiation**

Resembles numerous other viral and bacterial infectious diseases in early stages, i.e., malaise, headache, fever, myalgia, sore throat

### **Complications**

*Include, but not limited to:*

Acute bronchitis  
Asthma exacerbation  
Croup  
Cystic fibrosis exacerbation  
Encephalopathy  
Myelitis  
Myocarditis  
Myositis  
Pericarditis  
Pneumonia – bacterial  
Pneumonia – viral  
Radiculopathy – Guillain-Barré type  
Reye's syndrome [6] ▲  
Rhabdomyolysis  
Toxic shock syndrome

### **Laboratory**

Blood arterial pH – decreased (acidosis) [2]  
Blood concentration – increased [2]  
Respiratory secretion rapid antigen test – positive, type A, B

### **ECG**

NA in absence of complications [4]

### **Imaging**

NA in absence of pneumonia or other complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

Fluids and electrolytes



# Lassa Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

NA

## Etiology

Lassa virus (arenavirus)

Endothelial cell damage, platelet dysfunction, myocardial suppression, release of cytokines and other mediators of shock/inflammation

## Transmission

Source: Rodent (rat *mastomys natalensis*) excreta/  
direct contact

Entry: Contact  
Ingestion  
Inhalation  
Sexual

Human-to-Human: Yes

## Predisposing/Comorbid Conditions

Pregnancy [3, 4] ▲

## Demographics

Location: West Africa  
Populations: All  
Calendar: Year-round

## Systems

Cardiovascular  
Coagulation

Gastrointestinal  
Lymphatic  
Musculoskeletal  
Nervous  
Oropharynx  
Otic  
Skin

## **Incubation**

1-3 weeks

## **Signs/Symptoms [10]**

Abdomen, epigastrium – pain  
Abdomen, lower – pain  
Abdomen – tender  
Arterial pressure – decreased (hypotension)  
Back – pain  
Bowel movements – diarrhea  
Bowel movements – blood or black (hematochezia) (melena)  
Chest, ant – pain, nonpleuritic rest  
Cough – nonproductive  
Cranial nerve VIII – palsy  
Dizziness (lightheaded)  
Ears, hearing – loss (deafness) [1]  
Ears – ringing (tinnitus)  
Eyes, conjunctivae – hemorrhage  
Eyes, conjunctivae – injected  
Face – edema  
Hair, head – loss (alopecia)  
Head, frontal – pain  
Head – pain (headache)  
Heart – friction rub, pericardial  
Heart rate – decreased relative to fever (relative bradycardia)  
Joints, gen – pain (arthralgia)  
Lungs – friction rub, pleural  
Lymph nodes – enlarged  
Mentation – confusion  
Mentation – weakness (malaise)  
Mouth, gingiva – bleeding

Mouth, mucosa – ulcers  
Muscles, movement – incoordinated (ataxia)  
Muscles – pain (myalgia)  
Muscles – tender  
Muscles – tremors, rest  
Nausea  
Neck – edema  
Nose – blood (epistaxis)  
Seizures  
Skin – rash, macular/papular  
Temperature, body – elevated (fever)  
Throat – exudate  
Throat – sore  
Throat – ulcers  
Throat – vesicles  
Vagina – blood  
Vomiting  
Vomiting – blood (hematemesis)

### **Differentiation**

*Includes, but not limited to:*

Anicteric hepatitis  
Arboviral infection  
Bacterial or viral conjunctivitis  
Bacterial sepsis  
Enterovirus infection  
Leptospirosis  
Malaria  
Meningitis  
Other hemorrhagic fevers  
Typhoid fever

### **Complications**

*Include, but not limited to:*

Abortion [3, 4] ▲  
Deafness [12]  
Encephalitis  
Myocarditis  
Occulogyric crisis



Orchitis  
Pericarditis  
Systemic capillary “leak” syndrome [11]

### **Laboratory [7] ▲**

Blood culture – positive  
Blood liver enzymes – increased  
Blood serology – positive (rise in titer) [13]  
Blood WBC – decreased (leukopenia)  
Throat culture – positive  
Urine protein – present (heavy)(proteinuria)

### **ECG**

NS abnormalities [8]

### **Imaging**

Lungs – NS abnormalities

### **Other Tests**

NA in absence of complications [9]

### **Treatment – Nonpharmacologic**

Fluids and electrolytes

### **Treatment – Pharmacologic**

Ribavirin [2]

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

BSL-4 procedures ▲  
Standard

### **Primary Prevention**

Vaccine: no  
Contact surveillance [6]  
Isolation of patients  
Rodent control



# Legionellosis

## Weapon

No

## Alternate Names

Legionnaires' disease [5]

Pontiac fever [6]

## Etiology

*Legionella pneumophila* [16]

## Transmission

Source: Contaminated water, including cooling towers, showers, faucets, spas, hot tubs

Entry: Inhalation [17]

Human-to-Human: No

## Predisposing/Comorbid Conditions

Advanced age

Cigarette smoking

Cancer

COPD

Diabetes mellitus

Immune deficiency

Organ transplant

Renal disease

## Demographics

Location: Global

Populations: All, increases with age

Calendar: Year-round [15]

## Systems

Gastrointestinal

Nervous

Respiratory – lower

## **Incubation**

2-10 days

## **Signs/Symptoms**

Abdomen – tender [11]  
Abdomen – pain  
Appetite – decreased (anorexia)  
Bowel movements – diarrhea [9]  
Breath sounds, local – decreased  
Breath sounds – crackling (rales)  
Breathing – difficult, rest (rest dyspnea)  
Chest, gen – pain, pleuritic  
Chest, local – consolidation signs  
Chest, local – pain, pleuritic  
Chills  
Cough – acute NS  
Cough – nonproductive [2]  
Cough – productive  
Head – pain (headache) [10]  
Heart rate – decreased relative to fever (relative bradycardia)  
Liver – enlarged (hepatomegaly) [11]  
Mentation – confusion  
Mentation – fatigue  
Mentation – hallucinations  
Mentation – sleepy (somnia)  
Mentation – weakness (malaise)  
Mood – depression  
Mood – lethargy  
Muscles – pain (myalgia)  
Muscles – weakness  
Nausea  
Neurologic changes, focal [12]  
Seizures  
Spleen – enlarged (splenomegaly) [12]  
Sputum – blood (hemoptysis) [3]  
Sputum – clear  
Sputum – purulent  
Temperature, body – increased (fever) [8]  
Vomiting

## Differentiation

*Includes, but not limited to:*

- Acute abdomen
- Gastroenteritis
- Influenza
- Metastatic infection [19]
- Other forms of pneumonia [18]
- Pancreatitis

## Complications [4]

*Include, but not limited to:*

- Bowel abscess
- Cellulitis
- Disseminated intravascular coagulation (DIC)
- Myocarditis
- Pancreatitis
- Pericarditis
- Peritonitis
- Postcardiotomy syndrome
- Prosthetic valve endocarditis
- Pyelonephritis
- Sinusitis

## Laboratory

- Blood bilirubin – increased
- Blood cold agglutinins – present
- Blood creatine kinase – increased
- Blood creatinine – increased [13]
- Blood culture – positive
- Blood liver enzymes – increased
- Blood platelets – decreased (thrombocytopenia) [13]
- Blood phosphate – decreased
- Blood sodium – decreased
- Blood WBC – decreased (leukopenia) [13]
- Blood WBC – increased (leukocytosis)
- Pleural fluid culture – positive
- Sputum culture – positive
- Urine antigen – positive
- Urine myoglobin – positive (myoglobinuria)
- Urine protein – present (proteinuria)

Urine RBC – present (hematuria, microhematuria)

Urine WBC – present (pyuria)

## **ECG**

NA in absence of complications [14]

## **Imaging**

Lungs, parenchyma – cavitation

Lungs, parenchyma – consolidation

Lungs, parenchyma – infiltrates [7]

Lungs, pleura – fluid (effusion)

## **Other Tests**

NA in absence of complications

## **Treatment – Nonpharmacologic**

NS

## **Treatment – Pharmacologic**

Antibiotics

Macrolides

Quinolones

Tetracyclines

## **Treatment – Surgical/Invasive**

NA in absence of complications

## **Precautions**

Standard

## **Primary Prevention**

Water system control [20]

## **Course**

Legionnaires' form – 10-15% mortality ☠

## **Notes**

[1] For “Legionnaires’ pneumonia”

[2] Initially



# Leptospirosis

## Weapon

No

## Alternate Names

Canicola fever  
Hemorrhagic jaundice  
Mud fever  
Swineherd disease  
Weil's disease [1]

## Etiology

Genus *leptospira*

Disseminates from entry point via bloodstream to organs, esp kidneys (interstitial nephritis), liver (centrilobular necrosis), and muscle (focal necrosis)

## Transmission

Source: Water, food and soil contaminated by urine from infected animals, including rats, raccoons, dogs, pigs, cattle, deer

Entry: Skin/mucous membranes  
Ingestion  
Inhalation

Human-to-Human: Rare

## Predisposing/Comorbid Conditions

Skin abrasion

## Demographic

Location: Global [11]

Population: All, esp farmers, sewer workers, recreational swimmers, veterinarians

Calendar: Year-round, with late summer peak, esp after periods of increased rainfall



## Systems

Cardiovascular  
Coagulation  
Liver/Biliary tract/Pancreas  
Musculoskeletal  
Nervous  
Optic  
Renal/Genitourinary  
Skin

## Incubation

7-14 days

## Signs/Symptoms [2]

Abdomen, RUQ – tender  
Abdomen – pain  
Appetite – decreased (anorexia)  
Back, lumbar – pain  
Bone – pain  
Bowel movements – diarrhea  
Breath sounds – crackling (rales)  
Chest – pain, pleuritic  
Chills  
Cough – acute NS  
Eyes, conjunctivae – hemorrhage [3]  
Eyes, conjunctivae – injected [3]  
Eyes, light sensitivity – increased (photophobia)  
Head – pain (headache) [4]  
Heart rate – decreased relative to fever (relative bradycardia)  
Joints – pain (arthralgia)  
Legs, walking – pain  
Liver – enlarged (hepatomegaly)  
Lymph nodes – enlarged  
Mentation – confused  
Mentation – nonspecific changes  
Muscles – pain (myalgia) [5]  
Muscles – rigid  
Muscles – tender  
Nausea  
Neck, post – pain [6]

Neck, post – stiff [6]  
Skin, color – yellow (jaundice)  
Skin, sensation – increased (hyperesthesia, causalgia)  
Skin – rash, itching (urticaria) [7]  
Skin – rash, macular [7]  
Skin – rash, petechiae [7]  
Spleen – enlarged (splenomegaly) [8]  
Sputum – blood (hemoptysis) [9]  
Temperature, body – elevated (fever)  
Throat – injected  
Throat – sore  
Urine – blood (hematuria)  
Urine – cloudy  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Acute cholecystitis  
Encephalitis  
Hepatitis  
Influenza  
Meningitis  
Renal failure

### **Complications**

*Include, but not limited to:*

Abortion  
Acute respiratory distress syndrome (ARDS)  
Arthritis  
Cardiac dysrhythmias  
Congestive heart failure  
Disseminated intravascular coagulation  
Guillain-Barré syndrome  
Hemorrhage – adrenal  
Hemorrhage – gastrointestinal  
Hemorrhage – pulmonary  
Hemorrhage – subarachnoid  
Liver failure  
Meningoencephalitis – aseptic  
Myocarditis [12]

Pericarditis  
Pulmonary failure  
Renal failure  
Rhabdomyolysis  
Transverse myelitis  
Uveitis

### Laboratory

Blood alkaline phosphatase – increased  
Blood bilirubin – increased  
Blood culture – positive  
Blood Hgb/Hct – decreased (anemia)  
Blood liver enzymes – increased  
Blood platelets – decreased (thrombocytopenia)  
Blood prothrombin time – increased  
Blood serology – positive  
Blood urea nitrogen – increased  
Blood WBC – increased (leukocytosis)  
CSF culture – positive  
CSF protein – increased  
Urine casts, hyaline – present  
Urine culture – positive  
Urine protein – present (proteinuria)  
Urine RBC – present (hematuria)  
Urine WBC – present (pyuria)

### ECG

Dysrhythmias, atrial and ventricular  
Rate – slow relative to temperature (relative bradycardia)

### Imaging

Lungs – infiltrates

### Other Tests

NA in absence of complications, esp bleeding

### Treatment – Nonpharmacologic

Dialysis – severe cases

## Treatment – Pharmacologic [13]

### Antibiotics

- Amoxicillin
- Ampicillin
- Cephalosporins
- Doxycycline
- Erythromycin
- Penicillin

## Treatment – Surgical/Invasive

NA

## Precautions

- Handling specimens
- Standard

## Primary Prevention

- Vaccine: yes
- Animal immunization
- Avoid contaminated water
- Chemoprophylaxis for exposure
- Protective clothing and footwear
- Rodent control

## Course

- Highly variable
- Recovery usual
- Increased mortality with advanced age and pregnancy ☠

## Notes

- [1] Severe form of leptospirosis with jaundice
- [2] Abrupt onset; often subclinical
- [3] Conjunctival suffusion is most characteristic physical feature
- [4] Esp frontal
- [5] May be severe, esp back and legs
- [6] Second phase, with meningismus
- [7] Esp trunk
- [8] Uncommon
- [9] Uncommon except in Asia
- [10] Occur in 2 phases separated by short afebrile period



# Listeriosis

## Weapon

No

## Alternate Names

NA

## Etiology

*Listeria monocytogenes*

## Transmission

Source:	Soil, water, silage, animals, humans, food [2]
Entry:	Ingestion [3] Contact
Human-to-Human:	Maternal – fetal Fecal – oral

## Predisposing/Comorbid Conditions

- Advanced age
- Cancer
- Diabetes mellitus
- Immune compromise, esp AIDS
- Iron-overload states
- Newborn [5]
- Patients taking glucocorticoids
- Pregnancy [10]
- Renal disease

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

- Gastrointestinal
- Nervous

## Incubation

Invasive: 3-70 days (mean 3 weeks)

Noninvasive gastroenteritis: <1-2 days

## Signs/Symptoms [1]

Abdomen – cramps

Appetite – decreased (anorexia)

Bowel movements – diarrhea

Chills

Head – pain (headache)

Mentation – fatigue

Muscles – pain (myalgia)

Nausea

Neck, post – stiff (meningismus)

Skin, hands/arms – papules [4]

Temperature, body – elevated (fever)

Vomiting

## Differentiation

*Includes, but not limited to:*

Brain abscess

Fever of unknown origin [10]

Gastroenteritis – other causes

Meningoencephalitis – other causes

## Complications

*Include, but not limited to:*

Acute respiratory distress syndrome (ARDS)

Brain abscess

Brain stem encephalitis (rhombencephalitis) [9]

Disseminated intravascular coagulation (DIC)

Endocarditis

Eye inflammation

Meningoencephalitis [8]

Pericarditis

Peritonitis

Pneumonia

Pregnancy-related [10]

infection of newborn [7]

miscarriage

placental rupture

premature labor  
spontaneous abortion  
stillbirth endocarditis  
Rhabdomyolysis  
Sepsis

**Laboratory [6] ▲**

Blood culture – positive  
CSF culture – positive  
Stool culture – positive

**ECG**

NA in absence of complications

**Imaging**

NA in absence of complications

**Other Tests**

NA in absence of complications

**Treatment – Nonpharmacologic**

NS

**Treatment – Pharmacologic**

Antibiotics  
Aminoglycosides  
Ampicillin  
Penicillin  
Trimethoprim – sulfa

**Treatment – Surgical/Invasive**

NA in absence of complications

**Precautions [6]**

Standard

**Primary Prevention**

Vaccine: investigational  
Cooking and pasteurization kill organism, but contamination can occur after cooking before packaging, so packaged cooked foods should be reheated  
Pregnant women and immunocompromised patients: thorough cleaning and cooking of all foods, esp leftovers, and avoidance of soft cheeses and deli meats ▲





# Lyme Disease

## Weapon

No

## Alternate Names

Acrodermatitis chronica atrophicans  
Bannwarth syndrome  
Erythema chronicum migrans  
LD  
Steere's disease  
Tick-borne meningopolyneuritis

## Etiology [1]

*Borrelia burgdorferi*

## Transmission

Source: *Ixodes* ticks from wild animals [14]  
Entry: Tick bite  
Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographic

Location: Asia, Europe, N America  
Population: All, esp children, young adults  
Calendar: Year-round, esp summer

## Systems

Cardiovascular  
Liver/Biliary tract/Pancreas  
Lymphatic  
Musculoskeletal

Nervous  
Optic  
Skin

## Incubation

3-30 days (mean 7-10 days)

## Signs/Symptoms [1]

Back, lumbar – pain  
Bones – pain [8]  
Breathing – diff, rest (rest dyspnea)  
Chest, ant – pain, nonpleuritic rest [10]  
Chills  
Consciousness – loss, sudden (syncope) [9]  
Cough – acute NS  
Cough – nonproductive  
Eyes, conjunctivae – injected  
Eyes, iris – inflamed  
Eyes, retina – swollen  
Head, gen – pain (headache)  
Heart, rate – reduced (bradycardia) [9]  
Heart, rhythm – irregular [9]  
Joints, local – tender [2]  
Joints – pain (arthralgia) [2, 7]  
Joints – swollen [2]  
Liver – enlarged (hepatomegaly)  
Lymph nodes – enlarged  
Mentation – fatigue  
Mentation – memory loss  
Mentation – weakness (malaise) [3]  
Mood – depression  
Multiple s/s – nervous system  
Muscles – pain (myalgia)  
Nausea  
Neck, post – pain  
Neck, post – stiff  
Seizures  
Skin, local – macule/papule, single [4]  
Skin, local – necrosis, single [4]  
Skin, local – rings, red, single [4]

Skin – itching (urticaria)  
Skin – red (erythema)  
Spleen – enlarged  
Temperature, body – elevated (fever)  
Tendons – pain [8]  
Testicles, bilat – enlarged  
Throat – sore  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Acute rheumatic fever  
Bell's palsy  
Chronic fatigue syndrome  
Multiple sclerosis  
Reiter's syndrome  
Rheumatoid arthritis

### **Complications**

*Include, but not limited to:*

Acrodermatitis chronica atrophicans  
Arthritis  
Cerebellar ataxia [12]  
Chorea [12]  
Cranial neuritis [5, 12]  
Dilated cardiomyopathy  
Encephalopathy [12]  
Facial palsy  
Fatigue, recurrent  
Keratitis  
Lymphocytoma benigna cutis  
Meningitis [12]  
Mononeuritis multiplex [12]  
Myelitis [12]  
Myocarditis [6]  
Pericarditis  
Peripheral neuropathy [12]  
Radiculopathy [12]

### **Laboratory**

Blood IgG-specific antibodies – present  
Blood IgM-specific antibodies – present

Synovial fluid protein – increased  
Synovial fluid WBC – increased

### Imaging

Heart – enlarged [10]

### ECG

AV conduction – 1<sup>st</sup> degree block [10]  
AV conduction – 2<sup>nd</sup> degree block, Mobitz I (Wenckebach) [10]  
AV conduction – 3<sup>rd</sup> degree block [10]  
ST-T wave – NS abnormality [10]

### Other Tests

NA in absence of complications

### Treatment – Nonpharmacologic

Tick removal [15] ▲

### Treatment – Pharmacologic

Antibiotics [13]  
Amoxicillin  
Ceftriaxone  
Doxycycline  
Erythromycin  
Penicillin  
Tetracycline

### Treatment – Surgical/Invasive

Joint fluid aspiration  
Synovectomy [11]

### Precautions

Standard

### Primary Prevention

Vaccine: yes  
Early tick removal [15] ▲  
Tick-bite prevention

### Course

Variable  
Spontaneous resolution usual



# Lymphocytic Choriomeningitis

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

LCM

Lymphocytic meningitis

## Etiology

Lymphocytic choriomeningitis virus (arenavirus)

Viremia infects multiple organ systems with predilection for central nervous system, followed by inflammatory response

## Transmission

Source: Aerosolized rodent (mouse, hamster) waste or saliva

Entry: Ingestion of contaminated food  
Direct exposure of open skin lesions to infected blood  
Fetal circulation

Human-to-Human: Mother-fetus; organ transplant

## Predisposing/Comorbid Conditions

Skin abrasion

## Demographics

Location: Global, esp Europe, Americas, Japan, Australia

Populations: All

Calendar: Year-round, usually autumn

## Systems

Musculoskeletal

Nervous

Skin

## Incubation

1-3 weeks

## Signs/Symptoms [1]

Appetite – decreased (anorexia)  
Back, lumbar – pain  
Chest, ant – pain, nonpleuritic rest  
Chills  
Cough – nonproductive  
Mentation – lightheaded  
Extremities, sensations – abnormal (dysesthesias) [2]  
Eyes, light sensitivity – increased (photophobia)  
Eyes, retroorbital – pain  
Face, parotid – pain [2]  
Hair, head – loss (alopecia) [2]  
Head – pain (headache)  
Heart rate – decreased relative to fever (relative bradycardia)  
Joints, hand – pain [2]  
Joints, hand – swollen [2, 3]  
Joints – pain (arthralgia)  
Lymph nodes – enlarged  
Mentation – confusion [2]  
Mentation – weakness (malaise)  
Muscles – pain (myalgia)  
Muscles – paralysis [2, 4]  
Nausea  
Neck, post – stiff (meningismus) [2]  
Skin – rash, macular/papular [2]  
Skin – rash, red (erythematous) [2]  
Temperature, body – elevated (fever)  
Testicles, bilat – pain [2]  
Throat – injected  
Throat – sore  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other forms of encephalitis  
Other forms of meningitis  
Other viral hemorrhagic fevers



## Complications

*Include, but not limited to:*

- Acute hydrocephalus
- Alopecia
- Arthritis
- Encephalomyelitis
- Myelitis
- Myocarditis
- Nerve deafness
- Orchitis
- Pregnancy:
  - Abortion
  - Congenital chorioretinitis
  - Congenital hydrocephalus
  - Mental retardation

## Laboratory [6] ▲

- Blood ELISA antibodies – positive
- Blood liver enzymes – increased
- Blood platelets, total – decreased (thrombocytopenia)
- Blood WBC, total – decreased (leukopenia)
- CSF ELISA antibody titer – positive
- CSF glucose – decreased
- CSF lymphocytes – increased
- CSF protein – increased

## ECG

NA in absence of complications, esp myocarditis

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic

Ribavirin [5]



# Malaria

## Weapon

No

## Alternate Names

Ague

Marsh fever

## Etiology

*P falciparum*

*P malariae*

*P ovale*

*P vivax*

## Transmission

Source: Humans

Entry: Mosquito bite [5]

Blood transfusion

Human-to Human: Via mosquito only

## Predisposing/Comorbid Conditions

HIV

## Demographics

Location: Tropics and subtropics

Populations: All, esp children; pregnant women risk complications

Calendar: Year-round, esp after rain in dry areas

## Systems

Hematopoietic/immune

Liver/Biliary tract/Pancreas

Nervous

**Incubation [3]**

<i>P falciparum</i> :	7-14 days
<i>P malariae</i> :	7-30 days
<i>P ovale</i> :	8-14 days
<i>P vivax</i> :	8-14 days

**Signs/Symptoms [6, 8]**

Abdomen – pain  
Abdomen – tender  
Appetite – decreased (anorexia)  
Arterial pressure, diastolic – decreased  
Arterial pressure, systolic – decreased  
Back, gen – pain  
Bowel movements – blood or black (hematochezia) (melena)  
Bowel movements – diarrhea  
Chills  
Consciousness – altered  
Cough – nonproductive  
Eyes, retina – hemorrhage  
Head – pain (headache)  
Heart rate – increased (tachycardia)  
Joints – pain (arthralgia)  
Liver – enlarged (hepatomegaly)  
Lymph nodes – enlarged  
Mentation – confusion  
Mentation – delirium  
Mentation – fatigue  
Mentation – sleepy (somnia)  
Mentation – weakness (malaise)  
Muscles – pain (myalgia)  
Nausea  
Seizures  
Skin color – pallor  
Skin color – yellow (jaundice)  
Sleep – disturbed (insomnia)  
Spleen – enlarged (splenomegaly)  
Sweating – increased (hyperhidrosis)  
Temperature, body – elevated (fever)  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other recurrent febrile illnesses

## Complications

*Include, but not limited to:*

Anemia

Blackwater fever [1]

Cerebral malaria

Cognitive impairment

Gastroenteritis

Hypoglycemia

Liver failure

Metabolic acidosis

Noncardiac pulmonary edema

Pregnancy:

    fetal death ☠

    maternal death ☠

    miscarriage

    neonatal death ☠

Renal failure

Respiratory distress

Shock

Spleen rupture

## Laboratory

Blood bilirubin – increased

Blood creatinine – increased

Blood glucose – decreased (hypoglycemia)

Blood Hgb/Hct – decreased (anemia)

Blood liver enzymes – increased

Blood lymphocytes – decreased (lymphopenia) [2]

Blood pH – decreased (metabolic acidosis)

Blood platelets – decreased (thrombocytopenia)

Blood sodium – decreased (hyponatremia)

Blood WBC – decreased (leukopenia)

Blood WBC – increased (leukocytosis)

Urine hemoglobin – present (hemoglobinuria)

Urine protein – present (proteinuria)

## ECG

Rate – rapid (sinus tachycardia)

## Imaging

NS in absence of complications

## Other Tests

Demonstration of parasite in bloodstream (Giemsa stain)

Rapid dipstick test for *plasmodium* protein or LDH

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic [8, 9] ▲

Artemether

Atovaquone

Chloroquine

Doxycycline

Lumefantane

Primaquine

Proguanil

Quinidine

Quinine

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Needle disposal ▲

## Primary Prevention

Vaccine: no

Chemoprophylaxis [9]

Mosquito control and exposure

Physical barriers to mosquito bites [4] ▲

Pregnant women should exercise maximum protection, including avoiding malarious areas whenever possible ▲

## Course

Variable



# Marburg Hemorrhagic Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

African hemorrhagic fever

## Etiology

Marburg filovirus (*Filoviridae* virus)

Initially infects lymphatic system, with dissemination to testes, ovaries, and liver, with secondary, severe effects on blood coagulation

## Transmission

Source: Monkeys, bats  
Entry: Contact with animals or materials contaminated with infectious blood or body secretions  
Human-to-Human: Yes

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Africa, esp Congo  
Populations: Monkey handlers, laboratory personnel, caregivers  
Calendar: Year-round

## Systems

Coagulation  
Liver/Biliary tract/Pancreas  
Renal/Genitourinary



## Incubation

5-10 days

## Signs/Symptoms [7]

Abdomen – pain

Appetite – reduced (anorexia)

Bowel movements, stool – blood or black (hematochezia) (melena)

Bowel movements – diarrhea

Breathing – rapid (tachypnea)

Chills

Eyes, conjunctivae – injected

Eyes – burning, itching

Fatigue

Head – pain (headache)

Hiccups [1]

Joints – pain (arthralgia)

Mentation – apathetic

Mentation – confused

Mentation – weakness (malaise)

Mouth, gingiva – bleeding

Mouth, mucosa – hemorrhage

Mouth, mucosa – ulcers

Muscles – pain (myalgia)

Nausea

Nose – blood (epistaxis)

Skin – petechiae

Skin – rash, desquamating

Skin – rash, macular/papular [3]

Sputum – blood (hemoptysis)

Swallowing – difficult (dysphagia)

Swallowing – pain (odynophagia)

Temperature, body – elevated (fever)

Throat – sore

Vagina – blood

Vomiting

Vomiting – blood (hematemesis)

Weight – loss

## Differentiation

*Includes, but not limited to:*

Ebola and other viral hemorrhagic fevers

Malaria  
Rickettsial diseases  
Typhoid fever

## Complications

*Include, but not limited to:*

Blindness  
Disseminated intravascular coagulation (DIC)  
Hepatitis, recurrent  
Liver failure  
Massive hemorrhage  
Multi-organ failure  
Myocarditis  
Orchitis  
Pancreatitis  
Parotitis  
Renal failure  
Shock  
Spontaneous abortion  
Transverse myelitis  
Uveitis

## Laboratory [6] ▲

Blood amylase – increased  
Blood creatinine – increased  
Blood ELISA IgG antibodies – positive (2<sup>nd</sup> week)  
Blood liver enzymes – increased  
Blood lymphocytes – decreased (lymphopenia)  
Blood platelets, total – decreased (thrombocytopenia)  
Blood prothrombin time – increased  
Blood WBC – decreased (leukopenia)  
Blood WBC – left shift [4]  
Urine protein – present (proteinuria)

## ECG

NS [5]

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications



# Melioidosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Pseudoglanders  
Whitmore's disease

## Etiology

*Burkholder pseudomallei*

Initial local infection in skin or lungs with intracellular multiplication; may become disseminated via bloodstream, with septic shock

## Transmission

Source:	Soil
Entry:	Contact through skin wound Inhalation Ingestion
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

Chronic conditions, i.e., HIV, renal failure, diabetes mellitus, chronic lung disease, alcohol excess

## Demographics

Location:	Global, esp SE Asia, Northern Australia, S Pacific, China, Africa, India, Middle East
Populations:	All, esp debilitated; military serving in endemic areas
Calendar:	Year-round

## Systems

Musculoskeletal  
Renal/Genitourinary  
Respiratory – lower  
Skin

## Time to Clinical Onset

Days – years

## Signs/Symptoms (Acute form) [1]

Appetite – decreased (anorexia)  
Breath sounds – coarse (rhonchi)  
Breath sounds – crackling (rales)  
Breathing – diff, rest (rest dyspnea)  
Chest, gen – pain, pleuritic  
Chills  
Cough – productive  
Head – pain (headache)  
Lymph nodes, regional – enlarged  
Mentation – confused  
Mentation – weakness (malaise)  
Muscles – pain (myalgia)  
Muscles – tender  
Skin – nodule  
Skin – ulcer, single  
Skin – rash, papular  
Skin – rash, pruritic  
Skin – rash, pustular  
Sputum – blood (hemoptysis)  
Sputum – purulent  
Temperature, body – elevated (fever)

## Differentiation (Acute form)

*Includes, but not limited to:*

Glanders  
Other causes of pulmonary infection  
Tuberculosis

## Complications

*Include, but not limited to:*

Chronic suppurative infection involving many organs, i.e., brain,  
bone, joints, liver, parotid, spleen  
Septicemia

## Laboratory [2]

Blood culture – positive

Blood IgM-specific antibodies – present  
Blood lymphocytes – increased (lymphocytosis)  
Blood serology – positive  
Blood WBC – increased (leukocytosis)  
Skin culture – positive  
Skin stain – positive  
Sputum culture – positive  
Sputum stain – positive  
Urine culture – positive

### **ECG**

NA in absence of complications

### **Imaging**

Chest x-ray  
    cavitation  
    infiltrates – apical  
    nodules – diffuse, miliary

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

NS

### **Treatment – Pharmacologic**

Antibiotics  
    Ceftazadime  
    Doxycycline  
    Imipenem  
    Meropenem  
    Trimethoprim – sulfa

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

Contact  
Standard



# Meningococemia

## Weapon

No

## Alternate Names

Purpura fulminans [1]

Waterhouse-Friderichsen syndrome [1]

## Etiology

*Neisseria meningitidis*

## Transmission

Source: Secretions from infected humans

Entry: Mucosal contact

Human-to-Human: Yes

## Predisposing/Comorbid Conditions

Asplenia

Enteropathy

Genetic complement C5-C9 deficiency

Hepatic disease

HIV

Immunoglobulin deficiency

Multiple myeloma

Nephrotic syndrome

Systemic lupus erythematosus

## Demographics

Location: Global, esp sub-Saharan Africa [12]

Populations: All – esp infants, late teens-early 20's, bacteriologists, military recruits, residents of college dormitories [13]

Calendar: Year-round, peak late winter – early spring



## Systems

Hematopoietic/Immune  
Nervous  
Skin

## Incubation

2-10 days

## Signs/Symptoms [2]

Appetite – decreased (anorexia)  
Arterial press – low (hypotension)  
Chills  
Consciousness – loss, prolonged (coma)  
Cough – acute NS [3]  
Eyes, light sensitivity – increased (photophobia)  
Head – pain (headache)  
Heart rate – increased (tachycardia)  
Joints – pain (arthralgia)  
Mentation – delirium [1]  
Mentation – sleepy (somnolence)  
Mentation – weak (malaise)  
Mood – restless/irritable [1]  
Muscles – pain (myalgia)  
Nausea  
Neck, post – stiff (meningismus)  
Skin, gen – rash, ecchymotic [1, 6]  
Skin – rash, macular/papular  
Skin – rash, petechiae [4]  
Skin – rash, purpura [1, 6]  
Skin – rash, pustular [1]  
Skin – rash, urticarial[7]  
Temperature, body – elevated (fever) [5]  
Temperature, body – low [5]  
Throat – injected  
Throat – sore [3]  
Vomiting

## Differentiation

*Includes, but not limited to:*

Dengue fever  
Infective endocarditis

Other causes of meningitis  
Rocky Mountain spotted fever  
Thrombotic thrombocytopenic purpura

### **Complications**

*Include, but not limited to:*

Adrenal failure [1]  
Arthritis – immune complex  
Arthritis – septic  
Congestive heart failure  
Conjunctivitis  
Deafness  
Disseminated intravascular coagulation (DIC)  
Endocarditis  
Endometritis  
Epiglottitis  
Hepatic failure  
Herpes labialis  
Limb gangrene  
Meningitis  
Myocarditis  
Osteomyelitis  
Pericarditis  
Renal failure  
Respiratory failure  
Seizures  
Sinusitis  
Thrombocytopenia  
Urethritis  
Vascular collapse  
Vascular thrombosis

### **Laboratory [15] ▲**

Blood culture – positive [8]  
Blood latex agglutination – positive [1]  
Blood platelets– decreased (thrombocytopenia) [1]  
Blood WBC – increased (leukocytosis)  
Blood WBC – left shift  
CSF bacterial stain – positive [9]  
CSF culture – positive [9]  
CSF glucose – decreased [9]

CSF latex agglutination – positive [10]  
CSF protein – increased [9]  
CSF WBC – increased [9]  
Skin culture – positive

## ECG

NA in absence of complications

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Cardiac support  
Fluids and electrolytes  
Ventilation

## Treatment – Pharmacologic

Antibiotics [16] ▲  
    Cephalosporins – third generation  
    Chloramphenicol  
    Penicillin G  
Corticosteroids (?) [13]  
Platelets and clotting factors

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Standard [15] ▲

## Primary Prevention

Vaccine: yes  
    college students  
    travelers  
    pregnant women  
Chemoprophylaxis [16] ▲  
Living space ventilation  
Reduce/eliminate crowded living conditions  
Reduce/eliminate secretion exposure from infected persons



# Monkeypox

## Weapon

No

## Alternate Names

NA

## Etiology

Monkeypox virus, an orthopoxvirus

## Transmission

Source: Primates, rodents, rabbits, humans [4]

Entry: Animal bite

Contact with secretions from infected animal

Inhalation

Human-to-Human: Yes [5]

## Predisposing/Comorbid Conditions

NA

## Demographics

Locations: Most cases reported in Central Africa; 1 outbreak in USA midwest [6]

Populations: All

Calendar: Year-round

## Systems

Lymphatic

Skin

## Incubation

7-20 days

## Signs/Symptoms

Back – pain  
Breathing – diff, rest (rest dyspnea)  
Chills  
Cough – nonproductive  
Hair, head – loss (alopecia) [1]  
Head – pain (headache)  
Lymph nodes – enlarged [7]  
Mentation – fatigue  
Muscles – pain (myalgia)  
Nausea  
Skin, sweating – increased (hyperhidrosis)  
Skin – rash, crusting [2, 3]  
Skin – rash, papular [2, 3]  
Skin – rash, pustular [2, 3]  
Skin – rash, vesicular [2, 3]  
Skin – ulcers [2]  
Temperature, body – elevated (fever)  
Throat – sore  
Vomiting

## Differentiation

*Includes, but not limited to:*

Chickenpox  
Cowpox  
Smallpox  
Vaccinia

## Complications

Bacterial skin infection  
Encephalitis  
Keratitis  
Pulmonary

## Laboratory [9] ▲

NS in absence of complications

## ECG

NA in absence of complications

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic

NS

## Treatment – Surgical/Invasive

NA

## Precautions

BSL-2 or BSL-3 procedures ▲  
Standard

## Primary Prevention

Vaccine: no [8]  
Avoid contact with suspect animals ▲  
Handwashing after contact with suspect animal ▲  
Infection control

## Course

Duration – 2-4 weeks  
Mortality in Africa – up to 10% ☠

## Notes

- [1] May occur in acute stage illness
- [2] Multiple stages may exist concurrently
- [3] Head, trunk, extremities; may begin on soles or generalized
- [4] Monkeys in Africa; prairie dogs in USA; all animals may be suspect
- [5] Respiratory droplets; body fluids; direct contact
- [6] In 2003 from infected prairie dogs in Wisconsin, Illinois, Indiana
- [7] Differentiating point from smallpox, which does not cause lymphadenopathy
- [8] Smallpox vaccination may convey some preventative effect if given soon after exposure
- [9] BSL-2 or BSL-3 procedures ▲





# Mumps

## Weapon

No

## Alternate Names

Epidemic parotitis  
Infectious parotitis

## Etiology

Mumps virus (genus paramyxovirus)

## Transmission

Source: Humans  
Entry: Direct contact with infected saliva  
Human-to-Human: Yes

## Predisposing/Comorbid Conditions

NA

## Demographic

Location: Global  
Population: All persons unvaccinated/without prior infection  
Calendar: Year-round, peak winter and spring

## Systems

Nervous  
Genitourinary  
Oropharynx

## Incubation

14-21 days

## Signs/Symptoms

- Appetite – decreased (anorexia) [3]
- Cough – nonproductive [4]
- Ears – pain
- Face, jaw – tender [1, 2]
- Face, parotid glands – enlarged [1]
- Face, parotid glands – pain [1, 5]
- Face, parotid glands – tender
- Neck, submandibular glands – pain
- Neck, submandibular glands – enlarged
- Neck, submandibular glands – tender
- Head – pain (headache) [3]
- Mentation – weak (malaise)
- Mouth, chewing – pain [5]
- Mouth, Stensen's duct – inflammation
- Muscles – pain (myalgia) [3]
- Swallowing – pain (odynophagia) [5]
- Temperature, body – elevated (fever) [3]

## Differentiation

*Includes, but not limited to:*

- Other infectious causes of parotid swelling [8]
- Noninfectious causes of parotid swelling [9]

## Complications

*Include, but not limited to:*

- Arthritis
- Deafness
- Encephalitis
- Fetal death – 1<sup>st</sup> trimester
- Mastitis
- Meningitis – aseptic
- Myocarditis
- Nephritis
- Oophoritis
- Orchitis
- Pancreatitis

## Laboratory

- Blood amylase – increased

Blood IgG-specific antibodies – present  
Blood IgM-specific antibodies – present [6]

### ECG [7]

NS ST-T wave changes  
Prolonged PR interval

### Imaging

NA in absence of complications

### Other Tests

NA in absence of complications

### Treatment – Nonpharmacologic

Parotid warm/cold packs  
Soft diet

### Treatment – Pharmacologic

NS

### Treatment – Surgical/Invasive

NA in absence of complications

### Precautions

Standard

### Primary Prevention

Vaccine: yes  
Avoid exposure to high risk persons such as those with AIDS,  
pregnancy ▲

### Course

Complete recovery usual

### Notes

- [1] Unilateral or bilateral
- [2] Angle of jaw
- [3] Prodromal symptom



# OMSK Hemorrhagic Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

OHF

## Etiology

OMSK hemorrhagic fever virus (a flaviviridae virus)

Causes small blood vessel thrombi, RBC extravasation, surrounding tissue edema

## Transmission

Source:	Ticks, muskrats, rodents
Entry:	Tick bite Direct contact Ingestion of contaminated water
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographic

Location:	Western Siberia
Population:	All, esp muskrat trappers
Calendar:	Peak in late spring and late summer

## Systems

Coagulation  
Nervous

**Incubation**

3-8 days

**Signs/Symptoms**

Bowel movements, stool – blood or black (hematochezia)  
(melena)

Chills

Extremities, lower – pain

Extremities, upper – pain

Eyes, conjunctivae – blood

Head – pain (headache)

Lymph nodes, anterior cervical – enlarged

Mentation – confusion

Mentation – delirium

Mentation – weakness (malaise)

Mouth, soft palate – eruption, papulovesicular

Muscles – pain (myalgia)

Muscles – tremors, intention

Neck, posterior – stiff (meningismus)

Nose – blood (epistaxis)

Sputum – blood (hemoptysis)

Temperature, body – elevated (fever)

Urine – blood (hematuria)

Vagina – blood

Vomiting – blood (hematemesis)

**Differentiation**

*Includes, but not limited to:*

Coagulopathies

Encephalitis

Other viral hemorrhagic fevers

**Complications**

*Include, but not limited to:*

Alopecia

Hearing loss

Neuropsychiatric changes

Pneumonia

Shock

**Laboratory [1] ▲**

- Blood culture – positive
- Blood IgM specific antibodies – positive
- Blood platelets – decreased (thrombocytopenia) [2]
- Blood WBC – decreased (leukopenia) [2]
- Urine blood – positive
- Urine protein – present (proteinuria)

**ECG**

- NA in absence of complications

**Imaging**

- NA in absence of complications

**Other Tests**

- NA in absence of complications

**Treatment – Nonpharmacologic**

- Fluids, electrolytes

**Treatment – Pharmacologic**

- NS

**Treatment – Surgical/Invasive**

- NA

**Precautions**

- BSL-4 procedures ▲
- Standard

**Primary Prevention**

- Vaccine: experimental
- Tick bite prevention

**Course**

- <5% mortality





# Parvovirus B19

## Weapon

No

## Alternate Names

Academy rash  
Erythema infectiosum  
Fifth disease  
Slapped cheek disease  
Sticker's disease

## Etiology

Human parvovirus B19

## Transmission

Source: Humans  
Entry: Inhalation  
Maternal-fetal  
Transfusion  
Human-to-Human: Yes [10]

## Predisposing/Comorbid Conditions [12]

Congenital hemolytic anemia  
Immune deficiency  
Pregnancy

## Demographics

Location: Global  
Populations: All, esp children  
Calendar: Late winter-early spring in epidemics

## Systems

Hematopoietic  
Musculoskeletal  
Skin

## Incubation

4-20 days

## Signs/Symptoms [9]

- Appetite – decreased (anorexia) [1]
- Bowel movements – diarrhea [1]
- Cough – nonproductive [1]
- Head – pain (headache) [1]
- Joints – pain (arthralgia) [2]
- Joints – swelling [2]
- Mentation – weak (malaise) [1]
- Mouth, mucosa – ulcers [3]
- Muscles – pain (myalgia)
- Muscles – stiffness
- Nausea [1]
- Nose, drainage – increased (rhinorrhea, coryza ) [1]
- Nose – congested [1]
- Skin, face – rash, red (erythema) [4]
- Skin – rash, macular/papular [5]
- Skin – rash, petechiae [6]
- Skin – rash, pruritic [13]
- Skin – rash, purpura [6]
- Skin – rash, red (erythematous) [5]
- Skin – rash, vesicular [6]
- Temperature, body – elevated (fever) [1]

## Differentiation

*Includes, but not limited to:*

- Other causes of arthritis [11]
- Other causes of hemorrhagic/vesicular/maculopapular rashes
- Scarlet fever

## Complications

*Include, but not limited to:*

- Aplastic crisis [7]
- Chronic infection [8]
- Encephalitis
- Hypdrops fetalis
- Spontaneous abortion

## Laboratory

- Blood IgG-specific antibodies – positive
- Blood IgM-specific antibodies – positive
- Blood WBC – increased (leukocytosis)
- Bone marrow – amorphous pronormoblast inclusions

## ECG

- NA in absence of complications

## Imaging

- NA in absence of complications

## Other Tests

- NA in absence of complications

## Treatment – Nonpharmacologic

- NS

## Treatment – Pharmacologic

- NS

## Treatment – Surgical/Invasive

- NA

## Precautions

- Aerosol barriers before rash appears
- Standard

## Primary Prevention

- Vaccine: in development

## Course

- Spontaneous resolution in days-weeks, although rash or arthritis can recur or persist longer

## Notes

- [1] Prodromal phase
- [2] Joint symptoms usually last 2-3 weeks, but sometimes can persist for several months



# Plague

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

Black death

## Etiology

*Yersinia pestis* [10]

Inhaled or multiply in lymph nodes draining bite site leading to lymph node destruction (bubo), septicemia and toxemia; septicemia can cause secondary pneumonic, pharyngitic, and meningitic forms

## Transmission

Source:	Rodents
Entry:	Flea bites or directly by bites of rats, other rodents, and cats
	Inhalation
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

NA

## Demographic

Location:	Global except Australia [7]
Populations:	Crowded living conditions, cold temperatures, high humidity
Calendar:	Year-round, esp warm seasons

## Systems

Lymphatic  
Nervous  
Respiratory – lower

**Incubation**

1-6 days

**Signs/Symptoms [5]**

Abdomen – pain  
Bowel movements – diarrhea  
Breath sounds – coarse (rhonchi) [p]  
Breath sounds – crackles (rales) [p]  
Breathing – diff, rest (rest dyspnea) [p]  
Breathing – rapid (tachypnea) [p]  
Chest – pain, pleuritic [p]  
Chills  
Cough – productive  
Digits – gangrenous [1] [s]  
Head – pain (headache)  
Heart rate – increased (tachycardia)  
Liver – large (hepatomegaly)  
Lymph nodes, ant cervical – enlarged [t]  
Lymph nodes, regional – break down (suppurate) [b]  
Lymph nodes, regional – enlarged [2] [b]  
Lymph nodes, regional – tender [2] [b]  
Lymph nodes, regional – skin overlying red/hot [2] [b]  
Mentation – confusion  
Mentation – delirium  
Mentation – weak (malaise)  
Mood – restless/irritable  
Muscles, movement – incoordinated (ataxia)  
Muscles – pain (myalgia)  
Muscles – weak  
Nausea  
Neck, post – stiff (meningismus)  
Nose – gangrene [1] [s]  
Seizures  
Skin – rash, purpura [s]  
Sleep – disturbed (insomnia)  
Speech – disturbed (dysphasia)  
Spleen – large (splenomegaly)  
Sputum – blood (hemoptysis) [p]  
Sputum – clear [p]

Sputum – purulent [p]  
Temperature, body – elevated (fever)  
Throat – sore [t]  
Vomiting [p]

### Differentiation

*Includes, but not limited to:*

Acute abdomen  
Other causes of lymphadenitis  
Other causes of pneumonia  
Other causes of meningitis

### Complications

*Include, but not limited to:*

Cellulitis  
Coma  
Disseminated intravascular coagulation (DIC)  
Meningitis  
Shock – septic [11]  
Skin abscess

### Laboratory [8] ▲

Blood bacterial stain – positive  
Blood bilirubin – increased  
Blood coagulation – abnormal  
Blood culture – positive  
Blood glucose – decreased  
Blood IgG-specific antibodies – present  
Blood liver enzymes – increased  
Blood specific antigen – positive  
Blood WBC – increased (leukocytosis)  
Lymph node culture – positive (b)  
Sputum culture – positive (p)  
Sputum stain – positive (p)

### ECG

NA in absence of complications

### Imaging

Lungs, parenchyma – consolidation (p)  
Lungs, parenchyma – infiltrates (p)

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Fluids and electrolytes  
Ventilation

## Treatment – Pharmacologic

Antibiotics [4]  
Chloramphenicol [3]  
Doxycycline  
Fluroquinolones  
Gentamicin  
Streptomycin  
Sulfonamides

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Isolation of patient and contacts ▲  
Droplet precautions [9]  
Standard

## Primary Prevention [8]

Vaccine: yes  
Animal reservoir control  
Environmental control  
Post exposure antibiotic prophylaxis  
Avoid travel to endemic/epidemic areas or take appropriate precautions when doing so

## Course

Treated mortality – 15% ☠  
Untreated mortality – 50-90% ☠

## Notes

[b] Bubonic form  
[p] Pneumonic form  
[t] Pharyngitic form





# Psittacosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Avian chlamydiosis  
Ornithosis  
Parrot fever

## Etiology

*Chlamydia psittaci*

## Transmission

Source: Birds, esp parrots, parakeets, love birds, turkeys  
Entry: Inhalation  
Human-to-Human: Rare

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global  
Populations: All, esp bird owners and handlers  
Calendar: Year-round

## Systems

Respiratory – lower  
Respiratory – upper

## Incubation

1-4 weeks

## Signs/Symptoms

- Abdomen – distention [1]
- Abdomen – pain
- Appetite – decreased (anorexia)
- Back – stiffness
- Bowel movements – constipation
- Bowel movements – diarrhea [1]
- Breathing – difficult (dyspnea)
- Breathing – rapid (tachypnea)
- Chest – friction rub
- Chest – pain, pleuritic
- Chest – rales
- Chills
- Consciousness – loss, prolonged (coma) [2]
- Cough – nonproductive
- Cough – productive [1]
- Ears, hearing – decreased
- Ears – ringing (tinnitus)
- Eyes, vision – light sensitivity, increased (photophobia)
- Head – pain (headache) [3]
- Heart rate – slow relative to fever (relative bradycardia)
- Joints – pain (arthralgia)
- Liver – enlarged (hepatomegaly) [4]
- Lymph nodes, anterior cervical – enlarged
- Mentation – confusion
- Mentation – delirium
- Mentation – feeling of weakness (malaise)
- Mood – depressed
- Mood – lethargic, slowed
- Mood – restless, irritable
- Mouth, palate – petechiae
- Muscles, back – spasm
- Muscles – pain (myalgia)
- Muscles – tender
- Nausea
- Neck, posterior – stiff (meningismus)
- Nose – blood (epistaxis)
- Skin color – yellow (jaundice) [4]
- Skin – rash, macular [5]
- Sleep – disturbed (insomnia)

Spleen – enlarged (splenomegaly)  
Sputum – blood (hemoptysis) [1]  
Sweating – increased (hyperhidrosis)  
Temperature, body – elevated (fever)  
Throat – injected  
Throat – sore  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

*Chlamydia pneumoniae*  
*Coxiella burnetti*  
Infectious mononucleosis  
Influenza  
Legionnaires' disease  
Meningitis  
*Mycoplasma pneumoniae*  
Q fever  
Tularemia  
Typhoid fever  
Viral pneumonias

### **Complications**

*Include, but not limited to:*

Acute respiratory distress syndrome (ARDS)  
Anemia, hemolytic  
Arthritis  
Dilated cardiomyopathy  
Disseminated intravascular coagulation (DIC)  
Encephalitis  
Endocarditis  
Glomerulonephritis  
Hepatitis  
Keratoconjunctivitis  
Myocarditis  
Pancreatitis  
Pericarditis  
Pregnancy – related [8]  
Pulmonary infarction  
Thrombophlebitis

Thyroiditis  
Transverse myelitis

### Laboratory [7] ▲

Blood alkaline phosphatase – increased  
Blood antibody – titer increase  
Blood bilirubin – increased  
Blood IgG-specific antibodies – present  
Blood IgM-specific antibodies – present  
Blood liver enzymes – increased  
Blood WBC – increased (leukocytosis)  
Blood WBC – left shift

### ECG

NS in absence of complications

### Imaging

Lungs, parenchyma – consolidation [6]  
Lungs, parenchyma – infiltrates (miliary)  
Lungs, pleura – fluid (effusion)  
Lungs – atelectasis

### Other Tests

NS in absence of complications

### Treatment – Nonpharmacologic

NS

### Treatment – Pharmacologic

Antibiotics  
Doxycycline  
Erythromycin  
Tetracycline

### Treatment – Surgical/Invasive

NA

### Precautions

Laboratory handling of *chlamydia psittaci* organism ▲  
Standard



# Q Fever

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Query fever

## Etiology

*Coxiella burnetii* [12]

## Transmission

Source: Infected dust and other materials from many animals, including sheep, cattle, goats, rodents, ticks [15]

Entry: Contact  
Inhalation

Human-to-Human: Rare

## Predisposing/Comorbid Conditions

Cigarette smoking?

## Demographics

Location: Global

Populations: All, esp slaughterhouse workers and veterinarians

Calendar: Year-round

## Systems

Liver/Biliary tract/Pancreas

Musculoskeletal

Nervous

Optic

Respiratory – lower [5, 9]

## Incubation

1-4 weeks

**Signs/Symptoms [8, 9, 10]**

Abdomen, RUQ – pain  
Appetite – decreased (anorexia)  
Bowel movements – diarrhea  
Chest – crackles (rales)  
Chest – friction rub  
Chest – pain, pleuritic  
Chills  
Cough, nonproductive  
Eyes, retroorbital – pain  
Eyes, vision – double (diplopia)  
Face, unilat – pain  
Fatigue  
Head – pain (headache) [16]  
Joints – pain (arthralgia)  
Liver – large (hepatomegaly)  
Mentation – hallucinations [3]  
Mentation – weak (malaise)  
Muscles – pain (myalgia)  
Nausea  
Neck, post – stiff (meningismus)  
Skin, color – yellow (jaundice)  
Skin – rash, macular [4]  
Speech – disturbed (dysphasia)  
Speech – inarticulate (dysarthria)  
Spleen – large (splenomegaly)  
Sweating – increased (hyperhidrosis)  
Temperature, body – increased (fever)  
Throat – sore  
Vomiting  
Weight – loss

**Differentiation**

*Includes, but not limited to:*

Brucellosis  
Hepatitis  
Influenza  
Legionnaires' disease  
Malaria



Other causes of pneumonia  
Salmonellosis  
Tularemia

## Complications

*Include, but not limited to:*

Encephalomyelitis  
Hepatitis  
Infectious endocarditis [1]  
Myocarditis  
Optic neuritis  
Osteomyelitis  
Pericarditis

## Laboratory [11] ▲

Blood culture – positive  
Blood liver enzymes – increased  
Blood platelets – decreased (thrombocytopenia) [7]  
Blood serology – positive  
Blood WBC – increased (leukocytosis)

## ECG

NA in absence of complications

## Imaging

Lungs, parenchyma – infiltrates [14]  
Lungs, parenchyma – consolidation [14]  
Lungs, pleura – fluid

## Other Tests

Liver biopsy – granulomas, inflammation

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic

Antibiotics  
Chloramphenicol  
Quinolones

Rifampin  
Tetracycline

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

Laboratory handling of samples [11] ▲  
Standard

### **Primary Prevention**

Vaccine: yes [13]  
Pasteurization

### **Course**

Most cases resolve spontaneously

### **Notes**

- [1] Esp aortic valve, prosthetic valve
- [2] Highly infective in humans
- [3] Auditory and visual
- [4] Erythematous, transient
- [5] Lungs – focal intraaveolar and bronchial necrosis
- [6] Granulomatous inflammation of liver and bones
- [7] Transient
- [8] Onset sudden
- [9] Pneumonia in about 50% of patients
- [10] 50% or more of infected persons have no clinical illness
- [11] BSL-3 procedures ▲
- [12] Gram neg rod
- [13] For persons at high risk
- [14] Predilection for lower lobes
- [15] Transmitted among animals by ticks
- [16] May be severe
- [17] Usually normal

<http://www.argus1.com/?qfever>



# Rift Valley Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

NA

## Etiology

Bunyaviridae virus (genus *phlebovirus*)

After inoculation, virus replicates at exposure site, then migrates to target organ(s), mainly liver

## Transmission

Source: Mosquitoes and livestock, esp sheep  
Entry: Bite of mosquito and maybe fly  
Contact with blood/tissue of infected animals  
Human-to-Human: No

## Predisposing/Comorbid Conditions

Skin abrasion

## Demographics

Location: Africa, Arabian peninsula  
Populations: Livestock workers, veterinarians, anyone exposed to mosquitoes in endemic area  
Calendar: Year-round

## Systems

Coagulation  
Liver/Biliary tract/Pancreas  
Nervous  
Optic  
Skin

## Incubation

2-6 days

## Signs/Symptoms [3]

Abdomen, epigastrium – pain  
Appetite – decreased (anorexia)  
Back – pain  
Bowel movements – blood or black (hematochezia) (melena)  
Chills  
Eyes, conjunctivae – injected  
Eyes, light sensitivity – increased (photophobia)  
Eyes, retina – exudate  
Eyes, retina – hemorrhage  
Eyes, retina macula – swollen (macular edema)  
Eyes, retina – vascular occlusion  
Eyes, vision – blind spots (scotoma)  
Eyes, vision – loss, subtotal  
Face – flushed  
Head – pain (headache)  
Mentation – weak (malaise)  
Mentation – sleepy (somnolence)  
Muscles – pain (myalgia)  
Neck, post – stiff (meningismus)  
Nose – blood (epistaxis)  
Sense of taste – decreased/absent  
Skin color – yellow (jaundice)  
Skin – rash, purpura  
Temperature, body – elevated (fever)  
Vomiting  
Vomiting – blood (hematemesis)

## Differentiation

*Includes, but not limited to:*

Other viral hemorrhagic fevers

## Complications

*Include, but not limited to:*

Encephalitis  
Intracranial hemorrhage  
Liver necrosis  
Permanent vision loss

**Laboratory [2] ▲**

- Blood clotting time – increased
- Blood platelets – decreased (thrombocytopenia)
- Blood serology – positive
- Blood WBC – decreased (leukopenia)
- Blood WBC – left shift
- CSF – pleocytosis

**ECG**

- NA in absence of complications

**Imaging**

- NA in absence of complications

**Other Tests**

- NA in absence of complications

**Treatment – Nonpharmacologic**

- NS

**Treatment – Pharmacologic**

- Ribavirin [1]

**Treatment – Surgical/Invasive**

- NA in absence of complications

**Precautions**

- BSL-3 or BSL-4 procedures ▲
- Standard

**Primary Prevention**

- Vaccine: experimental
- Avoid sick animals in endemic areas
- Mosquito control

**Course**

- Overall mortality – 1%
- Up to 50% mortality in patients with hemorrhagic syndrome ☠



# Rocky Mountain Spotted Fever

## Weapon

No [10]

## Alternate Names

NA

## Etiology

*Rickettsia rickettsii*

Infection of vascular endothelial cells causes multiple abnormal organ manifestations

## Transmission

Source: Ticks  
Entry: Tick bite [9]  
Inhalation (laboratory exposure)  
Human-to-Human: No

## Predisposing/Comorbid Conditions

Increased morbidity and mortality with  
Advanced age  
African-American ethnicity  
Chronic alcohol abuse  
G6PD deficiency  
Male gender

## Demographic

Location: Western hemisphere  
Populations: All  
Calendar: Year-round, peak April-September



## Systems

Coagulation  
Liver/Biliary tract/Pancreas  
Musculoskeletal  
Nervous  
Optic  
Otic  
Skin

## Incubation

5-10 days

## Signs/Symptoms

Abdomen – distention  
Abdomen – pain [1]  
Abdomen – tender  
Appetite – decreased (anorexia)  
Arterial pressure – low [2]  
Arterial pulse, amplitude – decreased [2]  
Back – stiff  
Back, sacrum – swelling  
Bowel movements – diarrhea  
Bowel sounds – decreased/absent (ileus, adynamic)  
Chills  
Consciousness – loss, prolonged (coma) [2]  
Cough – nonproductive  
Ears, hearing – loss (deafness)  
Eyes, conjunctivae – injected  
Eyes, retina – petechiae  
Eyes, vision – light sensitivity, increased (photophobia)  
Extremities, ankles – swollen (edema)  
Extremities, feet – swollen (edema)  
Extremities, hands – swollen (edema)  
Face – swelling  
Head – pain (headache) [3]  
Joints – pain (arthralgia)  
Liver – enlargement (hepatomegaly)  
Lymph nodes, gen – enlarged (lymphadenopathy)  
Mood – lethargic, slowed  
Mood – restless, irritable

Muscles – movement, slow spontaneous (athetosis)  
Muscles – pain (myalgia) [4]  
Muscles – rigid  
Muscles – tender  
Nausea  
Neck – stiff (meningismus)  
Seizures  
Skin – dry  
Skin – rash, macular [6]  
Skin – rash, petechiae [5, 7]  
Skin – ulcers  
Sleep – disturbed (insomnia)  
Spleen – enlarged (splenomegaly)  
Temperature, body – elevated (fever)  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Ehrlichiosis  
Infectious mononucleosis  
Measles  
Meningococemia  
Murine typhus  
Rickettsialpox  
Sepsis  
Thrombotic thrombocytopenia purpura  
Vasculitis

### **Complications**

*Include, but not limited to:*

Acute respiratory distress syndrome (ARDS)  
Cardiac dysrhythmias  
Encephalitis  
Gangrene of extremity  
Hemiplegia  
Myocarditis  
Noncardiac pulmonary edema  
Otitis media  
Parotitis  
Peripheral neuritis  
Pneumonia  
Renal failure

**Laboratory [8] ▲**

- Blood bilirubin – increased
- Blood Hgb, Hct – decreased (anemia)
- Blood liver enzymes – increased
- Blood platelets, total – decreased (thrombocytopenia)
- Blood serology – positive/rising titer
- Blood sodium – decreased

**ECG**

- NA in absence of complications

**Imaging**

- NA in absence of complications

**Other Tests**

- NA in absence of complications

**Treatment – Nonpharmacologic**

- NS

**Treatment – Pharmacologic**

- Doxycycline

**Treatment – Surgical/Invasive**

- NA in absence of complications

**Precautions [8]**

- Standard

**Primary Prevention**

- Vaccine: no
- Avoid tick-infested areas
- Clothing barriers
- Tick removal [11]

**Course**

- Mortality untreated – 20% ☠



# Rubella – Acquired

## Weapon

No

## Alternate Names

German measles

Third disease

## Etiology

Togavirus, genus *rubivirus*

Replicates in nasopharynx and regional lymph nodes followed by viremia, when virus may cross placental barrier in pregnant women, causing fetal congenital rubella

## Transmission

Source: Respiratory secretions [5]

Entry: Inhalation

Human-to-Human: Yes

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All [1]

Calendar: Year-round, peak in spring

## Systems

Lymphatic

Musculoskeletal

Skin

## Incubation

12-23 days

**Signs/Symptoms [6]**

- Appetite – decreased (anorexia)
- Eyes, conjunctivae – injected
- Head – pain (headache)
- Joints – pain (arthralgia) [3]
- Joints – stiffness [3]
- Lymph nodes, postauricular – enlarged [2]
- Lymph nodes, postcervical – enlarged
- Lymph nodes, suboccipital – enlarged
- Lymph nodes, gen – enlarged
- Lymph nodes, gen – tender
- Mentation – weakness (malaise)
- Mouth, palate – Forchheimer's spots [7]
- Mouth, palate – injected
- Nose – drainage (rhinorrhea, coryza)
- Skin – rash, macular/papular [4]
- Skin – rash, pruritic [4]
- Skin – rash, punctate [4]
- Spleen – enlarged (splenomegaly)
- Temperature, body – elevated (fever)
- Testicles, bilateral – pain

**Differentiation**

*Includes, but not limited to:*

- Drug rash
- Erythema infectiosum
- Infectious mononucleosis
- Other viral exanthems
- Parvovirus B19
- Rubeola
- Scarlet fever
- Secondary syphilis
- Toxoplasmosis

**Complications**

*Include, but not limited to:*

- Arthritis
- Congenital rubella
- Encephalitis
- Fetal infection

Hemorrhage  
Hepatitis  
Neuritis  
Orchitis  
Otitis media  
Panencephalitis  
Thrombocytopenia  
Thrombocytopenic purpura

### Laboratory

Blood lymphocytes – atypical  
Blood platelets – decreased (thrombocytopenia)  
Blood serology – positive  
Blood WBC – decreased (leukopenia)

### Imaging

NA

### Other Tests

NA

### Treatment – Nonpharmacologic

NS

### Treatment – Pharmacologic

NS

### Treatment – Surgical/Invasive

NA

### Precautions

Standard

### Primary Prevention

Vaccine: yes

### Course

Recovery usual





# Rubeola

## Weapon

No

## Alternate Names

Measles

## Etiology

Measles virus, genus *morbillivirus*, family *paramyxoviridae*

Invades and multiplies in respiratory epithelium from nose to lungs; spreads via bloodstream leukocytes to reticulendothelial cells throughout body and to entire respiratory tract

## Transmission

Source: Respiratory secretions from infected humans  
Entry: Inhalation  
Human-to-Human: Yes [9]

## Predisposing/Comorbid Conditions

Increased severity in pregnant women and persons with immune deficiency or malnutrition

## Demographics

Location: Global [10]  
Populations: All, esp children  
Calendar: Year-round with winter peak

## Systems

Respiratory – lower  
Respiratory – upper  
Skin

**Incubation**

10-14 days

**Signs/Symptoms**

Abdomen – pain [6]  
 Abdomen, RLQ – pain [1]  
 Appetite – decreased (anorexia) [8]  
 Bowel movements – diarrhea  
 Cough – nonproductive  
 Eyes, conjunctivae – injected [8]  
 Eyes, vision – light sensitivity, increased (photophobia) [8]  
 Face – edema  
 Liver – enlarged (hepatomegaly) [2]  
 Lymph nodes, posterior cervical – enlarged  
 Mentation – weak (malaise) [8]  
 Mouth, mucosa – Koplick’s spots [3]  
 Nose – drainage (rhinorrhea, coryza ) [8]  
 Skin – rash, desquamating  
 Skin – rash, ecchymotic  
 Skin – rash, macular/papular [4]  
 Skin – rash, petechiae  
 Skin – rash, pruritic [5]  
 Spleen – enlarged (splenomegaly)  
 Temperature, body – elevated (fever) [8]  
 Vomiting

**Differentiation**

*Includes, but not limited to:*

Other causes of upper and lower respiratory tract infection  
 Other infectious and noninfectious causes of maculopapular rash

**Complications**

*Include, but not limited to:*

Bronchiolitis  
 Meningoencephalitis  
 Myocarditis  
 Otitis media  
 Pneumonia – bacterial [7]  
 Pneumonia – viral [7]  
 Spontaneous abortion

Subacute sclerosing panencephalitis [13]  
Tuberculosis exacerbation/worsening

### Laboratory

Blood serology – positive  
Blood WBC – decreased (leukopenia)

### ECG

NA

### Imaging

NA in absence of complications

### Other Tests

NA in absence of complications

### Treatment – Nonpharmacologic

NS

### Treatment – Pharmacologic

NS [11]

### Treatment – Surgical/Invasive

NA

### Precautions

Standard

### Primary Prevention

Vaccine: yes  
Immunoglobulin for exposure [12]

### Course

Recovery usual

### Notes

- [1] Due to involvement of appendix
- [2] Transient hepatitis, esp adults
- [3] Pathognomonic gray-white dots with red areolae, sometimes hemorrhagic on buccal mucosa; may also occur on lower lip, palate



# Salmonellosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Nontyphoidal *salmonella*

## Etiology

*Salmonella enterica* (*S enteritidis*)

## Transmission

Source:	Humans and many domestic and wild animals
Entry:	Ingestion of contaminated food
Human-to-Human:	Yes (fecal-oral)

## Predisposing/Comorbid Conditions

- AIDS
- Altered GI flora
- Bartonellosis
- Decreased gastric acidity
- Decreased gastric motility
- Diabetes mellitus
- GI surgery
- Hemolytic diseases
- Histoplasmosis
- Inflammatory bowel disease
- Lymphoproliferative diseases
- Malaria
- Schistosomiasis

## Demographics

Location:	Global
Populations:	All, esp very young, elderly, residents of institutions
Calendar:	Year-round

## Systems

Gastrointestinal  
Nervous

## Incubation

6-72 hours

## Signs/Symptoms [3]

Abdomen – distention [2]  
Abdomen – pain [1]  
Abdomen – tender [1]  
Appetite – decreased (anorexia)  
Bowel movements – diarrhea  
Bowel sounds – increased  
Head – pain (headache)  
Mentation – confusion [2]  
Mood – lethargy [2]  
Nausea  
Seizures [2]  
Temperature, body – elevated (fever)  
Vomiting

## Differentiation

*Includes, but not limited to:*

Encephalitis  
Other gastroenteritides

## Complications

*Include, but not limited to:*

Arthritis – septic  
Cholecystitis  
Dehydration  
Endocarditis  
Extra-intestinal abscess  
Meningitis

Osteomyelitis  
Pericarditis  
Reiter's syndrome  
Septicemia  
Toxic megacolon

### **Laboratory**

Blood WBC – increased (leukocytosis) [4]  
Stool blood – positive  
Stool culture – positive  
Stool WBC – positive

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

Fluids and electrolytes

### **Treatment – Pharmacologic**

Antibiotics for extra-intestinal spread

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

Standard

### **Primary Prevention**

Vaccine: no  
Proper food handling and cooking

### **Course**

Spontaneous resolution – 5-7 days





# SARS

## Weapon

No

## Alternate Names

Severe acute respiratory syndrome

## Etiology

SARS-associated coronavirus (SARS-CoV)

## Transmission

Source:	Humans
	Contact
	Fecal-oral (possible)
Entry:	Inhalation
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

Recent close contact with SARS patient or patient with severe respiratory illness who may have had contact with disease  
Recent travel to domestic or foreign location with identified cases of SARS

## Demographics

Location:	Global
Populations:	All, esp healthcare workers
Calendar:	Year-round

## Systems

Respiratory – lower

## Incubation

2-7 days

## Signs/Symptoms [1]

Appetite – decreased (anorexia)  
Bowel movements – diarrhea

Breathing – diff, rest (rest dyspnea)  
Breathing – rapid (tachypnea)  
Cough – nonproductive  
Dizziness (lightheaded)  
Head – pain (headache)  
Mentation – confusion  
Mentation – weak (malaise)  
Muscles – pain (myalgia)  
Muscles – stiffness  
Nose, drainage – increased (rhinorrhea, coryza) [2]  
Temperature, body – elevated (fever)  
Throat – sore [2]

### **Differentiation**

*Includes, but not limited to:*

Acute respiratory distress syndrome (ARDS)  
Pneumonia

### **Complications**

*Include, but not limited to:*

Acute respiratory distress syndrome (ARDS)

### **Laboratory [4] ▲**

Blood C-reactive protein (CRP) – increased  
Blood creatine kinase (CK) – increased  
Blood liver enzymes – increased  
Blood lymphocytes – decreased (lymphopenia)  
Blood platelets – decreased (thrombocytopenia)  
Blood partial thromboplastin time (PTT) – increased  
Blood serology – positive [3]

### **ECG**

NA in absence of complications

### **Imaging**

Lungs, parenchyma general – infiltrates

### **Other Tests**

Arterial blood gases

### **Treatment – Nonpharmacologic**

Respiratory support

**Treatment – Pharmacologic**

NS

**Treatment – Surgical/Invasive**

NA in absence of complications

**Precautions**

Air and contact barriers ▲

Standard

**Primary Prevention**

Vaccine: no

Avoid contact

Avoid travel to areas with active infection

Isolation of cases ▲

**Course**

Variable

Fatal in 5% of cases

**Notes**

- [1] Chest signs may be strikingly normal in contrast to radiographic changes
- [2] Usually absent
- [3] CDC states that SARS-CoV antibody detection is best indicator of infection
- [4] BSL-3 procedures ▲

<http://www.argusI.com/?sars>

**Updates**


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# Shigellosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Bacillary dysentery

## Etiology

*S boydii*

*S dysenteriae*

*S flexneri*

*S sonnei*

## Transmission

Source:	Humans
Entry:	Ingestion
Human-to-Human:	Yes (fecal-oral)

## Predisposing/Comorbid Conditions

Advanced age  
Debilitation  
Malnourishment

## Demographic

Location:	Global
Populations:	All, esp persons living in crowded living conditions with poor hygienic conditions, such as jails, day care centers, refugee camps; uncommon <age 6 months
Calendar:	Year-round

## Systems

Gastrointestinal

## Incubation

Usual – 1-3 days (range  $1/2$ -7 days)

## Signs/Symptoms

Abdomen – distention

Abdomen – pain

Abdomen – tender

Anorectum – prolapse

Anorectum – tender

Appetite – decreased (anorexia)

Bowel movements, control – decreased/absent

Bowel movements, stool – blood or black (hematochezia)  
(melena)

Bowel movements, stool – mucoid

Bowel movements, stool – pustular

Bowel movements – diarrhea

Bowel movements – difficult/painful (tenesmus)

Bowel sounds – increased

Consciousness – loss, prolonged (coma) [1]

Mentation – delirium [1]

Mentation – weakness (malaise)

Mood – lethargy

Mood – restless/irritable

Nausea

Seizures [1]

Temperature, body – elevated (fever)

Vomiting

## Differentiation

*Includes, but not limited to:*

Other gastroenteritides

## Complications

*Include, but not limited to:*

Arthritis

Dehydration

Intestinal perforation

Myocarditis

Neuritis

### **Laboratory**

- Blood WBC – decreased (leukopenia) [2]
- Blood WBC – increased (leukocytosis) [2]
- Stool blood – positive
- Stool culture – positive
- Stool WBC – positive [4]

### **ECG**

- NA in absence of complications

### **Imaging**

- NA in absence of complications

### **Other tests**

- NA in absence of complications

### **Treatment – Nonpharmacologic**

- Fluids and electrolytes

### **Treatment – Pharmacologic**

- Antibiotics [3]
  - Cephalosporins
  - Fluoroquinolones
- Avoid anti-diarrheal medications

### **Treatment – Surgical/Invasive**

- NA in absence of complications

### **Precautions**

- Enteric
- Standard

### **Primary Prevention**

- Vaccine: no
- Hygiene

### **Course**

- Variable
- Spontaneous resolution usual in 1-6 weeks



# Smallpox

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

Variola

## Etiology

Variola virus, a DNA orthopoxvirus

Viral implantation into oropharynx/respiratory tract; spreads to regional lymph nodes; viremia with virus multiplication in spleen, bone marrow, lymph nodes; locates in leukocytes, small dermal blood vessels, and submucosal oral and pharyngeal cells

## Transmission

Source:	Humans prior to global eradication; presently maintained only in laboratories
Entry:	Direct (person to person) – respiratory aerosol Indirect – contact with contaminated items
Human-to-Human:	Yes

## Predisposing/Comorbid Conditions

Pregnancy – hemorrhagic form

## Demographics

Location:	Global
Populations:	All; distribution probably similar to general population except for residual immunity from prior vaccination in older population
Calendar:	Year-round, peak winter and spring



## Systems

Oropharynx  
Skin

## Incubation

7-17 days

## Signs/Symptoms

Abdomen – pain [1]  
Back – pain [13]  
Bowel movements – diarrhea  
Chills  
Cough  
Head – pain (headache) [13]  
Mentation – delirium  
Mentation – weak (malaise) [13]  
Mouth, mucosa – hemorrhage [h]  
Mouth, mucosa – petechiae  
Mouth, mucosa – pustules [21]  
Mouth, mucosa – ulcers [21]  
Mouth, mucosa – vesicles [21]  
Nausea  
Prostration [h] [m] [13]  
Skin, color gen – red (erythema) [h] [17]  
Skin – rash, hemorrhagic [h]  
Skin – rash, macular/papular [3, 9, 12, 14, 17]  
Skin – rash, petechiae [h]  
Skin – rash, pustular [3, 7, 11, 12, 14, 17]  
Skin – rash, vesicular [3, 12, 14, 17]  
Skin – scarring, residual [8]  
Temperature, body – elevated (fever) [13]  
Throat – maculopapular lesions  
Throat – petechiae  
Throat – pustules  
Throat – ulcers  
Throat – vesicles  
Vomiting [13]

## Differentiation

*Includes, but not limited to:*  
Acute abdomen [h] [m]

Chickenpox [10]  
Cowpox [2]  
Drug eruption  
Hand, foot, and mouth disease  
Herpes zoster, disseminated  
Leukemia – acute  
Measles  
Meningococemia  
Molluscum contagiosum  
Monkeypox [2]  
Rickettsialpox  
Syphilis, secondary  
Vaccinia  
Variola minor

### **Complications**

*Include, but not limited to:*

Bacterial secondary infections [15]  
Blepharitis  
Conjunctivitis  
Corneal ulceration/keratitis  
Dehydration/hypovolemia  
Encephalitis  
Hemorrhage [16]  
Myocarditis  
Noncardiac pulmonary edema  
Orchitis  
Osteomyelitis variolosa  
Pneumonia  
Shock

### **Laboratory [19] ▲**

Skin fluid EM – virions present [18]  
Exclusion of varicella zoster virus (DFA, EM, polymerase chain reaction)

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

NS

## Treatment – Pharmacologic

NS

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Airborne [22]

BSL-4 procedures ▲

Contact [22]

Droplet [22]

Standard [22]

## Primary Prevention

Vaccine: yes [20]

Quarantine

## Course

Mortality, hemorrhagic and malignant forms – usually fatal ☠

Mortality, usual form – 30% [5] ☠

## Notes

- [h] Hemorrhagic form
- [m] Malignant form
- [1] Can be predominant symptom leading to mistaken exploratory surgery in malignant form
- [2] Uncommonly transmitted person-to-person
- [3] Area lesions at same stage of development are well-circumscribed; chickenpox lesions present at all stages and less demarcated
- [4] Within 4 days of exposure
- [5] Course more benign among prior vaccinated persons
- [7] Round, tense, deeply imbedded
- [8] Face most severe
- [9] Begins on face, hands, forearms, followed by trunk
- [10] Unlike smallpox, rash often begins on trunk with lesions present in all stages



# Staphylococcus Food Poisoning

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

NA

## Etiology

Staphylococcus enterotoxin B

## Transmission

Source: Contaminated foods left at room temperature  
Entry: Ingestion  
Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global  
Populations: All  
Calendar: Year-round

## Systems

Gastrointestinal

## Incubation

2-8 hours

## Signs/Symptoms

Abdomen – pain  
Bowel movements, stool – blood or black (hematochezia) (melena)

Bowel movements, stool – mucoid  
Bowel movements – diarrhea  
Nausea  
Temperature, body – elevated (fever) [1]  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Other forms of gastroenteritis

### **Complications**

*Include, but not limited to:*

Dehydration

### **Laboratory**

Blood concentration – increased (hemoconcentration)

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

Isolate coagulase-positive staph from food source

### **Treatment – Nonpharmacologic**

Fluids and electrolytes

### **Treatment – Pharmacologic**

Antidiarrheals

Antiemetics

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

NA



# Streptococcal Pharyngitis

## Weapon

No

## Alternate Names

Strep throat

## Etiology

Group A streptococci [7]

## Transmission

Source: Humans  
Entry: Direct oral/throat contact with infected secretions  
Ingestion of contaminated food, esp milk products [5]  
Inhalation  
Human-to-Human: Yes

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global  
Populations: All, esp school-age children  
Calendar: Year-round with winter-spring peak

## Systems

Lymphatic  
Oropharynx

## Incubation

1-3 days



## Signs/Symptoms

Abdomen, gen – pain  
Chills  
Head – pain (headache)  
Heart rate – increased (tachycardia)  
Lymph nodes, ant cervical – enlarged  
Lymph nodes, submaxillary – enlarged  
Lymph nodes, tonsillar – enlarged  
Lymph nodes, tonsillar – exudate  
Mentation – weak (malaise)  
Mouth, palate – petechiae  
Nausea  
Nose, drainage – increased (rhinorrhea, coryza) [1]  
Temperature, body – elevated (fever)  
Throat – exudate  
Throat – injected  
Throat – sore  
Vomiting

## Differentiation [2]

*Includes, but not limited to:*

*A hemolyticum*  
Brucellosis  
Diphtheria  
Infectious mononucleosis  
Mycoplasma  
*Neisseria gonorrhoeae*  
*Neisseria meningitidis*  
Salmonellosis  
Tonsillar tuberculosis  
Toxoplasmosis  
Tularemia  
Viral pharyngitis  
Yersiniosis

## Complications

*Include, but not limited to:*

Acute glomerulonephritis  
Acute rheumatic fever  
Bronchopneumonia [3]  
Cervical adenitis [3]

Endocarditis [4]  
Mastoiditis [3]  
Meningitis [4]  
Osteomyelitis [4]  
Otitis media [3]  
Parapharyngeal abscess [3]  
Retropharyngeal abscess [3]  
Scarlet fever  
Septic arthritis [4]  
Sinusitis [3]

**Laboratory**

Blood CRP – increased  
Blood WBC – increased (leukocytosis)  
Throat culture – positive  
Throat rapid antigen detection – positive

**ECG**

NA in absence of complications [6]

**Imaging**

NA in absence of complications

**Other Tests**

NA in absence of complications

**Treatment – Nonpharmacologic**

NS

**Treatment – Pharmacologic**

Antibiotics  
    Penicillin  
    Erythromycin [8]

**Treatment – Surgical/Invasive**

NA in absence of complications

**Precautions**

Standard

**Primary Prevention**

Vaccine: no



# Western Equine Encephalitis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

WEE

## Etiology

Western equine encephalitis virus, family togaviridae, genus *Alphavirus*

## Transmission

Source: Mosquitoes – *Culex tarsalis*  
Entry: Mosquito bite  
Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Western (esp California) and Central USA, Western Canada, S America  
Populations: All in infected areas, esp infants and children  
Calendar: Year-round, peak April-September

## Systems

Nervous

## Incubation

3-15 days

## Signs/Symptoms [2]

Abdomen – pain

Bowel movements, control – loss of  
Bowel movements – diarrhea  
Chills  
Consciousness – loss, prolonged (coma)  
Cranial nerve VII – palsy  
Dizziness (vertigo, true)  
Eyes, motion general – jerky (nystagmus)  
Eyes, vision – light sensitivity, increased (photophobia)  
Gait – ataxic  
Head – pain (headache)  
Joints – pain (arthralgia)  
Mentation – confused  
Mentation – delirium  
Mentation – feeling of weakness (malaise)  
Mood – labile  
Mood – lethargic  
Mood – restless, irritable  
Muscles, movement – fine (fasciculations)  
Muscles, movement – jerks (myoclonus)  
Muscles, movement – spontaneous (involuntary)  
Muscles – pain (myalgia)  
Muscles – paralysis [1]  
Muscles – weak [1]  
Nausea  
Neck, posterior – pain  
Neck, posterior – stiff (meningismus)  
Seizures  
Sign: Babinski's  
Signs/symptoms, nervous system – multiple other  
Speech – absent (aphonia) or loss (aphasia)  
Temperature, body – elevated (fever)  
Throat – sore  
Urination, spontaneous control – loss of (urinary incontinence, true)  
Vomiting

## **Differentiation**

*Includes, but not limited to:*

Other encephalitides

## **Complications**

*Include, but not limited to:*

- Mild-severe permanent neurologic damage [3]
- Respiratory failure

## **Laboratory**

- Blood IgM-specific antibodies – present
- Blood culture – positive
- Blood WBC – increased (leukocytosis)
- CSF culture – positive
- CSF IgM-specific antibodies – present
- CSF pressure – increased
- CSF protein – increased
- CSF WBC – increased

## **ECG**

- NA in absence of complications

## **Imaging**

- NA in absence of complications

## **Other Tests**

- NA in absence of complications

## **Treatment – Nonpharmacologic**

- NS

## **Treatment – Pharmacologic**

- NS

## **Treatment – Surgical/Invasive**

- NA

## **Precautions**

- Standard

## **Primary Prevention**

- Vaccine: no
- Mosquito control



# Yellow Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

NA

## Etiology

Yellow fever virus, genus *flavavirus*

## Transmission

Source: *Aedes aegypti* mosquito from  
Humans – urban form  
Monkeys – jungle/sylvan form  
Entry: Mosquito bite  
Human-to-Human: No

## Predisposing/Comorbid Conditions

More serious with advanced age

## Demographics

Location: Africa, S America  
Populations: All  
Calendar: Year-round

## Systems

Coagulation  
Cardiovascular  
Gastrointestinal  
Liver/Gallbladder/Pancreas  
Renal

## Incubation

3-6 days



## Signs/Symptoms

Abdomen, epigastrium – pain

Appetite – reduced (anorexia)

Back – pain

Bowel movements, stool – blood or black (hematochezia) (melena)

Bowel movements – constipation

Chills

Eyes, conjunctivae – injected

Eyes – bleeding

Face – flushed

Head – pain (headache)

Heart rate – slow relative to fever (relative bradycardia) [1]

Heart rhythm – irregular

Hiccups

Mentation – delirium

Mentation – weakness (malaise)

Mood – restless, irritable

Mouth, gingiva – bleeding

Mouth, mucosa – hemorrhage

Mouth – blood

Muscles – pain (myalgia)

Nausea

Nose – blood (epistaxis)

Skin, color – yellow (jaundice)

Skin – rash, petechiae

Sleep – disturbed (insomnia)

Temperature, body – elevated (fever)

Tongue, center – “furred”

Tongue – reddened [2]

Urine – absent (anuria)

Urine – decreased (oliguria)

Vomiting – blood (hematemesis)

## Differentiation

*Includes, but not limited to:*

Hepatitis

Leptospirosis

Malaria

Other hemorrhagic fevers

Rickettsial fevers

## Complications

*Include, but not limited to:*

- Acute renal tubular necrosis
- Cardiac dysrhythmias
- Congestive heart failure
- Disseminated intravascular coagulation (DIC)
- Hyperkalemia
- Liver failure
- Meningoencephalitis
- Metabolic acidosis
- Pneumonia
- Seizures
- Severe hemorrhage

## Laboratory [3] ▲

- Blood bilirubin – increased
- Blood factor VII – decreased
- Blood fibrinogen – decreased
- Blood glucose – decreased
- Blood liver enzymes – increased
- Blood prothrombin time – increased
- Blood PTT – increased
- Blood WBC – decreased (leukopenia)
- Urine protein – present (proteinuria)

## ECG

- Dysrhythmias, NS
- PR interval – long (AV conduction – 1<sup>st</sup> degree block)
- QT interval – long
- Rate – slow (sinus bradycardia)
- Rate – slow relative to temperature (relative bradycardia)
- ST-T waves – abnormal, NS

## Imaging

- NA in absence of complications

## Other Tests

- Isolate yellow fever virus from blood
- Isolate yellow fever virus from liver biopsy



# Yersiniosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Extraintestinal yersiniosis

Intestinal yersiniosis

## Etiology

*Y enterocolitica*

## Transmission

Source: Animals, esp swine

Entry: Ingestion of contaminated food, esp under-cooked pork, unpasteurized milk, water  
Blood transfusion

Human-to-Human: No

## Predisposing/Comorbid Conditions

More severe in immune deficiency

## Demographics

Location: Global

Populations: All, esp children

Calendar: Year-round, peak winter

## Systems

Gastrointestinal

## Incubation

3-7 days

## Signs/Symptoms

Abdomen – pain [3]

Abdomen, RLQ – pain [4]

Bowel movements – blood or black (hematochezia) (melena)  
Bowel movements – diarrhea  
Nausea  
Temperature, body – elevated (fever)  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Appendicitis  
Other causes of enterocolitis

### **Complications**

*Include, but not limited to:*

Arthritis [2]  
Bowel perforation (ileum)  
Dehydration  
Endocarditis  
Erythema nodosum  
Lower gastrointestinal hemorrhage  
Mesenteric adenitis  
Myocarditis  
Organ abscess  
Pharyngitis  
Septicemia [1]  
Tonsillitis

### **Laboratory**

Bile culture – positive  
Blood culture – positive  
Blood serology – positive  
Joint fluid culture – positive  
Lymph node biopsy culture – positive  
Stool culture – positive  
Throat culture – positive  
Urine culture – positive

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

**Other Tests**

NA in absence of complications

**Treatment – Nonpharmacologic**

Fluids and electrolytes

**Treatment – Pharmacologic**

Antibiotics [5]

Aminoglycosides

Doxycycline

Fluroquinolones

Trimethoprim sulfa

**Treatment – Surgical/Invasive**

NA in absence of complications

**Precautions**

Standard

**Primary Prevention**

Vaccine: no

Avoid contaminated products

Food handling and preparation

**Course**

Complete resolution usual

**Notes**

- [1] Esp in immune deficiency, advanced age, iron-overload states
- [2] Esp common in Scandinavia; occurs about 1 week after onset of intestinal symptoms
- [3] Due to mesenteric adenitis
- [4] May resemble acute appendicitis
- [5] Treatment of uncertain value in mild cases

<http://www.argus1.com/?yers>



# Ammonia Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

NA

## Etiology

Anhydrous ammonia

Converted to ammonium hydroxide aerosol when mixed with water in mucous membranes (eyes, oral mucosa, airways), causing thermal and chemical liquefaction tissue necrosis

## Transmission

Source:	Industrial
Entry:	Contact Inhalation Ingestion
Human-to-Human:	No [8]

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Optic  
Oropharynx  
Respiratory – upper  
Skin

## Time to Clinical Onset

Minutes



## Signs/Symptoms

Abdomen – pain  
Breath sounds – coarse (rhonchi)  
Breath sounds – crackling (rales)  
Breath sounds – wheezes  
Breathing – diff, acute (acute dyspnea)  
Chest – burning  
Chest – pain  
Chest – tightness  
Cough – acute  
Cough – productive [1]  
Eyes, conjunctivae – swelling (edema)  
Eyes, cornea – ulcer  
Eyes, tearing – excess (lacrimation)  
Eyes, vision – loss [2]  
Eyes, vision – blurred  
Eyes – irritation  
Eyes – pain  
Eyes – swollen  
Head – pain (headache)  
Heart, rate – rapid (tachycardia)  
Lips – swollen [3]  
Mood – irritable  
Mood – restless  
Mouth – burning  
Mouth – swelling [3]  
Nausea  
Skin – blisters [4]  
Skin color – red (erythema) [4]  
Skin – pain [4]  
Sputum – blood (hemoptysis)  
Sweating – increased (hyperhidrosis)  
Temperature, body – elevated (fever)  
Voice – hoarse  
Vomiting

## Differentiation

*Includes, but not limited to:*

Asthma  
Other causes of acute dyspnea

## Complications

*Include, but not limited to:*

- Bronchiectasis
- Cataracts
- Cornea perforation
- Gastrointestinal bleeding [5]
- Gastrointestinal perforation [5]
- Gastrointestinal strictures [5]
- Noncardiac pulmonary edema [6]
- Pneumonia
- Vascular collapse

## Laboratory

- Blood arterial pH – decreased (acidosis)
- Blood arterial pO<sub>2</sub> – decreased (hypoxia)
- Blood arterial pCO<sub>2</sub> – increased
- Blood liver enzymes – increased

## ECG

- NA in absence of complications

## Imaging

- Lungs – NS [7]

## Other Tests

- Bronchoscopy

## Treatment – Nonpharmacologic

- Do not induce emesis ▲
- Drink water or milk for ingested poison
- Fluids
- Intubation and ventilation
- Oxygen
- Remove all clothing
- Skin/eye washing and irrigation

## Treatment – Pharmacologic

- Antidote: no
- Antibiotics – ophthalmic
- Bronchodilators
- Corticosteroids (?)



# Arsenic Poisoning

## Category

CDC hazardous chemical category: metal

## Alternate Names

NA

## Etiology

Trivalent and pentavalent arsenic compounds

Inhibition of sulfhydryl cellular enzymes with damage to GI tract walls and peripheral blood vessels

## Transmission

Source: Industrial metallurgy, semiconductors, pesticides, wine, glue contamination

Entry: Ingestion  
Inhalation (rare)

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All

Calendar: Year-round

## Systems

Cardiovascular

Gastrointestinal

## Time to Clinical Onset

Minutes – hours

## Signs/Symptoms

Abdomen – pain

Arterial press – low [1]

Bowel movements – diarrhea  
Breath, odor – garlic  
Eyes, vision – dim  
Eyes, vision – light sensitivity, increased (photophobia)  
Mouth – pain/burning  
Muscles – twitching  
Nausea  
Seizures  
Throat – burning  
Voice – hoarse  
Vomiting  
Vomiting – blood (hematemesis)

### Differentiation

*Includes, but not limited to:*

Other causes of acute gastroenteritis

### Complications

*Include, but not limited to:*

Bone marrow suppression  
Cardiac dysrhythmias  
Coma  
Dermatitis  
Dehydration  
Encephalopathy  
Hepatic dysfunction  
Intestinal perforation  
Intrauterine fetal death ☠  
Polyneuropathy  
Renal failure  
Respiratory failure

### Laboratory

Urine arsenic – increased

### ECG

Dysrhythmias

### Imaging

Intestinal arsenic on plain radiography [2]

## Other Tests

Cardiac monitoring for dysrhythmias

## Treatment – Nonpharmacologic

Fluids and electrolytes  
Hemodialysis  
Skin/eye washing and irrigation  
Ventilation  
Whole-bowel irrigation

## Treatment – Pharmacologic

Antidote: no  
Chelation  
    dimercaprol  
    D-penicillamine  
    DMSA  
    DMPS

## Treatment – Surgical/Invasive

NA

## Precautions

NA

## Primary Prevention

Vaccine: no  
Industrial safety

## Course

Variable with exposure intensity and time to treatment

## Notes

- [1] Due to volume depletion from vascular damage
- [2] Arsenic is radiopaque

<http://www.argusl.com/?arsenic>



# Arsine Poisoning

## Weapon

CDC hazardous chemical category: blood agent

## Alternate Names

NA

## Etiology

Arsine

Depletes RBC glutathione, causing cell membrane instability and hemolysis

## Transmission

Source: Semiconductor industry

Entry: Contact with liquid

Inhalation [7]

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Population: All, esp workers exposed to metal refining, lead plating, soldering

Calendar: Year-round

## Systems

Cardiovascular

Gastrointestinal

Hematopoietic/Immune [2]

Renal/Genitourinary

Skin

## Time to Clinical Onset

Minutes – hours [6]



**Signs/Symptoms [5] ▲**

Abdomen, flank – pain  
Abdomen – pain  
Arterial press – low  
Breath, odor – garlic  
Breathing – difficult (dyspnea)  
Breathing – rapid (tachypnea)  
Dizziness (lightheaded)  
Eyes, conjunctivae – red stain  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Heart sound – S3 LV [5]  
Liver – enlarged (hepatomegaly)  
Mentation – disorientation  
Mentation – memory loss  
Mentation – restless, agitated  
Mentation – weakness (malaise)  
Muscles – cramps  
Muscles – pain (myalgia)  
Muscles – weak  
Nausea  
Skin color – bronze  
Skin – freezing [7]  
Thirst – excessive  
Urine – blood (hematuria)  
Vomiting

**Differentiation**

*Includes, but not limited to:*

Other causes of congestive heart failure  
Other causes of hemolytic anemia

**Complications**

*Include, but not limited to:*

Congestive heart failure  
Dehydration  
Encephalopathy/encephalitis  
Hyperkalemia  
Myocarditis  
Noncardiac pulmonary edema  
Peripheral neuropathy  
Renal failure

## Laboratory

- Blood BNP – increased [5]
- Blood calcium – decreased
- Blood CPK – increased
- Blood haptoglobin – present
- Blood Hgb/Hct – decreased (anemia)
- Blood liver enzymes – increased
- Blood myoglobin – present
- Blood potassium – increased
- Blood RBC – fragments
- Blood WBC – decreased (leukopenia)
- Urine hemoglobin – positive [1]
- Urine protein – present (proteinuria)

## ECG [5]

- Abnormalities – nonspecific
- Rate – rapid (sinus tachycardia)
- ST segment – depressed [3]
- T wave – peaked [4]

## Imaging

NS

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic [8]

- Fluids and electrolytes
- Hemodialysis
- Transfusion
- Urine alkalinization
- Ventilation with oxygen

## Treatment – Pharmacologic

- Antidote: no
- Chelation therapy (?)

## Treatment – Surgical/Invasive

NA in absence of complications



# Barium Poisoning

## Category

CDC hazardous chemical category: metal

## Alternate Names

NA

## Etiology

Soluble barium [1]

Proposed mechanism of toxicity is blockage of cellular efflux of potassium, but not uptake, causing hypokalemia, which may be severe

## Transmission

Source:	Industrial
Entry:	Ingestion
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Cardiovascular  
Gastrointestinal  
Musculoskeletal

## Time to Clinical Onset

Minutes

## Signs/Symptoms

- Abdomen, epigastrium – pain
- Bowel movements – diarrhea
- Heart, rhythm – irregular [2]
- Heart rate – slow (bradycardia)
- Muscles – paralysis [2, 3]
- Muscles – weak [2, 3]
- Nausea
- Tendon reflexes – reduced or absent [2]
- Vomiting

## Differentiation [4]

*Includes, but not limited to:*

- Tetrodotoxin poisoning
- Tick paralysis
- Other causes of paralysis

## Complications

*Include, but not limited to:*

- Renal failure
- Rhabdomyolysis
- Ventricular fibrillation

## Laboratory

- Blood aldolase – increased
- Blood creatine phosphokinase (CPK) – increased
- Blood creatinine – increased
- Blood phosphate – decreased
- Blood potassium – decreased
- Blood urea nitrogen – increased

## ECG

- AV conduction – AV dissociation, complete
- Dysrhythmias, ventricular
- QRS – long
- Rate – slow (sinus bradycardia)
- U wave – prominent

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Fluids, electrolytes – esp potassium [5] ▲

Gastric lavage

Hemodialysis

Ventilation

## Treatment – Pharmacologic

Antidote: no

NS

## Treatment – Surgical/Invasive

NA

## Precautions

NA

## Primary Prevention

Industrial safety

## Course

Variable with intensity of poisoning and treatment

## Notes

- [1] Include barium carbonate, barium chloride, etc; does *not* include form of barium used in contrast imaging, which is not absorbed
- [2] Due to hypokalemia
- [3] All extremities; lasts hours-days
- [4] Differentiated by normal potassium levels
- [5] Monitor potassium carefully to avoid hyperkalemia because total body potassium is normal ▲

<http://www.argusl.com/?barium>



# Benzene Poisoning

## Weapon

CDC hazardous chemical category: organic solvent

## Alternate Names

Benzol  
Coal tar naptha  
Cyclohexatriene  
Phenyl hydride

## Etiology

Benzene (C<sub>6</sub>H<sub>6</sub>)

Irritation of exposed tissue; bone marrow suppression

## Transmission

Source:	Industrial, motor fuels, paint removers
Entry:	Contact Ingestion Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographic

NA

## Systems

Cardiovascular  
Gastrointestinal  
Hematopoietic  
Nervous  
Optic  
Skin



## Time to Clinical Onset

Immediate

## Signs/Symptoms

Abdomen – pain  
Appetite – decreased  
Bowel movements – diarrhea  
Breathing, rate – increased (tachypnea)  
Chest – tightness  
Consciousness – loss, prolonged (coma) [2]  
Consciousness – loss, sudden (syncope) [2]  
Dizziness (lightheaded)  
Extremities – tremors  
Eyes, conjunctivae – injected  
Eyes, vision – blurred  
Eyes – irritation  
Gait – unsteady  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Heart rhythm – irregular [3]  
Mentation – confused  
Mentation – sleepy (somnolence)  
Mentation – weakness (malaise)  
Mood – depressed [1]  
Mood – euphoric [1]  
Muscles – tremors  
Nausea  
Seizures  
Skin – blisters  
Skin color – red (erythema)  
Skin – pain  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other dermatologic, gastrointestinal, mucosal irritants

## Complications

*Include, but not limited to:*

Aspiration pneumonitis  
Bone marrow suppression

Cardiac dysrhythmias  
Coma  
Cornea injury  
Leukemia  
Noncardiac pulmonary edema  
Renal Failure  
Respiratory failure

### Laboratory

Blood Hgb/Hct – decreased (anemia)  
Blood liver enzymes – increased  
Blood platelets – decreased (thrombocytopenia)  
Blood WBC – decreased (leukopenia)  
Urine phenol – increased

### ECG

Dysrhythmias

### Imaging

Pulmonary edema

### Other Tests

NS in absence of complications

### Treatment – Nonpharmacologic

Do not induce emesis ▲  
Fluids and electrolytes  
Gastric lavage  
Oxygen  
Skin/eye washing and irrigation  
Ventilation

### Treatment – Pharmacologic

Antidote: no  
Caution using sympathomimetics [3] ▲  
NS

### Treatment – Surgical/Invasive

NA in absence of complications

### Precautions

Protective clothing: yes  
Site decontamination: yes  
Other: SCBA



# Brevetoxin Poisoning

## Weapon

CDC hazardous chemical category: biotoxin

## Alternate Names

Neurotoxic shellfish poisoning

NSP

Red tide toxin

## Etiology

Brevetoxin [3]

Blocks action potentials in nerves by preventing sodium flow, reducing nerve conduction

## Transmission

Source: Shellfish

Entry: Ingestion

Inhalation

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Coasts – global

Populations: All

Calendar: Year-round, sporadic

## Systems

Gastrointestinal

Nervous

Respiratory – upper [1]

**Time to Clinical Onset**

Ingestion: <1 hour-18 hours  
Inhalation: immediate

**Signs/Symptoms**

Abdomen – pain  
Bowel movements – diarrhea  
Breathing – diff, acute (acute dyspnea) [1]  
Breath sounds – wheezes [1]  
Cough – acute NS [1]  
Dizziness (true vertigo)  
Extremities – pain, shooting (paresthesias)  
Gait – ataxic  
Sensation, hot and cold temperature – reversed  
Vomiting

**Differentiation**

*Includes, but not limited to:*

Asthma [1]  
Gastroenteritis – all causes  
Meniere's disease

**Complications**

*Include, but not limited to:*

Dehydration

**Laboratory**

Blood, ELISA antibodies – positive [2]

**ECG**

NA in absence of complications

**Imaging**

NA in absence of complications

**Other Tests**

NA in absence of complications

**Treatment – Nonpharmacologic**

NS



# Bromine Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

NA

## Etiology

Bromine gas ( $\text{Br}_2$ )

Irritation of exposed tissue

## Transmission

Source: Industrial, i.e., gasoline additive, agriculture, sanitation, fire retardant

Entry: Contact with liquid/gas  
Ingestion of contaminated food/water  
Inhalation of gas

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All, esp chemical plant workers

Calendar: Year-round

## Systems

Gastrointestinal

Optic

Oropharynx

Respiratory – lower

Respiratory – upper

Skin

## Time to Clinical Onset

Minutes

## Signs/Symptoms

Abdomen – pain

Breathing – diff, acute (acute dyspnea)

Breathing – rapid (tachypnea)

Cough – acute NS

Cough – productive

Dizziness (lightheaded)

Eyes, conjunctivae – injected

Eyes, vision – light sensitivity, increased (photophobia)

Eyes – tearing, excess (lacrimation)

Head – pain (headache)

Mentation – weakness (malaise)

Mouth, mucosa color – brown

Mouth – burning

Nausea

Nose – blood (epistaxis)

Nose – irritation

Skin – brown discoloration

Skin – irritation

Skin – itching (pruritus)

Skin – rash, pustular

Skin – rash, vesicular

Sweating – increased (hyperhidrosis)

Tongue – brown discoloration

Vomiting

## Differentiation

*Includes, but not limited to:*

Chlorine poisoning

## Complications

*Include, but not limited to:*

Hemorrhagic gastroenteritis

Noncardiac pulmonary edema

Pneumonitis

Skin ulcers



## **ECG**

NS in absence of complications

## **Laboratory**

Blood bromide – increased

## **Imaging**

NS in absence of complications

## **Other Tests**

NS in absence of complications

## **Treatment – Nonpharmacologic**

Skin/eye washing and irrigation

Ventilation

## **Treatment – Pharmacologic**

Antidote: no

NS

## **Treatment – Surgical/Invasive**

NA in absence of complications

## **Precautions**

Protective clothing: yes

Site decontamination: yes

Other: NS

## **Primary Prevention**

Industrial safety

## **Course**

Variable with exposure

<http://www.argus1.com/?bromine>



# Western Equine Encephalitis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

WEE

## Etiology

Western equine encephalitis virus, family togaviridae, genus *Alphavirus*

## Transmission

Source: Mosquitoes – *Culex tarsalis*  
Entry: Mosquito bite  
Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Western (esp California) and Central USA, Western Canada, S America  
Populations: All in infected areas, esp infants and children  
Calendar: Year-round, peak April-September

## Systems

Nervous

## Incubation

3-15 days

## Signs/Symptoms [2]

Abdomen – pain

Bowel movements, control – loss of  
Bowel movements – diarrhea  
Chills  
Consciousness – loss, prolonged (coma)  
Cranial nerve VII – palsy  
Dizziness (vertigo, true)  
Eyes, motion general – jerky (nystagmus)  
Eyes, vision – light sensitivity, increased (photophobia)  
Gait – ataxic  
Head – pain (headache)  
Joints – pain (arthralgia)  
Mentation – confused  
Mentation – delirium  
Mentation – feeling of weakness (malaise)  
Mood – labile  
Mood – lethargic  
Mood – restless, irritable  
Muscles, movement – fine (fasciculations)  
Muscles, movement – jerks (myoclonus)  
Muscles, movement – spontaneous (involuntary)  
Muscles – pain (myalgia)  
Muscles – paralysis [1]  
Muscles – weak [1]  
Nausea  
Neck, posterior – pain  
Neck, posterior – stiff (meningismus)  
Seizures  
Sign: Babinski's  
Signs/symptoms, nervous system – multiple other  
Speech – absent (aphonia) or loss (aphasia)  
Temperature, body – elevated (fever)  
Throat – sore  
Urination, spontaneous control – loss of (urinary incontinence, true)  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other encephalitides

## **Complications**

*Include, but not limited to:*

- Mild-severe permanent neurologic damage [3]
- Respiratory failure

## **Laboratory**

- Blood IgM-specific antibodies – present
- Blood culture – positive
- Blood WBC – increased (leukocytosis)
- CSF culture – positive
- CSF IgM-specific antibodies – present
- CSF pressure – increased
- CSF protein – increased
- CSF WBC – increased

## **ECG**

- NA in absence of complications

## **Imaging**

- NA in absence of complications

## **Other Tests**

- NA in absence of complications

## **Treatment – Nonpharmacologic**

- NS

## **Treatment – Pharmacologic**

- NS

## **Treatment – Surgical/Invasive**

- NA

## **Precautions**

- Standard

## **Primary Prevention**

- Vaccine: no
- Mosquito control



# Yellow Fever

## Weapon

CDC Bioterrorism Category: A

## Alternate Names

NA

## Etiology

Yellow fever virus, genus *flavavirus*

## Transmission

Source: *Aedes aegypti* mosquito from  
Humans – urban form  
Monkeys – jungle/sylvan form  
Entry: Mosquito bite  
Human-to-Human: No

## Predisposing/Comorbid Conditions

More serious with advanced age

## Demographics

Location: Africa, S America  
Populations: All  
Calendar: Year-round

## Systems

Coagulation  
Cardiovascular  
Gastrointestinal  
Liver/Gallbladder/Pancreas  
Renal

## Incubation

3-6 days

## Signs/Symptoms

Abdomen, epigastrium – pain

Appetite – reduced (anorexia)

Back – pain

Bowel movements, stool – blood or black (hematochezia) (melena)

Bowel movements – constipation

Chills

Eyes, conjunctivae – injected

Eyes – bleeding

Face – flushed

Head – pain (headache)

Heart rate – slow relative to fever (relative bradycardia) [1]

Heart rhythm – irregular

Hiccups

Mentation – delirium

Mentation – weakness (malaise)

Mood – restless, irritable

Mouth, gingiva – bleeding

Mouth, mucosa – hemorrhage

Mouth – blood

Muscles – pain (myalgia)

Nausea

Nose – blood (epistaxis)

Skin, color – yellow (jaundice)

Skin – rash, petechiae

Sleep – disturbed (insomnia)

Temperature, body – elevated (fever)

Tongue, center – “furred”

Tongue – reddened [2]

Urine – absent (anuria)

Urine – decreased (oliguria)

Vomiting – blood (hematemesis)

## Differentiation

*Includes, but not limited to:*

Hepatitis

Leptospirosis

Malaria

Other hemorrhagic fevers

Rickettsial fevers



## Complications

*Include, but not limited to:*

- Acute renal tubular necrosis
- Cardiac dysrhythmias
- Congestive heart failure
- Disseminated intravascular coagulation (DIC)
- Hyperkalemia
- Liver failure
- Meningoencephalitis
- Metabolic acidosis
- Pneumonia
- Seizures
- Severe hemorrhage

## Laboratory [3] ▲

- Blood bilirubin – increased
- Blood factor VII – decreased
- Blood fibrinogen – decreased
- Blood glucose – decreased
- Blood liver enzymes – increased
- Blood prothrombin time – increased
- Blood PTT – increased
- Blood WBC – decreased (leukopenia)
- Urine protein – present (proteinuria)

## ECG

- Dysrhythmias, NS
- PR interval – long (AV conduction – 1<sup>st</sup> degree block)
- QT interval – long
- Rate – slow (sinus bradycardia)
- Rate – slow relative to temperature (relative bradycardia)
- ST-T waves – abnormal, NS

## Imaging

- NA in absence of complications

## Other Tests

- Isolate yellow fever virus from blood
- Isolate yellow fever virus from liver biopsy



# Yersiniosis

## Weapon

CDC Bioterrorism Category: B

## Alternate Names

Extraintestinal yersiniosis

Intestinal yersiniosis

## Etiology

*Y enterocolitica*

## Transmission

Source: Animals, esp swine

Entry: Ingestion of contaminated food, esp under-cooked pork, unpasteurized milk, water  
Blood transfusion

Human-to-Human: No

## Predisposing/Comorbid Conditions

More severe in immune deficiency

## Demographics

Location: Global

Populations: All, esp children

Calendar: Year-round, peak winter

## Systems

Gastrointestinal

## Incubation

3-7 days

## Signs/Symptoms

Abdomen – pain [3]

Abdomen, RLQ – pain [4]

Bowel movements – blood or black (hematochezia) (melena)  
Bowel movements – diarrhea  
Nausea  
Temperature, body – elevated (fever)  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Appendicitis  
Other causes of enterocolitis

### **Complications**

*Include, but not limited to:*

Arthritis [2]  
Bowel perforation (ileum)  
Dehydration  
Endocarditis  
Erythema nodosum  
Lower gastrointestinal hemorrhage  
Mesenteric adenitis  
Myocarditis  
Organ abscess  
Pharyngitis  
Septicemia [1]  
Tonsillitis

### **Laboratory**

Bile culture – positive  
Blood culture – positive  
Blood serology – positive  
Joint fluid culture – positive  
Lymph node biopsy culture – positive  
Stool culture – positive  
Throat culture – positive  
Urine culture – positive

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

**Other Tests**

NA in absence of complications

**Treatment – Nonpharmacologic**

Fluids and electrolytes

**Treatment – Pharmacologic**

Antibiotics [5]

Aminoglycosides

Doxycycline

Fluroquinolones

Trimethoprim sulfa

**Treatment – Surgical/Invasive**

NA in absence of complications

**Precautions**

Standard

**Primary Prevention**

Vaccine: no

Avoid contaminated products

Food handling and preparation

**Course**

Complete resolution usual

**Notes**

- [1] Esp in immune deficiency, advanced age, iron-overload states
- [2] Esp common in Scandinavia; occurs about 1 week after onset of intestinal symptoms
- [3] Due to mesenteric adenitis
- [4] May resemble acute appendicitis
- [5] Treatment of uncertain value in mild cases

<http://www.argus1.com/?yers>



# Ammonia Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

NA

## Etiology

Anhydrous ammonia

Converted to ammonium hydroxide aerosol when mixed with water in mucous membranes (eyes, oral mucosa, airways), causing thermal and chemical liquefaction tissue necrosis

## Transmission

Source:	Industrial
Entry:	Contact Inhalation Ingestion
Human-to-Human:	No [8]

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Optic  
Oropharynx  
Respiratory – upper  
Skin

## Time to Clinical Onset

Minutes

## Signs/Symptoms

Abdomen – pain  
Breath sounds – coarse (rhonchi)  
Breath sounds – crackling (rales)  
Breath sounds – wheezes  
Breathing – diff, acute (acute dyspnea)  
Chest – burning  
Chest – pain  
Chest – tightness  
Cough – acute  
Cough – productive [1]  
Eyes, conjunctivae – swelling (edema)  
Eyes, cornea – ulcer  
Eyes, tearing – excess (lacrimation)  
Eyes, vision – loss [2]  
Eyes, vision – blurred  
Eyes – irritation  
Eyes – pain  
Eyes – swollen  
Head – pain (headache)  
Heart, rate – rapid (tachycardia)  
Lips – swollen [3]  
Mood – irritable  
Mood – restless  
Mouth – burning  
Mouth – swelling [3]  
Nausea  
Skin – blisters [4]  
Skin color – red (erythema) [4]  
Skin – pain [4]  
Sputum – blood (hemoptysis)  
Sweating – increased (hyperhidrosis)  
Temperature, body – elevated (fever)  
Voice – hoarse  
Vomiting

## Differentiation

*Includes, but not limited to:*

Asthma  
Other causes of acute dyspnea



## Complications

*Include, but not limited to:*

- Bronchiectasis
- Cataracts
- Cornea perforation
- Gastrointestinal bleeding [5]
- Gastrointestinal perforation [5]
- Gastrointestinal strictures [5]
- Noncardiac pulmonary edema [6]
- Pneumonia
- Vascular collapse

## Laboratory

- Blood arterial pH – decreased (acidosis)
- Blood arterial pO<sub>2</sub> – decreased (hypoxia)
- Blood arterial pCO<sub>2</sub> – increased
- Blood liver enzymes – increased

## ECG

- NA in absence of complications

## Imaging

- Lungs – NS [7]

## Other Tests

- Bronchoscopy

## Treatment – Nonpharmacologic

- Do not induce emesis ▲
- Drink water or milk for ingested poison
- Fluids
- Intubation and ventilation
- Oxygen
- Remove all clothing
- Skin/eye washing and irrigation

## Treatment – Pharmacologic

- Antidote: no
- Antibiotics – ophthalmic
- Bronchodilators
- Corticosteroids (?)



# Arsenic Poisoning

## Category

CDC hazardous chemical category: metal

## Alternate Names

NA

## Etiology

Trivalent and pentavalent arsenic compounds

Inhibition of sulfhydryl cellular enzymes with damage to GI tract walls and peripheral blood vessels

## Transmission

Source: Industrial metallurgy, semiconductors, pesticides, wine, glue contamination

Entry: Ingestion  
Inhalation (rare)

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All

Calendar: Year-round

## Systems

Cardiovascular

Gastrointestinal

## Time to Clinical Onset

Minutes – hours

## Signs/Symptoms

Abdomen – pain

Arterial press – low [1]

Bowel movements – diarrhea  
Breath, odor – garlic  
Eyes, vision – dim  
Eyes, vision – light sensitivity, increased (photophobia)  
Mouth – pain/burning  
Muscles – twitching  
Nausea  
Seizures  
Throat – burning  
Voice – hoarse  
Vomiting  
Vomiting – blood (hematemesis)

### Differentiation

*Includes, but not limited to:*

Other causes of acute gastroenteritis

### Complications

*Include, but not limited to:*

Bone marrow suppression  
Cardiac dysrhythmias  
Coma  
Dermatitis  
Dehydration  
Encephalopathy  
Hepatic dysfunction  
Intestinal perforation  
Intrauterine fetal death ☠  
Polyneuropathy  
Renal failure  
Respiratory failure

### Laboratory

Urine arsenic – increased

### ECG

Dysrhythmias

### Imaging

Intestinal arsenic on plain radiography [2]

## Other Tests

Cardiac monitoring for dysrhythmias

## Treatment – Nonpharmacologic

Fluids and electrolytes  
Hemodialysis  
Skin/eye washing and irrigation  
Ventilation  
Whole-bowel irrigation

## Treatment – Pharmacologic

Antidote: no  
Chelation  
    dimercaprol  
    D-penicillamine  
    DMSA  
    DMPS

## Treatment – Surgical/Invasive

NA

## Precautions

NA

## Primary Prevention

Vaccine: no  
Industrial safety

## Course

Variable with exposure intensity and time to treatment

## Notes

- [1] Due to volume depletion from vascular damage
- [2] Arsenic is radiopaque

<http://www.argusl.com/?arsenic>



# Arsine Poisoning

## Weapon

CDC hazardous chemical category: blood agent

## Alternate Names

NA

## Etiology

Arsine

Depletes RBC glutathione, causing cell membrane instability and hemolysis

## Transmission

Source: Semiconductor industry

Entry: Contact with liquid

Inhalation [7]

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Population: All, esp workers exposed to metal refining, lead plating, soldering

Calendar: Year-round

## Systems

Cardiovascular

Gastrointestinal

Hematopoietic/Immune [2]

Renal/Genitourinary

Skin

## Time to Clinical Onset

Minutes – hours [6]

**Signs/Symptoms [5] ▲**

Abdomen, flank – pain  
Abdomen – pain  
Arterial press – low  
Breath, odor – garlic  
Breathing – difficult (dyspnea)  
Breathing – rapid (tachypnea)  
Dizziness (lightheaded)  
Eyes, conjunctivae – red stain  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Heart sound – S3 LV [5]  
Liver – enlarged (hepatomegaly)  
Mentation – disorientation  
Mentation – memory loss  
Mentation – restless, agitated  
Mentation – weakness (malaise)  
Muscles – cramps  
Muscles – pain (myalgia)  
Muscles – weak  
Nausea  
Skin color – bronze  
Skin – freezing [7]  
Thirst – excessive  
Urine – blood (hematuria)  
Vomiting

**Differentiation**

*Includes, but not limited to:*

Other causes of congestive heart failure  
Other causes of hemolytic anemia

**Complications**

*Include, but not limited to:*

Congestive heart failure  
Dehydration  
Encephalopathy/encephalitis  
Hyperkalemia  
Myocarditis  
Noncardiac pulmonary edema  
Peripheral neuropathy  
Renal failure



## Laboratory

- Blood BNP – increased [5]
- Blood calcium – decreased
- Blood CPK – increased
- Blood haptoglobin – present
- Blood Hgb/Hct – decreased (anemia)
- Blood liver enzymes – increased
- Blood myoglobin – present
- Blood potassium – increased
- Blood RBC – fragments
- Blood WBC – decreased (leukopenia)
- Urine hemoglobin – positive [1]
- Urine protein – present (proteinuria)

## ECG [5]

- Abnormalities – nonspecific
- Rate – rapid (sinus tachycardia)
- ST segment – depressed [3]
- T wave – peaked [4]

## Imaging

NS

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic [8]

- Fluids and electrolytes
- Hemodialysis
- Transfusion
- Urine alkalinization
- Ventilation with oxygen

## Treatment – Pharmacologic

- Antidote: no
- Chelation therapy (?)

## Treatment – Surgical/Invasive

NA in absence of complications



# Barium Poisoning

## Category

CDC hazardous chemical category: metal

## Alternate Names

NA

## Etiology

Soluble barium [1]

Proposed mechanism of toxicity is blockage of cellular efflux of potassium, but not uptake, causing hypokalemia, which may be severe

## Transmission

Source:	Industrial
Entry:	Ingestion
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Cardiovascular  
Gastrointestinal  
Musculoskeletal

## Time to Clinical Onset

Minutes

## Signs/Symptoms

- Abdomen, epigastrium – pain
- Bowel movements – diarrhea
- Heart, rhythm – irregular [2]
- Heart rate – slow (bradycardia)
- Muscles – paralysis [2, 3]
- Muscles – weak [2, 3]
- Nausea
- Tendon reflexes – reduced or absent [2]
- Vomiting

## Differentiation [4]

*Includes, but not limited to:*

- Tetrodotoxin poisoning
- Tick paralysis
- Other causes of paralysis

## Complications

*Include, but not limited to:*

- Renal failure
- Rhabdomyolysis
- Ventricular fibrillation

## Laboratory

- Blood aldolase – increased
- Blood creatine phosphokinase (CPK) – increased
- Blood creatinine – increased
- Blood phosphate – decreased
- Blood potassium – decreased
- Blood urea nitrogen – increased

## ECG

- AV conduction – AV dissociation, complete
- Dysrhythmias, ventricular
- QRS – long
- Rate – slow (sinus bradycardia)
- U wave – prominent

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Fluids, electrolytes – esp potassium [5] ▲

Gastric lavage

Hemodialysis

Ventilation

## Treatment – Pharmacologic

Antidote: no

NS

## Treatment – Surgical/Invasive

NA

## Precautions

NA

## Primary Prevention

Industrial safety

## Course

Variable with intensity of poisoning and treatment

## Notes

- [1] Include barium carbonate, barium chloride, etc; does *not* include form of barium used in contrast imaging, which is not absorbed
- [2] Due to hypokalemia
- [3] All extremities; lasts hours-days
- [4] Differentiated by normal potassium levels
- [5] Monitor potassium carefully to avoid hyperkalemia because total body potassium is normal ▲



# Benzene Poisoning

## Weapon

CDC hazardous chemical category: organic solvent

## Alternate Names

Benzol  
Coal tar naptha  
Cyclohexatriene  
Phenyl hydride

## Etiology

Benzene (C<sub>6</sub>H<sub>6</sub>)

Irritation of exposed tissue; bone marrow suppression

## Transmission

Source:	Industrial, motor fuels, paint removers
Entry:	Contact Ingestion Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographic

NA

## Systems

Cardiovascular  
Gastrointestinal  
Hematopoietic  
Nervous  
Optic  
Skin

## Time to Clinical Onset

Immediate

## Signs/Symptoms

Abdomen – pain  
Appetite – decreased  
Bowel movements – diarrhea  
Breathing, rate – increased (tachypnea)  
Chest – tightness  
Consciousness – loss, prolonged (coma) [2]  
Consciousness – loss, sudden (syncope) [2]  
Dizziness (lightheaded)  
Extremities – tremors  
Eyes, conjunctivae – injected  
Eyes, vision – blurred  
Eyes – irritation  
Gait – unsteady  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Heart rhythm – irregular [3]  
Mentation – confused  
Mentation – sleepy (somnolence)  
Mentation – weakness (malaise)  
Mood – depressed [1]  
Mood – euphoric [1]  
Muscles – tremors  
Nausea  
Seizures  
Skin – blisters  
Skin color – red (erythema)  
Skin – pain  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other dermatologic, gastrointestinal, mucosal irritants

## Complications

*Include, but not limited to:*

Aspiration pneumonitis  
Bone marrow suppression



Cardiac dysrhythmias  
Coma  
Cornea injury  
Leukemia  
Noncardiac pulmonary edema  
Renal Failure  
Respiratory failure

### Laboratory

Blood Hgb/Hct – decreased (anemia)  
Blood liver enzymes – increased  
Blood platelets – decreased (thrombocytopenia)  
Blood WBC – decreased (leukopenia)  
Urine phenol – increased

### ECG

Dysrhythmias

### Imaging

Pulmonary edema

### Other Tests

NS in absence of complications

### Treatment – Nonpharmacologic

Do not induce emesis ▲  
Fluids and electrolytes  
Gastric lavage  
Oxygen  
Skin/eye washing and irrigation  
Ventilation

### Treatment – Pharmacologic

Antidote: no  
Caution using sympathomimetics [3] ▲  
NS

### Treatment – Surgical/Invasive

NA in absence of complications

### Precautions

Protective clothing: yes  
Site decontamination: yes  
Other: SCBA



# Brevetoxin Poisoning

## Weapon

CDC hazardous chemical category: biotoxin

## Alternate Names

Neurotoxic shellfish poisoning

NSP

Red tide toxin

## Etiology

Brevetoxin [3]

Blocks action potentials in nerves by preventing sodium flow, reducing nerve conduction

## Transmission

Source: Shellfish

Entry: Ingestion

Inhalation

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Coasts – global

Populations: All

Calendar: Year-round, sporadic

## Systems

Gastrointestinal

Nervous

Respiratory – upper [1]

**Time to Clinical Onset**

Ingestion: <1 hour-18 hours  
Inhalation: immediate

**Signs/Symptoms**

Abdomen – pain  
Bowel movements – diarrhea  
Breathing – diff, acute (acute dyspnea) [1]  
Breath sounds – wheezes [1]  
Cough – acute NS [1]  
Dizziness (true vertigo)  
Extremities – pain, shooting (paresthesias)  
Gait – ataxic  
Sensation, hot and cold temperature – reversed  
Vomiting

**Differentiation**

*Includes, but not limited to:*

Asthma [1]  
Gastroenteritis – all causes  
Meniere's disease

**Complications**

*Include, but not limited to:*

Dehydration

**Laboratory**

Blood, ELISA antibodies – positive [2]

**ECG**

NA in absence of complications

**Imaging**

NA in absence of complications

**Other Tests**

NA in absence of complications

**Treatment – Nonpharmacologic**

NS



# Bromine Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

NA

## Etiology

Bromine gas ( $\text{Br}_2$ )

Irritation of exposed tissue

## Transmission

Source: Industrial, i.e., gasoline additive, agriculture, sanitation, fire retardant

Entry: Contact with liquid/gas  
Ingestion of contaminated food/water  
Inhalation of gas

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All, esp chemical plant workers

Calendar: Year-round

## Systems

Gastrointestinal

Optic

Oropharynx

Respiratory – lower

Respiratory – upper

Skin

## Time to Clinical Onset

Minutes

## Signs/Symptoms

Abdomen – pain

Breathing – diff, acute (acute dyspnea)

Breathing – rapid (tachypnea)

Cough – acute NS

Cough – productive

Dizziness (lightheaded)

Eyes, conjunctivae – injected

Eyes, vision – light sensitivity, increased (photophobia)

Eyes – tearing, excess (lacrimation)

Head – pain (headache)

Mentation – weakness (malaise)

Mouth, mucosa color – brown

Mouth – burning

Nausea

Nose – blood (epistaxis)

Nose – irritation

Skin – brown discoloration

Skin – irritation

Skin – itching (pruritus)

Skin – rash, pustular

Skin – rash, vesicular

Sweating – increased (hyperhidrosis)

Tongue – brown discoloration

Vomiting

## Differentiation

*Includes, but not limited to:*

Chlorine poisoning

## Complications

*Include, but not limited to:*

Hemorrhagic gastroenteritis

Noncardiac pulmonary edema

Pneumonitis

Skin ulcers

## **ECG**

NS in absence of complications

## **Laboratory**

Blood bromide – increased

## **Imaging**

NS in absence of complications

## **Other Tests**

NS in absence of complications

## **Treatment – Nonpharmacologic**

Skin/eye washing and irrigation

Ventilation

## **Treatment – Pharmacologic**

Antidote: no

NS

## **Treatment – Surgical/Invasive**

NA in absence of complications

## **Precautions**

Protective clothing: yes

Site decontamination: yes

Other: NS

## **Primary Prevention**

Industrial safety

## **Course**

Variable with exposure

<http://www.argus1.com/?bromine>





# BZ Poisoning

## Weapon

CDC hazardous chemical category: incapacitating agent

## Alternate Names

Agent 15

## Etiology

3-quinuclidinyl benzilate

Inhibition of acetylcholine in autonomic and central nervous systems

## Transmission

Source:	Military weapon
Entry:	Contact Ingestion Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Nervous

## Time to Clinical Onset

$1/2$ -48 hours

## Signs/Symptoms

- Abdomen – pain
- Arterial press – elevated
- Arterial press – upright, low (orthostatic hypotension)
- Behavior – bizarre or changed
- Behavior – hyperactive
- Bladder, urinary – distended
- Bowel movements – constipation
- Bowel sounds – decreased/absent (ileus, adynamic)
- Consciousness – altered [2]
- Consciousness – loss, prolonged (coma)
- Dizziness (lightheaded)
- Eyes, pupils – dilated (mydriasis)
- Eyes, vision – blurred
- Face – flushed
- Heart rate – rapid (tachycardia) [1]
- Heart rate – slow (bradycardia) [1]
- Mentation – concentration impaired
- Mentation – confabulation
- Mentation – confused
- Mentation – crying, purposeless
- Mentation – disrobing
- Mentation – hallucinations
- Mentation – illusions
- Mentation – judgement impaired
- Mentation – memory impaired (amnesia)
- Mentation – paranoid
- Mentation – smiling/laughter, inappropriate
- Mood – anxious
- Mood – combative
- Mood – fearful
- Mood – labile
- Mood – restless, irritable
- Mouth – dry (xerostomia)
- Muscles – movement, incoordinated (ataxia)
- Muscles – weak
- Skin – dry
- Skin – flushed
- Skin – temperature, hot
- Speech – inarticulate (dysarthria)

Sweating – decreased  
Temperature, body – elevated (fever)  
Tendon reflexes – increased (hyperactive reflexes)  
Thirst – excessive  
Urination force – decreased  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Alcohol intoxication  
Anxiety reaction  
Hallucinogenic substances, i.e., LSD  
Other causes of anticholinergic syndrome  
Schizophrenia and other CNS mood and mental disorders

### **Complications**

*Include, but not limited to:*

Cardiac dysrhythmias  
Dehydration  
Electrolyte disturbances  
Hyperthermia-induced  
Self-inflicted injury

### **Laboratory**

Urine BZ – present

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

Decontamination of clothing  
Fluids and electrolytes  
Isolation from hazardous objects  
Skin washing



# Carbon Monoxide Poisoning

## Weapon

CDC hazardous chemical category: blood agent

## Alternate Names

NA

## Etiology

Carbon monoxide (CO)

Fixation of CO to hemoglobin (Hgb) increases binding of O<sub>2</sub> to Hgb and reduces release of O<sub>2</sub> to peripheral body tissues [1]

## Transmission

Source: Many, including propane engines, auto exhaust, natural gas appliances, fireplaces, grills, paint, generators

Entry: Inhalation

Human-to-Human: No

## Predisposing/Comorbid Condition

NA

## Demographics

Location: Global

Populations: All

Calendar: Year-round, peak winter

## Systems

Cardiovascular

Coagulation [2]

Gastrointestinal [2]

Musculoskeletal [2]  
Nervous  
Optic  
Respiratory – lower [2]  
Skin

### Time to Clinical Onset

Minutes [9]

### Signs/Symptoms

Abdomen – pain  
Arterial press – low  
Behavior – bizarre or changed  
Bowel movements, control – loss  
Bowel movements, stool – blood or black (hematochezia)  
(melena)  
Bowel movements – diarrhea  
Breathing – diff, rest (rest dyspnea)  
Breathing – rapid (tachypnea)  
Breath sounds – crackling (rales)  
Chest, ant – pain, nonpleuritic rest  
Chest, ant – palpitations  
Consciousness – altered  
Consciousness – loss, prolonged (coma)  
Consciousness – loss, sudden (syncope)  
Dizziness (lightheaded)  
Ears, hearing – loss (deafness)  
Ears – ringing (tinnitus)  
Eyes, motion – jerky (nystagmus)  
Eyes, retina – hemorrhage, flame-shaped  
Eyes, retina – papilledema  
Eyes, retroorbital – pain  
Eyes, vision – blurred  
Eyes, vision – loss, subtotal  
Eyes, vision – scotoma  
Gait – ataxic  
Hair – loss (alopecia)  
Head, gen – pain (headache)  
Heart rate – rapid (tachycardia)  
Heart rhythm – irregular

Mentation – concentration impaired  
Mentation – confused  
Mentation – judgement impaired  
Mentation – memory impaired (amnesia)  
Mentation – NS changes  
Mentation – sleepiness (somnolence)  
Mentation – weakness (malaise)  
Mood – anxious  
Mood – depressed  
Mood – lethargic  
Muscles – rigid  
Muscles – tremors, rest  
Muscles – weak  
Nausea  
Seizures  
Skin color – cherry red  
Skin color – erythematous patches  
Sputum – blood (hemoptysis)  
Urination spontaneous control – loss (urinary incontinence, true)  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Alcohol intoxication  
Cerebrovascular accident  
Congestive heart failure  
Food poisoning  
Primary neuropsychiatric conditions

### **Complications**

*Include, but not limited to:*

Acute myocardial infarction [7] ▲  
Blindness  
Diabetes insipidus  
Disseminated intravascular coagulation  
Dysrhythmias  
Lactic acidosis  
Noncardiac pulmonary edema  
Rhabdomyolysis  
Thrombotic thrombocytopenic purpura



## ECG

Dysrhythmias, ventricular [6] ▲  
Rate – rapid (sinus tachycardia)  
ST-T wave – NS abnormality [3]

## Laboratory

Blood amylase – increased [4]  
Blood arterial pH – decreased (acidosis)  
Blood calcium – decreased  
Blood carboxyhemoglobin – increased [5]  
Blood glucose – increased

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Oxygen – 100% [8] ▲

## Treatment – Pharmacologic

Antidote: oxygen ▲

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Protective clothing:	No
Site decontamination:	Ventilation
Other:	SCBA

## Primary Prevention

Household/industrial precautions [10]

## Course

Variable with exposure intensity and prior health, esp cardiac and CNS conditions  
Recovery may take weeks



# Chlorine Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

NA

## Etiology

Chlorine gas

Toxic effects due to formation of hydrochlorous and hydrochloric acid when comes into contact with water in body tissue, causing tissue necrosis and coagulation defects

## Transmission

Source: Industrial, water purifiers, disinfectants  
Entry: Inhalation  
Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global  
Populations: All  
Calendar: Year-round

## Systems

Coagulation  
Optic  
Oropharynx  
Respiratory – lower  
Skin

## Time to Clinical Onset

Immediate

## Signs/Symptoms

Abdomen – pain

Arterial pressure – increased [7]

Arterial pressure – decreased [7]

Breath sounds, local – wheezes

Breath sounds – coarse (rhonchi)

Breath sounds – crackling (rales)

Breathing – difficult, acute (dyspnea)

Breathing – rapid (tachypnea)

Chest, ant – pain/tightness, nonpleuritic

Chest – cough, acute NS

Chest – rales

Chills

Consciousness – altered

Consciousness – loss, sudden (syncope)

Dizziness (lightheaded)

Eyes, conjunctivae – injected

Eyes, cornea – burns

Eyes, tearing (lacrimation) – increased

Eyes – irritation

Head – pain (headache)

Heart rate – rapid (tachycardia)

Mentation – weakness (malaise)

Mood – anxious

Mouth – burning

Nausea

Nose – irritation

Skin, face – burns [6]

Skin color – blue (cyanosis)

Skin – pain [6]

Sputum – blood (hemoptysis)

Temperature, body – elevated (fever) [1]

Temperature, body – decreased (hypothermia) [1]

Throat – injected

Throat – sore

Voice – hoarse

Vomiting

## Differentiation

*Includes, but not limited to:*

- Asthma
- Congestive heart failure
- Other causes of acute cough with or without dyspnea
- Other causes of acute pulmonary edema
- Pulmonary embolus

## Complications

*Include, but not limited to:*

- Noncardiac pulmonary edema
- Respiratory failure
- Respiratory infection

## Laboratory

- Blood arterial pH – decreased [3]
- Blood arterial pH – increased [2]
- Blood arterial pO<sub>2</sub> – decreased (hypoxia)
- Blood WBC – increased (leukocytosis)

## Imaging

- Lungs, parenchyma – consolidation [4]
- Lungs, parenchyma interstitial markings – increased
- Lungs, vasculature – congested [5]

## Other Tests

- NA in absence of complications

## Treatment – Nonpharmacologic

- Oxygen
- Skin/eye washing and irrigation

## Treatment – Pharmacologic

- Bronchodilators
- Corticosteroids
- Nonsteroidal anti-inflammatory drugs (?)

## Treatment – Surgical/Invasive

- NA

## Precautions

- Protective clothing: yes
- Site decontamination: yes
- Other: SBCA



# Colchicine Poisoning

## Weapon

CDC hazardous chemical category: biotoxin

## Alternate Names

NA

## Etiology

Extract of *colchicum autumnale*

Toxic effect caused by binding to tubulin, inhibiting cell mitosis

## Transmission

Source:	Medicine Saffron leaves [1]
Entry:	Ingestion Intravenous
Human-to-Human:	No

## Predisposing/Comorbid Conditions

Major depression with suicide intention

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

- Cardiovascular
- Coagulation
- Gastrointestinal
- Hematopoietic/Immune
- Musculoskeletal
- Nervous
- Renal/Genitourinary
- Respiratory – lower

## **Time to Clinical Onset**

4-12 hours

## **Signs/Symptoms [3]**

Abdomen – pain

Appetite – decreased

Bowel movements, stool – blood or black (hematochezia)  
(melena)

Bowel movements – diarrhea

Liver – enlarged (hepatomegaly)

Mentation – coma

Mentation – delirium

Seizures

Skin, hair – loss (alopecia) [4]

Vomiting

Vomiting – blood (hematemesis)

## **Differentiation**

*Includes, but not limited to:*

All causes of acute gastroenteritis

All other causes of multi-organ failure

Arsenic poisoning

Nonsteroidal anti-inflammatory drug poisoning

Other medical poisons

## **Complications**

*Include, but not limited to:*

Acute renal failure

Acute respiratory failure

Cardiac dysrhythmias

Dehydration

Disseminated intravascular coagulation

Electrolyte abnormalities

Neutropenia

Rhabdomyolysis

Seizures

Sepsis

Shock

Thrombocytopenia



**Laboratory [3]**

- Blood WBC – increased (leukocytosis)
- Blood WBC – left shift [2]
- Liver enzymes – increased
- Urine protein – present
- Urine RBC – present

**ECG**

- Dysrhythmias

**Imaging**

- NA in absence of complications

**Other Tests**

- NA in absence of complications

**Treatment – Nonpharmacologic**

- Fluids and electrolytes
- Gastric lavage

**Treatment – Pharmacologic**

- Antidote: no
- NS

**Treatment – Surgical/Invasive**

- NA

**Precautions**

- NA

**Primary Prevention**

- Home medicinal safety

**Course**

- Variable with exposure and time-to-treatment

**Notes**

- [1] May be mistaken for leaves of ransom herb *allium ursinum*
- [2] May include immature myeloid cells



# Cyanide Poisoning

## Weapon

CDC hazardous chemical category: blood agent

## Alternate Names

Cassava poisoning  
Konzo

## Etiology [5]

Cyanogen chloride  
Hydrogen cyanide  
Potassium cyanide  
Sodium cyanide

Toxic effects caused by cyanide binding of ferric iron in mitochondrial cytochrome oxidase, affecting cellular ability to utilize O<sub>2</sub> in oxidative phosphorylation, causing tissue hypoxia, anaerobic metabolism and lactic acidosis

## Transmission

Source: Industrial, fires, poisonous plants [7]  
Entry: Inhalation  
Ingestion  
Human-to-Human: No

## Predisposing/Comorbid Condition

NA

## Demographics

Location: Global  
Populations: All, esp chemical industry workers  
Calendar: Year-round

## Systems

Cardiovascular  
Hematopoietic/Immune

Nervous  
 Optic  
 Respiratory – lower  
 Respiratory – upper  
 Rhabdomyolysis

**Time to Clinical Onset**

Immediate

**Signs/Symptoms [3]**

Abdomen, epigastrium – pain  
 Arterial press – elevated  
 Arterial press – low  
 Bowel movements – diarrhea  
 Breath, odor – “bitter almonds” or musty  
 Breathing – deep (hyperpnea)  
 Breathing – diff, rest (rest dyspnea)  
 Breathing – rapid (tachypnea)  
 Chest, ant – pain, nonpleuritic rest  
 Chest, ant – palpitations  
 Chest – rales  
 Consciousness – loss, prolonged (coma)  
 Consciousness – loss, sudden (syncope)  
 Cough – acute, NS  
 Dizziness (lightheaded)  
 Eyes, conjunctivae – injected  
 Eyes, pupil reaction – slow  
 Eyes, pupils – dilated (mydriasis)  
 Eyes, tearing (lacrimation) – increased  
 Eyes – pain  
 Head – pain (headache)  
 Heart rate – rapid (tachycardia)  
 Heart rate – slow (bradycardia)  
 Heart rhythm – irregular  
 Mentation – coma  
 Mentation – sleepy (somnolence)  
 Mentation – syncope  
 Mood – anxious  
 Mood – restless/irritable  
 Nausea  
 Nose – drainage (rhinorrhea, coryza)

Seizures  
Skin color – blue (cyanosis) [1]  
Skin – pain  
Throat – sore  
Vomiting

### Differentiation

*Includes, but not limited to:*

All other causes of acute respiratory failure

### Complications

*Include, but not limited to:*

Noncardiac pulmonary edema [4]  
Respiratory failure  
Seizures  
Shock

### Laboratory

Blood lactate – increased [6]  
Blood pH – decreased

### ECG [2] ▲

AV conduction – 1st degree block  
AV conduction – 2nd degree block, Mobitz II  
AV conduction – 3rd degree block  
Dysrhythmias, atrial  
Dysrhythmias, ventricular  
Rate – rapid (sinus tachycardia)  
Rate – slow (sinus bradycardia)  
ST segment – depressed  
T wave – inversion, abnormal

### Imaging

Chest x-ray – NS in absence of complications

### Other Tests

NS in absence of complications

### Treatment – Nonpharmacologic

Do not induce vomiting for ingestion ▲

Eye/skin irrigation and washing  
 Rest  
 Ventilation with oxygen

### **Treatment – Pharmacologic**

Antidote: no  
 NS

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

Protective clothing: yes  
 Site decontamination: yes  
 Other: SBCA  
 Do not administer mouth-to-mouth artificial respiration ▲  
 Wear protective gloves when administering first aid ▲  
 Avoid any skin-skin contact with victims ▲  
 No food or liquid ingestion or smoking during care ▲  
 Remove contaminated clothes following aid ▲

### **Primary Prevention**

Industrial safety

### **Course**

Varies with exposure intensity  
 Less than 5% overall mortality

### **Notes**

- [1] Late only; skin color typically normal or cherry red in presence of hypoxia
- [2] Cardiac rhythm should be continuously monitored ▲
- [3] Depend on route, dose of exposure, i.e., inhalation vs gastrointestinal
- [4] Both inhalation and gastrointestinal exposure
- [5] Compounds that release cyanide spontaneously, by thermal decomposition, or by chemical reaction, such as cyanogen, cyanogen bromide, cyanogen chloride, calcium cyanide, acetonitrile, laetrile, amygdalin, lethane, thanate, sodium nitroprusside, cassava root



# Digitalis Poisoning

## Category

CDC hazardous chemical category: biotoxin

## Alternate Names

Digitalis intoxication [1]

## Etiology

Digitalis medicinal preparations

    Taken in excess [2]

    Increased sensitivity

Decreases intracardiac impulse conduction and suppresses/stimulates cardiac impulse generation

## Transmission

Source: Medicine

Entry: Ingestion

Parenteral

Human-to-Human: No

## Predisposing/Comorbid Conditions

Advanced age

Cardiac disease

Drugs

    amiodarone

    corticosteroids

    cyclosporine

    diuretics

    other cardiac drugs

Electrolyte abnormalities

Endocrine/metabolic disease

Kidney disease

Pulmonary disease



## Demographics

Location:	Global
Populations:	All, esp aged
Calendar:	Year-round

## Systems

Cardiovascular  
Gastrointestinal  
Nervous

## Time to Clinical Onset

Variable

## Signs/Symptoms

Abdomen – pain  
Appetite – reduced (anorexia)  
Bowel movements – diarrhea  
Chest, ant – palpitations  
Consciousness – loss, sudden (syncope)  
Dizziness (lightheaded)  
Eyes, vision – blurred  
Eyes, vision – colored halos around lights  
Face – pain  
Fatigue  
Heart rate – slow (bradycardia)  
Heart rate – rapid (tachycardia)  
Heart rhythm – irregular  
Mentation – confused  
Mentation – weakness (malaise)  
Mood – depressed  
Nausea  
Sleep – disturbed (insomnia)  
Urination – nocturnal (nocturia)  
Vomiting

## Differentiation

*Includes, but not limited to:*

CNS and mood disorders, esp major depression  
Gastroenteritis  
Other causes of cardiac dysrhythmias

## Complications

*Include, but not limited to:*

- Advanced atrioventricular heart block
- Cardiac ventricular fibrillation

## Laboratory

- Blood digitalis level – increased [3]
- Blood potassium – decreased

## ECG

- Dysrhythmias, atrial
- Dysrhythmias, conduction block
- Dysrhythmias, junctional
- Dysrhythmias, ventricular
- Rate – slow (sinus bradycardia)
- ST segment – depressed
- ST-T wave – abnormality, NS
- Tachycardia – bidirectional

## Imaging

- NA in absence of complications

## Other Tests

- NA

## Treatment – Nonpharmacologic

- DC digitalis
- DC drugs that elevate digitalis blood levels
- Fluids and electrolytes
- Oxygen for hypoxia

## Treatment – Pharmacologic

- Digoxin-specific antibodies [6]
- Potassium [4] ▲
- Lidocaine [5]
- Phenytoin [5]

## Treatment – Surgical/Invasive

- Dialysis
- Ventricular pacing



# Elemental Mercury Poisoning—Acute

## Category

CDC hazardous chemical category: metal

## Alternate Names

Quicksilver  
Hydragyrum  
Metal fume fever

## Etiology

Elemental mercury ( $\text{Hg}^{0+}$ )

Binds to sulfide groups, blocking sulfhydryl enzymes, disrupting cellular metabolism

## Transmission

Source:	Industrial, medicinal
Entry:	Inhalation [1] Ingestion [2]
Human-to-Human:	No

## Predisposing/Comorbid Condition

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Nervous  
Respiratory – upper  
Respiratory – lower

## Time to Clinical Onset

Minutes-hours

## Signs/Symptoms [3]

Arterial pressure – increased

Bowel movements – diarrhea

Breathing – diff, acute (acute dyspnea)

Chest – pain

Chills

Cough, non-productive

Eyes – irritation

Heart rate – increased (tachycardia)

Mentation – coma

Mentation – confusion

Mentation – weakness (malaise)

Mood – lethargic

Mouth, gingiva – inflamed

Mouth – burning

Nausea

Sense of taste – metallic

Skin – rash, erythematous

Skin – rash, vesicular

Vomiting

## Differentiation

*Includes, but not limited to:*

Other causes of acute respiratory distress

## Complications [3]

*Include, but not limited to:*

Chronic mercury poisoning

Noncardiac pulmonary edema

Respiratory failure

## Laboratory

Blood mercury – increased

Urine mercury – increased

## ECG

NA in absence of complications

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic [3]

Skin/eye washing and irrigation  
 Ventilation with humidified oxygen

## Treatment – Pharmacologic [3]

Antidote: no  
 Chelation therapy if systemic absorption occurs

## Treatment – Surgical/Invasive

NA

## Precautions

Protective clothing:	yes
Site decontamination:	yes
Other:	NS

## Primary Prevention

Home safety  
 Industrial safety

## Course

Variable with exposure intensity  
 Chronic poisoning may occur with systemic absorption

## Notes

- [1] Easily vaporizes from liquid form at room temperature to become inhaled and converted in vivo to inorganic form, which is toxic to respiratory tract
- [2] Important mainly in persons with abnormal GI absorption as elemental mercury is otherwise poorly absorbed
- [3] Acute inhaled form only



# Ethylene Glycol Poisoning

## Weapon

CDC hazardous chemical category: toxic alcohol

## Alternate Names

1,2-dihydroxyethane  
1,2-ethanediol  
2-hydroxyethanol  
Ethylene alcohol  
Ethylene dihydrate  
Glycol

## Etiology

Ethylene glycol ( $C_2H_6O_2$ )

Toxic effects due to breakdown products causing metabolic acidosis and formation of calcium oxalate crystals in kidneys and other tissues

## Transmission

Source:	Industrial, i.e., antifreeze, de-icing solutions, and polyester fibers; ingredient in hydraulic brake fluids and in various inks; solvent in paints and plastics
Entry:	Ingestion
Human-to-Human:	No

## Predisposing/Comorbid Condition

Alcoholism

## Demographics

Location:	Global
Populations:	All, esp persons working with cars and photographic developing solutions
Calendar:	Year-round



## Systems

Nervous

Renal/Genitourinary

## Exposure to Clinical Onset

Hours [3]

## Signs/Symptoms [1, 5]

Arterial press – elevated

Arterial press – low

Consciousness – loss, prolonged (coma)

Consciousness – loss, sudden (syncope)

Dizziness (lightheaded)

Eyes, motion – jerky (nystagmus)

Eyes, motion – reduced or paralyzed (ophthalmoplegia)

Gait – unsteady (ataxia)

Head – pain (headache)

Heart rate – rapid (tachycardia)

Mentation – confusion [1]

Mentation – sleepy (somnolence)

Mood – restless/irritable

Muscles – spasm (myoclonus) [4]

Nausea

Seizures

Speech – slurred

Tendon reflexes – reduced or absent

Vomiting

Vomiting – blood (hematemesis)

## Differentiation

*Includes, but not limited to:*

Ethyl alcohol intoxication

## Complications

*Include, but not limited to:*

Cerebral edema

Congestive heart failure

Hypocalcemia

Hyperkalemia

Metabolic acidosis

Neuropathy  
Noncardiac pulmonary edema  
Renal failure – oliguric  
Respiratory failure  
Shock

### **Laboratory**

Blood – anion gap  
Blood arterial pH – decreased (acidosis)  
Blood calcium – increased  
Blood potassium – increased

### **ECG**

Dysrhythmias – NS [2]

### **Imaging**

NS in absence of complications

### **Other Tests**

NS in absence of complications

### **Treatment – Nonpharmacologic**

Gastric lavage  
Hemodialysis

### **Treatment – Pharmacologic**

Sodium bicarbonate [6]

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

NA

### **Primary Prevention**

Industrial safety

### **Course**

Untreated: variable, sometimes fatal ☠



# Lewisite Poisoning

## Weapon

CDC hazardous chemical category: blister agent/vessicant

## Alternate Names

“L”

## Etiology

Lewisite

Causes direct cell damage, mechanism unknown

## Transmission

Source:	Military weapon
Entry:	Contact Ingestion of contaminated food/water Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Optic  
Respiratory – upper  
Skin

## Time to Clinical Onset

Immediate

## Signs/Symptoms

Abdomen – pain  
Arterial press – low [1]  
Bowel movements – blood (melena)  
Bowel movements – diarrhea  
Breathing – diff, acute (acute dyspnea)  
Breath sounds – wheezes  
Chest – pain, burning  
Cough – productive [3]  
Eyes, conjunctivae – edema  
Eyes, conjunctivae – injected  
Eyes, cornea – damage  
Eyes, lids – (edema) swelling  
Eyes, vision – light sensitivity, increased (photophobia)  
Eyes, vision – loss, binocular total (blindness)  
Eyes, vision – loss, transient (temporary blindness)  
Eyes – blinking, spasmodic (blepharospasm)  
Eyes – pain  
Eyes – tearing, excess  
Head, sinuses – pain  
Mentation – weakness (malaise)  
Mood – restless, irritable  
Nausea  
Nose – blood (epistaxis)  
Nose – drainage (rhinorrhea, coryza)  
Nose – irritation  
Nose – sneezing [2]  
Skin, local – blisters  
Skin color – gray [4]  
Skin color – red (erythematous)  
Temperature, body – decreased (hypothermia)  
Voice – hoarse  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other dessicants and blistering agents

## Complications

*Include, but not limited to:*

Bone marrow suppression

Hepatic failure  
Noncardiac pulmonary edema  
Renal failure

### **Laboratory**

NA in absence of complications

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

Do not induce emesis ▲  
Eye/skin irrigation and washing  
Rapid decontamination  
Ventilation

### **Treatment – Pharmacologic**

Antidote: British anti-lewisite

### **Treatment – Surgical/Invasive**

NA

### **Precautions**

Protective clothing:	yes
Site decontamination:	yes
Other:	SCBA

### **Primary Prevention**

NA

### **Course**

Variable with exposure intensity



# Methyl Bromide Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

Bromomethane  
Embafume  
Isobrone  
Monobromomethane  
Methyl fume  
Terabol

## Etiology

Methyl bromide ( $\text{CH}_3\text{Br}$ )

Methylation of sulfhydryl groups, disrupting cell function, esp CNS

## Transmission

Source:	Natural – from oceanic algae and kelp Industrial – fumigant, sod preparation [1]
Entry:	Contact Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Condition

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Nervous



Optic  
Respiratory – upper  
Skin

## Time to Clinical Onset

1-48 hours

## Signs/Symptoms

Breathing – diff, rest (rest dyspnea)  
Chest – pain  
Consciousness – loss, prolonged (coma)  
Cough – acute NS  
Dizziness (lightheaded)  
Eyes, movements – involuntary  
Eyes, pupils – dilated  
Eyes, vision – blurred  
Eyes, vision – double (diplopia)  
Eyes – irritation  
Eyes – tearing, excess (lacrimation)  
Gait – ataxic  
Head – pain (headache)  
Mentation – delirium  
Mentation – manic  
Mentation – weakness (malaise)  
Mood – anxious  
Mood – euphoric  
Mood – restless, irritable  
Nausea  
Seizures  
Skin color – erythema  
Skin – itching (pruritus)  
Skin – pain  
Skin – rash, vesicular  
Speech – inarticulate (dysarthria)  
Tendon reflexes – decreased  
Throat – irritation  
Touch sensation – decreased  
Vomiting

## Differentiation

*Includes, but not limited to:*

- Other causes of CNS abnormalities
- Other inhalational and blistering agents

## Complications

*Include, but not limited to:*

- Blindness
- Brain damage
- Corneal injury
- Hepatic failure
- Neuropsychosis
- Noncardiac pulmonary edema
- Optic nerve atrophy
- Peripheral neuropathy
- Pneumonitis
- Respiratory failure
- Renal failure

## Laboratory

- Blood arterial  $pO_2$  – decreased (hypoxia)
- Blood liver enzymes – increased
- Blood urea nitrogen – increased

## Imaging

- NA in absence of complications

## Other Tests

- Pulse oximetry

## Treatment – Nonpharmacologic

- Eye/skin irrigation and washing
- Remove and discard clothing
- Ventilation with oxygen

## Treatment – Pharmacologic

- Antidote: no
- Activated charcoal (ingestion)
- Bronchodilators



# Methyl Isocyanate Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

Isocyanatomethane  
Methyl carbylamine  
MIC

## Etiology

Methyl isocyanate ( $C_2H_3NO$ )

Irritation/corrosion of respiratory tract

## Transmission

Source: Industrial, i.e., pesticides, rubber, adhesives  
Entry: Contact  
Inhalation  
Human-to-Human: No

## Predisposing/Comorbid Condition

NA

## Demographics

Location: Global  
Populations: All  
Calendar: Year-round

## Systems

Optic  
Respiratory – lower  
Respiratory – upper  
Skin

## Time to Clinical Onset

1-4 hours

## Signs/Symptoms

Abdomen – pain  
Bowels – defecation  
Breathing – diff, acute (acute dyspnea)  
Breathing – rapid (tachypnea)  
Breath sounds – wheezes  
Breath sounds – crackling (rales)  
Chest, ant – pain, nonpleuritic rest  
Consciousness – loss, sudden (syncope)  
Cough – acute nonspecific  
Eyes, conjunctivae – injected  
Eyes, cornea – damage  
Eyes, lids – swelling (edema)  
Eyes, light sensitivity – increased (photophobia)  
Eyes – irritation  
Eyes – tearing, excess (lacrimation) [1]  
Mouth – burning  
Nausea  
Nose – irritation  
Skin – burns  
Vomiting

## Differentiation

*Includes, but not limited to:*

Asthma

## Complications

*Include, but not limited to:*

Eye damage  
Noncardiac pulmonary edema  
Pneumonia  
Respiratory failure

## Laboratory

NA in absence of complications

**ECG**

NA in absence of complications

**Imaging**

NA in absence of complications

**Other Tests**

NS in absence of complications

**Treatment – Nonpharmacologic**

Eye/skin irrigation and washing

Fluids/electrolytes

Remove contaminated clothing

Ventilation

**Treatment – Pharmacologic**

Antidote: no

Bronchodilators

Corticosteroids

**Treatment – Surgical/Invasive**

NA

**Precautions**

Protective clothing: yes

Site decontamination: yes

Other: SCBA

**Primary Prevention**

Industrial safety

**Course**

Variable and may be fatal ☠



# Nicotine Poisoning

## Weapon

CDC hazardous chemical category: biotoxin

## Alternate Names

NA

## Etiology

Nicotine

Stimulation, followed by suppression, of nicotinic cholinergic ganglia

## Transmission

Source:	Tobacco leaves, commercial tobacco, nicotine patch, nicotine gum, insecticides
Entry:	Ingestion
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All, esp children
Calendar:	Year-round

## Systems

Cardiovascular  
Nervous

## Time to Clinical Onset

Hours



## Signs/Symptoms

Abdomen – pain  
Arterial press – elevated  
Arterial press – low [1]  
Bowel movements – diarrhea  
Breathing – diff, acute (acute dyspnea)  
Breathing – rapid (tachypnea)  
Chest, ant – palpitations  
Consciousness – loss, prolonged (coma)  
Consciousness – loss, sudden (syncope)  
Head – pain (headache)  
Heart rate – rapid (tachycardia)  
Heart rate – slow (bradycardia) [1]  
Mentation – confused  
Mentation – weakness (malaise)  
Mood – depressed  
Mood – restless, irritable  
Mouth – burning  
Mouth – drooling  
Nausea  
Seizures  
Skin color – pale (pallor)  
Sputum – excessive (bronchorrhea)  
Sweating – increased  
Vomiting

## Differentiation

*Includes, but not limited to:*

Organophosphate poisoning

## Complications

*Include, but not limited to:*

Respiratory failure  
Shock

## Laboratory

NS in absence of complications

## **ECG**

NS in absence of complications

## **Imaging**

NA in absence of complications

## **Other Tests**

NA in absence of complications

## **Treatment – Nonpharmacologic**

Gastric irrigation

Skin irrigation

Ventilation

## **Treatment – Pharmacologic**

Antidote: atropine

Activated charcoal (ingestion)

## **Treatment – Surgical/Invasive**

NA

## **Precautions**

NA

## **Primary Prevention**

Home medicinal/tobacco exposure precautions

## **Course**

Variable with exposure intensity

## **Note**

[1] Severe exposure

<http://www.argus1.com/?nicotine>



# Opioid Poisoning

## Weapon

CDC hazardous chemical category: incapacitating agent

## Alternate Names

NA

## Etiology

Codeine  
Fentanyl  
Heroin  
Meperidine  
Methadone  
Morphine  
Propoxyphene

Inhibit synaptic transmission via stimulation of opioid receptors in central and peripheral nervous system

## Transmission

Source:	Legal and illicit substances
Entry:	Ingestion Inhalation Innoculation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

Alcoholism  
Drug addiction  
Major depression with suicidal intent

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Nervous

Respiratory – lower

## Time to Clinical Onset

Varies with transmission route

## Signs/Symptoms

Breathing – cessation [2]

Breathing – diff, rest (rest dyspnea) [1]

Breathing – rapid (tachypnea) [1]

Breathing – slow [2]

Breath sounds – crackling (rales) [1]

Consciousness – loss, prolonged (coma)

Eyes, pupils – constricted (miosis)

Mentation – sleepiness (somnia)

Mood – depressed

Mood – lethargic

## Differentiation

*Includes, but not limited to:*

Congestive heart failure

Other causes of central nervous system depression

## Complications

*Include, but not limited to:*

Cardiac conduction disturbances and dysrhythmias

Myocardial ischemia

Noncardiac pulmonary edema [1]

Seizures

## Laboratory

Drug screens

## ECG

NS in absence of complications

## Imaging

Pulmonary edema without cardiac enlargement [1]

### Other Tests

NS in absence of complications

### Treatment – Nonpharmacologic

Gastric lavage (ingestion)

Ventilation with oxygen ▲

### Treatment – Pharmacologic

Antidotes: opioid antagonists

nalmefene

naloxone

naltrexone

Activated charcoal (ingestion)

Induce emesis (ingestion)

### Treatment – Surgical/Invasive

NA

### Precautions

NA

### Primary Prevention

Avoidance

### Course

Variable with exposure intensity, time to treatment, prior health of victim, other substances taken, and other factors

### Notes

- [1] Noncardiogenic pulmonary edema is most often due to heroin intoxication and may occur within minutes
- [2] Hypoxia due to respiratory depression is most common cause of death ☠

<http://www.argus1.com/?opioid>



# Organophosphate Poisoning

## Poison

CDC hazardous chemical category: nerve agent

## Alternate Names

Insecticide poisoning  
Nerve agents

## Etiology

Commercial insecticides  
GF  
Sarin  
Soman  
Tabun  
VX

Cholinesterase inhibition causing widespread neurologic effects,  
esp muscle and CNS function

## Transmission

Source:	Weapon arsenals; commercial compounds
Entry:	Contact Ingestion Inhalation
Human-to-Human:	No

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Gastrointestinal  
Nervous



Optic

Respiratory – lower

### Time to Clinical Onset

Immediate

### Signs/Symptoms [6]

Abdomen – pain

Arterial press – elevated

Arterial press – low (hypotension)

Bowel movements, control – loss [1]

Bowel movements – diarrhea

Breathing – cessation [1]

Breathing – diff, rest (rest dyspnea)

Breathing – rapid (tachypnea)

Chest – pain/tightness

Chest – rales

Consciousness – loss, prolonged (coma) [1]

Consciousness – loss, sudden (syncope) [1]

Cough – acute NS

Eyes, conjunctivae – injected [2]

Eyes, pupils – constricted (miosis)

Eyes, tearing (lacrimation) – increased [2]

Eyes, vision – blurred

Eyes, vision – dim

Eyes – pain [2]

Gait – unsteady [1]

Head – pain (headache)

Heart rate – increased (tachycardia)

Heart rate – decreased (bradycardia)

Mentation, memory – impaired (amnesia) [5]

Mentation, judgement – impaired [5]

Mentation – confusion [5]

Mentation – sleepy (somnolence) [5]

Mentation – weak (malaise) [5]

Mood – anxious [5]

Mood – restless/irritable [5]

Mood – depressed [5]

Mouth – drooling

Muscles, movements local – fasciculations

Muscles – paralysis [3]  
 Muscles – weak  
 Nausea  
 Nose, drainage – increased (rhinorrhea, coryza)  
 Nose – congested  
 Salivation – excessive (psyalism)  
 Seizures [1]  
 Skin, local – sweating [4]  
 Speech – slurred  
 Sweating – increased (hyperhydrosis)  
 Throat – pain/tightness  
 Urination, spontaneous control – decreased/absent (urinary incontinence)  
 Urination – frequent (polyuria)  
 Vomiting

### **Differentiation**

*Includes, but not limited to:*

All nerve agent (organophosphate) poisonings

### **Complications**

*Include, but not limited to:*

Coma  
 Pancreatitis  
 Paralysis  
 Respiratory failure

### **Laboratory**

Blood arterial pH – increased  
 Blood cholinesterase – decreased  
 Blood creatine kinase (CK) – increased  
 Blood amylase – increased  
 Blood glucose – increased  
 Blood WBC – increased (leukocytosis)

### **ECG**

Dyrhythmias – slow-rate (bradyarrhythmias)  
 Rate – decreased (sinus bradycardia)  
 Rate – increased (sinus tachycardia)

## Imaging

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Airway

Do not induce vomiting for ingestion ▲

Gastric lavage

Oxygen

Remove all clothing immediately ▲

Wash entire skin immediately ▲

## Treatment – Pharmacologic

Antidotes: atropine ▲

atropine

pralidoxime chloride

Activated charcoal

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Protective clothing: yes

Site decontamination: yes

Other: NS

## Primary Prevention

Industrial safety

## Course

Recovery usual with mild or moderate exposure

Survival usual with prompt treatment

Usually fatal with severe exposure ☠

## Notes

[1] Severe poisoning

[2] Local eye symptoms have rapid onset after exposure (seconds to minutes)

[3] Flaccid



# Osmium Tetroxide Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

Osmic acid anhydride  
Osmium oxide

## Etiology

Osmium tetroxide ( $\text{OsO}_4$ )

Toxic effect by direct tissue oxidation

## Transmission

Source: Industrial, biology laboratories

Entry: Contact  
Ingestion  
Inhalation

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All

Calendar: Year-round

## Systems

Gastrointestinal

Optic

Respiratory – lower

Respiratory – upper

Skin

## Time to Clinical Onset

Hours ▲

## Signs/Symptoms

Abdomen – pain (ingestion)  
 Breathing – diff, acute (acute dyspnea)  
 Breathing – rapid (tachypnea)  
 Breath sounds – crackling (rales)  
 Breath sounds – wheezes  
 Cough – acute NS  
 Dizziness (lightheaded)  
 Eyes, conjunctivae – injected  
 Eyes, cornea – black  
 Eyes, cornea – damage  
 Eyes, vision – blurred  
 Eyes, vision – loss, binocular total (blindness)  
 Eyes, vision – loss, subtotal  
 Eyes – irritation  
 Eyes – tearing, excess (lacrimation)  
 Head – pain (headache)  
 Nose – irritation  
 Skin color – black  
 Skin – irritation  
 Skin – pain, burning  
 Skin – rash, erythematous  
 Skin – rash, vesicular  
 Throat – pain  
 Vomiting

## Differentiation

*Includes, but not limited to:*

Phosgene poisoning  
 Sarin poisoning  
 Sulfur mustard poisoning

## Complications

*Include, but not limited to:*

Corneal injury/blindness  
 Noncardiac pulmonary edema  
 Pneumonia

## Laboratory

NS in absence of complications

## ECG

NS in absence of complications

## Imaging

NS in absence of complications

## Other Tests

NS in absence of complications

## Treatment – Nonpharmacologic

Remove contaminated clothing  
Skin/eye washing and irrigation ▲  
Ventilation

## Treatment – Pharmacologic

Antidote: no

## Treatment – Surgical/Invasive

NA

## Precautions

Protective clothing:	yes
Site decontamination:	yes
Other:	NS

## Primary Prevention

Industrial precautions

## Course

Variable with exposure  
May be fatal due to pulmonary damage ☠

<http://www.argusl.com/?osmium>





# Phosgene Poisoning

## Poison

CDC hazardous chemical category: blister agent/vessicant

## Alternate names

Carbonic acid dichloride  
Carbonic dichloride  
Carbon oxychloride  
Carbonyl chloride  
Chemical ID: ID1076  
Chloroformyl chloride

## Etiology

Phosgene ( $\text{COCl}_2$ )

Hydrolyzes in mucous membrane water to form hydrochloric acid, damaging respiratory tract epithelial cells and eyes and also causing hemoconcentration, hypovolemia, hypoxia, liver necrosis, pulmonary necrosis, and renal necrosis

## Transmission

Source:	Industrial; many household solvents, cleaning fluids, paint removers; welding in confined space
Entry:	Contact Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All, esp chemical plant workers
Calendar:	Year-round

## Systems

Optic  
Oropharynx  
Respiratory – upper  
Skin

## Time to Clinical Onset

Immediate

## Signs/Symptoms [1]

Breathing – diff, acute (acute dyspnea)  
Breathing – rapid (tachypnea)  
Breath sounds – wheezes  
Chest, ant – pain, nonpleuritic rest  
Chest, ant – pain, pleuritic  
Cough – acute NS  
Eyes, conjunctivae – injected  
Eyes, cornea – damage  
Eyes, tearing (lacrimation) – increased  
Eyes – irritation  
Head – pain (headache)  
Nausea  
Nose, mucosa – inflamed  
Nose – irritation  
Skin color – blue (cyanosis)  
Skin – irritation [2]  
Sputum – blood (hemoptysis)  
Sputum – clear/thick  
Thirst – increased  
Throat – injected  
Throat – burning  
Throat – dry  
Vomiting

## Differentiation

*Includes, but not limited to:*

Acute respiratory distress syndrome  
Ammonia poisoning  
Chlorine poisoning  
Congestive heart failure

Nitrogen oxide poisoning  
Pneumonia  
Sulfur dioxide poisoning  
Upper respiratory tract infections

### Complications

*Include, but not limited to:*

Hemolytic anemia  
Hepatic necrosis  
Noncardiac pulmonary edema  
Renal necrosis  
Respiratory distress  
Shock

### Laboratory

Blood arterial  $pO_2$  – decreased (hypoxia)  
Blood bilirubin – increased  
Blood concentration – increased  
Blood creatinine – increased  
Blood Hgb/Hct – decreased (anemia)  
Blood liver enzymes – increased  
Blood lung enzymes – increased  
Blood urea nitrogen – increased

### ECG

NS in absence of complications

### Imaging

Lungs, hila bilateral – enlarged  
Lungs, parenchyma central – infiltrates  
Lungs, vasculature – congested

### Other Tests

NS in absence of complications

### Treatment – Nonpharmacologic

Oxygen  
Skin/eye washing and irrigation  
Ventilation



# Phosphine Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

Chemical ID: 2199  
Aluminum phosphide (AlP)  
Calcium phosphide  
Hydrogen phosphide  
PH<sub>3</sub>  
Phosphorous trihydride  
Zinc phosphide (ZnP)

## Etiology

Phosphine gas (PH<sub>3</sub>) [7]

Inhalation of gas (rare) or ingestion of solid phosphide reacts with gastric HCl to form phosphine gas, which interferes with enzymes and protein synthesis, primarily in mitochondria of heart and lung cells, causing myofibril necrosis and secondary ionic changes in peripheral small vessels and lungs

## Transmission

Source: Industrial, i.e., semi-conductors, metal pickling, manufacture of phosphonium halides; contaminant of acetylene

Entry: Inhalation  
Ingestion

Human-to-Human: No

## Predisposing/Comorbid Conditions

Major depression [8]

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Cardiovascular  
Gastrointestinal  
Liver/Biliary tract/Pancreas  
Nervous  
Respiratory – lower

## Exposure to Clinical Onset

Hours [9]

## Signs/Symptoms [9]

Abdomen – pain  
Arterial press, gen – decreased (hypotension) [1]  
Bowel movements – diarrhea  
Bowel sounds – decreased/absent (ileus, adynamic)  
Breathing – difficult, acute (acute dyspnea)  
Breathing – rapid (tachypnea)  
Breath sounds – crackles (rales)  
Chest – pain/tightness  
Consciousness – loss, prolonged (coma)  
Cough – acute NS  
Dizziness (lightheaded)  
Extremities, sensation – decreased  
Extremities, sensation – “shooting” pain (paresthesia)  
Eyes, vision – double (diplopia)  
Gait – unsteady  
Head – pain (headache)  
Heart rate – increased (tachycardia)  
Heart rhythm – irregular  
Liver – large (hepatomegaly)  
Mentation – lightheaded  
Mood – restless/irritable  
Muscles – tremors, intention  
Nausea  
Seizures [2]  
Skin color – yellow (jaundice)

Spleen – enlarged (splenomegaly)  
Tendon reflexes – reduced/absent  
Urine volume – decreased (oliguria)  
Urine – blood (hematuria)  
Vomiting

### Differentiation

*Includes, but not limited to:*

Congestive heart failure  
Coronary heart disease  
Primary myocardial disease

### Complications

*Include, but not limited to:*

Hepatic failure  
Noncardiac pulmonary edema  
Renal failure  
Shock

### Laboratory

Blood arterial pH – decreased (acidosis) [4]  
Blood bilirubin – increased  
Blood cardiac enzymes – increased  
Blood creatinine – increased  
Blood Hgb/Hct – decreased (anemia)  
Blood liver enzymes – increased  
Blood magnesium – increased [3]  
Blood urea nitrogen – increased  
Blood WBC – decreased (leukopenia)  
Urine protein – present (proteinuria)  
Urine – blood

### ECG [5, 6]

Atrium – infarction  
AV conduction – AV dissociation, complete  
Dysrhythmias, atrial  
Dysrhythmias 2° to conduction block  
QRS – RBBB pattern

Rate, general – rapid  
ST segment – depressed  
ST segment – elevated  
T wave – inversion, abnormal

### **Imaging**

Lungs, parenchyma – edema

### **Other Tests**

NS in absence of complications

### **Treatment – Nonpharmacologic**

Fluids  
Gastric lavage with permanganate for ingestion ▲  
Oxygen  
Remove all contaminated clothing  
Skin/eye washing and irrigation

### **Treatment – Pharmacologic**

Antidote: no  
Antiarrhythmics  
Calcium gluconate and 20% magnesium sulfate  
Restore plasma volume  
Sodium bicarbonate

### **Treatment – Surgical/Invasive**

NA in absence of complications

### **Precautions**

Protective clothing: no  
Site decontamination: yes  
Other: SCBA

### **Primary Prevention**

Industrial safety, esp ventilation of sites where used

### **Course**

Varies with exposure and intervention  
May be fatal ☠





# Radiation Poisoning

## Weapon

CDC category: radiation

## Alternate Names

Dirty bomb

## Etiology

Radiation or fissionable material including

Americium-241 (Am-241)

Cesium-137 (Ce-137)

Cobalt-60 (Co-60)

Iodine-131 (I-131)

Iridium-192 (Ir-192)

Plutonium-238 (Pu-238)

Polonium 210 (Po-210)

Strontium-90 (Sr-90)

DNA damage causing abnormalities in body chemical and physiological reactions

## Transmission

Source: Industrial, medical

Entry: Ingestion

Inhalation

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All persons with job-related exposure to radioactive materials

Calendar: Year-round

## Systems

Gastrointestinal  
Hematopoietic/Immune  
Oropharynx  
Skin

## Incubation

NA

## Signs/Symptoms

Abdomen – pain  
Appetite – decreased (anorexia)  
Arterial press – low (hypotension)  
Bowel movements – blood (melena)  
Bowel movements – diarrhea  
Consciousness – loss, sudden (syncope)  
Dehydration  
Extremities – pain, shooting (paresthesias)  
Eyes, conjunctivae – injected  
Fatigue  
Hair, local – loss  
Hair, gen – loss  
Mentation – confusion [1]  
Mentation – weak (malaise)  
Mouth, gingiva – bleeding  
Mouth, gingiva – ulcers  
Mouth, mucosa – ulcers  
Muscles – weak  
Nausea  
Nose, mucosa – ulcers  
Nose – bleed (epistaxis)  
Salivation – increased (psyalism)  
Skin, local – burn  
Skin, local – inflammation  
Skin, local – pain  
Skin, local – shedding (desquamation)  
Skin, local – vesicles  
Skin, sensation local – heat  
Skin – bruising  
Skin color – red (erythema)

Skin – rash, petechiae  
Sweating – increased (hyperhidrosis)  
Vomiting  
Vomiting – blood (hematemesis)

### **Differentiation**

*Includes, but not limited to:*

Acute infectious syndrome  
Other causes of bone marrow suppression and bleeding

### **Complications**

*Include, but not limited to:*

Bleeding  
Cataracts [1]  
Coma  
Gastrointestinal toxicity  
Hypothyroidism  
Microcephaly and mental retardation (in utero) [1]  
Neoplasms – leukemia, thyroid cancer [1]  
Overwhelming infection/sepsis  
Pneumonia  
Renal failure

### **Laboratory**

Blood Hgb/Hct – decreased (anemia)  
Blood platelets – decreased (thrombocytopenia)  
Blood WBC – decreased (leukopenia)

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

### **Other Tests**

NA in absence of complications

### **Treatment – Nonpharmacologic**

Fluids and electrolytes  
Remove clothing  
Skin washing ▲

### **Treatment – Pharmacologic**

Antibiotics



# Ricin Poisoning

## Weapon

CDC hazardous chemical category: biotoxin

## Alternate Names

NA

## Etiology

Protein toxin from castor plant (*ricinus communis*) beans

Inhibits protein synthesis, causing systemic effects and local effects:

Airway inflammation, interstitial pneumonia, and perivascular and alveolar edema

GI wall inflammation and cell death

Muscle and local lymph node cell death

## Transmission

Source: Castor plant

Entry: Ingestion  
Inhalation  
Injection [1]

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All

Calendar: Year-round

## Systems

Gastrointestinal

Musculoskeletal

Optic

Respiratory – lower  
Respiratory – upper  
Skin

## Incubation

Hours-days

## Signs/Symptoms

Abdomen – pain [2]  
Bowel movements – blood or black (melena)  
Bowel movements – diarrhea  
Breathing – diff, rest (rest dyspnea)  
Chest, ant – pain, nonpleuritic rest  
Chest – crackles (rales)  
Chest – pain/tightness  
Cough – acute NS  
Eyes, conjunctivae – injected  
Eyes, lids – swollen (edema)  
Eyes, tearing – increased (lacrimation)  
Eyes – pain  
Fatigue  
Head – pain (headache)  
Joints – pain (arthralgia)  
Lymph nodes, regional – enlarged  
Mentation – hallucination  
Muscles, local – pain  
Muscles, local – swelling  
Muscles, neck – pain  
Muscles – pain (myalgia)  
Nausea  
Seizures  
Skin, local – blisters  
Skin, local – pain  
Skin color – blue (cyanosis)  
Skin color – red (erythema)  
Skin turgor – decreased  
Sweating – increased (hyperhydrosis)  
Temperature, body – elevated (fever)  
Throat – sore  
Urine – blood (hematuria)  
Vomiting

## Differentiation

*Includes, but not limited to:*

- Congestive heart failure
- Myocardial infarction
- Phosgene poisoning
- Plague
- Pneumonia
- Pulmonary embolism
- Q fever
- Tularemia

## Complications

*Include, but not limited to:*

- Corneal injury
- Hepatic failure
- Hypovolemia
- Noncardiac pulmonary edema
- Respiratory failure

## Laboratory

- Blood arterial pH – decreased (acidosis)
- Blood arterial pO<sub>2</sub> – decreased (hypoxia)
- Blood liver enzymes – increased
- Blood WBC – increased (leukocytosis)
- Urine RBC – present (hematuria, microhematuria)

## ECG

- NA in absence of complications

## Imaging

- Lungs, parenchyma – infiltrates

## Other Tests

- NA in absence of complications

## Treatment – Nonpharmacologic

- Eye/skin irrigation and washing ▲





# Riot Control Agents Poisoning

## Weapon

CDC hazardous chemical category: riot control agents/tear gas

## Alternate Names

NA

## Etiology

Agents include:

- Bromobenzylcyanide
- Chloroacetophenone
- Chlorobenzylidenemalononitrile
- Chloropicrin
- Dibenzoxazepine
- Others

Direct irritant to exposed mucosal surfaces

## Transmission

Source:	Law enforcement weapons
Entry:	Contact Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Condition

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems [1]

- Optic
- Oropharynx

Respiratory – upper  
Skin

### Time to Clinical Onset

Immediate

### Signs/Symptoms [1]

Breathing – difficult (dyspnea)  
Chest – pain/burning  
Choking  
Cough – acute NS  
Eyes, conjunctivae – injected  
Eyes, muscles – spasm (blepharospasm)  
Eyes, tearing (lacrimation) – increased, excess  
Eyes – pain  
Mouth, palate – pain/burning  
Mouth, salivation – increased (psyalism)  
Nose, drainage – increased (rhinorrhea, coryza)  
Nose – sneezing  
Skin color – red (erythema)  
Skin – pain/burning  
Throat, swallowing – gagging  
Throat – burning  
Tongue – pain

### Differentiation

*Includes, but not limited to:*

Other toxic chemical exposures

### Complications

*Include, but not limited to:*

Hypersensitivity reaction

### Laboratory

NA in absence of complications

### ECG

NA in absence of complications

### Imaging

NA in absence of complications



# Sarin Poisoning

## Weapon

CDC hazardous chemical category: nerve agent

## Alternate Names

GB

## Etiology

Sarin [10]

Cholinesterase inhibition causing widespread neurologic deficits, esp muscle and CNS function

## Transmission

Source:	Military weapon arsenal
Entry:	Ingestion Inhalation Contact
Human-to-Human:	No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location:	Global
Populations:	All
Calendar:	Year-round

## Systems

Nervous  
Optic

## Time to Clinical Onset

Immediate – hours

## Signs/Symptoms

- Abdomen – pain
- Arterial press – elevated
- Arterial press – low (hypotension)
- Bowel movements, control – loss [1]
- Bowel movements – diarrhea
- Breathing – cessation [1]
- Breathing – diff, rest (rest dyspnea)
- Breathing – rapid (tachypnea)
- Chest – pain/tightness
- Consciousness – loss, prolonged (coma) [1]
- Consciousness – loss, sudden (syncope) [1]
- Cough – acute NS
- Eyes, conjunctivae – injected [2]
- Eyes, pupils – constricted (miosis)
- Eyes, tearing (lacrimation) – increased [2]
- Eyes, vision – blurred
- Eyes, vision – dim
- Eyes – pain [2]
- Gait – unsteady [1]
- Head – pain (headache)
- Heart rate – decreased (bradycardia)
- Heart rate – increased (tachycardia)
- Mentation, judgement – impaired [5]
- Mentation, memory – impaired (amnesia) [5]
- Mentation – confusion [5]
- Mentation – sleepy (somnia) [5]
- Mentation – weak (malaise) [5]
- Mood – anxious [5]
- Mood – depressed [5]
- Mood – restless/irritable [5]
- Mouth – drooling
- Muscles, movements local – fasciculations
- Muscles – paralysis [3]
- Muscles – weak
- Nausea
- Nose, drainage – increased (rhinorrhea, coryza)
- Nose – congested
- Seizures [1]
- Skin, local – sweating [4]

Speech – slurred  
Sweating – increased (hyperhydrosis)  
Throat – pain/tightness  
Urination, spontaneous control – decreased/absent (urinary incontinence)  
Urination – frequent (polyuria)  
Vomiting

### Differentiation

*Includes, but not limited to:*

Other nerve agent (organophosphate) poisonings

### Complications

*Include, but not limited to:*

Coma  
Paralysis  
Respiratory failure

### Laboratory

Blood arterial pH – increased [8]  
Blood cholinesterase – decreased [9]  
Blood creatine kinase (CK) – increased [7]  
Blood WBC – increased (leukocytosis) [6]

### ECG

Dysrhythmias – slow-rate (bradyarrhythmias)  
Rate – decreased (sinus bradycardia)  
Rate – increased (sinus tachycardia)

### Imaging

NS in absence of complications

### Other Tests

NS in absence of complications

### Treatment – Nonpharmacologic

Do not induce vomiting for ingestion ▲  
Remove clothing immediately ▲  
Skin/eye washing and irrigation immediately ▲

## Treatment – Pharmacologic

Antidotes:

Atropine

Pralidoxime chloride

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Protective clothing:      yes  
Site decontamination:   yes  
Other:                        SCBA

## Primary Prevention

NA

## Course

Death usual with severe exposure ☠

Recovery usual with mild or moderate exposure

Survival usual with prompt treatment

## Notes

- [1] Severe poisoning
- [2] Local eye symptoms have rapid onset after exposure (seconds to minutes)
- [3] Flaccid
- [4] Area of contact
- [5] CNS manifestations may persist for several weeks after acute effects end
- [6] 60% of cases in 1995 Tokyo subway attack
- [7] 10% of cases in 1995 Tokyo subway attack
- [8] Respiratory alkalosis; >60% of cases in 1995 Tokyo subway attack
- [9] >50% of cases in 1995 Tokyo subway attack, increases with severity of exposure
- [10] Colorless, odorless, tasteless liquid

<http://www.argus1.com/?sarin>





# Sodium Monofluoroacetate Poisoning

## Weapon

CDC hazardous chemical category: blood agent

## Alternate Names

Compound 1080

SMFA

## Etiology

Sodium monofluoroacetate ( $\text{NaFC}_2\text{H}_3\text{O}_2$ )

Internally converted to fluoroacetate, which may block citrate in Krebs cycle inhibiting cell metabolism, but this mechanism has been challenged

## Transmission

Source: Plants, pesticides, military weapon (?)

Entry: Ingestion

Human-to-Human: No

## Predisposing/Comorbid Condition

NA

## Demographics

Location: Global, esp tropics

Populations: All, esp farmers

Calendar: Year-round

## Systems

Cardiovascular  
Nervous

## Time to Clinical Onset

$\frac{1}{2}$  hour-20 hours

## Signs/Symptoms

Arterial press – low  
Breathing – slow  
Consciousness – loss, prolonged (coma)  
Consciousness – loss, sudden (syncope)  
Dizziness (lightheaded)  
Heart rhythm – irregular  
Nausea  
Seizures  
Vomiting

## Differentiation

*Includes, but not limited to:*

Acute myocardial infarction  
Other causes of CNS depression

## Complications

*Include, but not limited to:*

Dysrhythmias  
Respiratory failure  
Shock

## Laboratory

Blood arterial pH – decreased (acidosis)  
Blood calcium – decreased  
Blood creatinine – increased  
Blood potassium – decreased

## ECG

Dysrhythmias, NS  
ST-T wave – NS changes

## Imaging

NA in absence of complications



# Sulfuryl Fluoride Poisoning

## Weapon

CDC hazardous chemical category: choking/lung/pulmonary agent

## Alternate Names

Profume  
Sulfonyl fluoride  
Sulfur dioxide difluoride  
Sulfuryl difluoride  
Sulphuryl fluoride  
Vikane  
Zythor

## Etiology

Sulfuryl fluoride ( $\text{SO}_2\text{F}_2$ ) [2]

Generates fluoride ion when metabolized in tissue or hydrolyzed in water

## Transmission

Source: Industrial insecticides and rodenticides  
Entry: Inhalation  
Human-to-Human: No

## Predisposing/Comorbid Condition

NA

## Demographics

Location: Global, esp agricultural areas  
Populations: All, esp pesticide handlers  
Calendar: Year-round

## Systems

Nervous  
Oropharynx  
Respiratory – upper

## Time to Clinical Onset

Immediate

## Signs/Symptoms

Abdomen – pain  
Breathing – diff, acute (acute dyspnea)  
Breathing – rapid (tachypnea)  
Breath sounds – crackling (rales)  
Breath sounds – wheezes  
Cough – acute NS  
Eyes, conjunctivae – injected  
Eyes – irritation  
Eyes – tearing, excess (lacrimation)  
Gait – abnormal (ataxia)  
Mentation – depression  
Mentation – weakness (malaise)  
Mood – restless, irritable  
Mouth – burning  
Muscle movement – slow voluntary  
Muscles – twitching  
Nausea  
Nose – irritation  
Seizures  
Speech – slow  
Throat – burning  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other causes of acute respiratory distress  
Other causes of CNS depression

## Complications

*Include, but not limited to:*

Liver necrosis  
Noncardiac pulmonary edema  
Pulmonary necrosis  
Renal necrosis

## Laboratory

Blood calcium – decreased  
Blood fluoride – elevated [1]  
Blood potassium – decreased

**ECG**

NA in absence of complications

**Imaging**

NA in absence of complications

**Other Tests**

NA in absence of complications

**Treatment – Nonpharmacologic**

Fluids and electrolytes  
Ventilation

**Treatment – Pharmacologic**

Antidote: no  
NS

**Treatment – Surgical/Invasive**

NA

**Precautions**

NA

**Primary Prevention**

Home fumigation precautions  
Industrial precautions

**Course**

Variable

**Notes**

- [1] Not diagnostic – varies with diet, environment exposures
- [2] Colorless, odorless gas





# Sulfur Mustard Poisoning

## Weapon

CDC hazardous chemical category: blister agent/vessicant

## Alternate Names

“H”

“HD”

“HT”

Mustard gas

Mustard agent

## Etiology

Sulfur mustard [2]

Alkylating agent with cholinergic and other undefined mechanisms

## Transmission

Source: Military weapon

Entry: Contact

Inhalation

Human-to-Human: No

## Predisposing/Comorbid Condition

NA

## Demographics

Location: Global

Populations: All

Calendar: NA

## Systems

Optic

Respiratory – upper

Respiratory – lower

Skin

## Time to Clinical Onset

4-24 hours

## Signs/Symptoms

Abdomen – pain  
Bowel movements – diarrhea  
Breathing – diff, acute (acute dyspnea)  
Breath sounds – coarse (rhonchi, general)  
Breath sounds – crackling (rales)  
Breath sounds – wheezes  
Chest – pain, burning  
Cough – acute NS  
Cough – productive  
Eyes, conjunctivae – injected  
Eyes, cornea – ulcer  
Eyes, lids – edema  
Eyes, pupils – constricted (miosis)  
Eyes, vision – light sensitivity, increased (photophobia)  
Eyes, vision – loss  
Eyes – irritation  
Eyes – pain  
Eyes – tearing, excess (lacrimation)  
Nausea  
Nose – blood (epistaxis)  
Nose – discharge (rhinorrhea)  
Nose – sneezing  
Prostration  
Skin – blisters [1]  
Skin color – erythema [1]  
Skin – itching (pruritus) [1]  
Temperature, body – elevated (fever)  
Voice – hoarse  
Voice – loss  
Vomiting

## Differentiation

*Includes, but not limited to:*

Other blistering agents

## Complications

*Include, but not limited to:*

- Blindness
- Cornea ulcer/perforation
- Noncardiac pulmonary edema
- Pneumonia
- Skin 2<sup>nd</sup> and 3<sup>rd</sup> degree burns

## Laboratory

NS in absence of complications

## Imaging

NS in absence of complications

## Other Tests

NS in absence of complications

## Treatment – Nonpharmacologic

- Do not induce vomiting ▲
- Do not cover eyes with bandages ▲
- Fluids and electrolytes
- Immediate clothing removal ▲
- Immediate eye and skin irrigation/washing ▲
- Ventilation

## Treatment – Pharmacologic

Antidote: no  
NS

## Treatment – Surgical/Invasive

NA

## Precautions

- Protective clothing: yes
- Site decontamination: yes
- Other: SCBA

## Primary Prevention

NA



# Super Warfarin Poisoning

## Weapon

CDC hazardous chemical category: long-acting anticoagulant

## Alternate Names

Brodifacoum (most common form)

## Etiology

Hydroxycoumarin

Decreases activity of vitamin K-dependent blood clotting factors II, VII, IX, and X

## Transmission

Source: Rodent poisons  
Entry: Ingestion  
Human-to-Human: No

## Predisposing/comorbid conditions

Major depression [2]  
Existing anticoagulation

## Demographics

Location: Global  
Populations: All, esp children and persons with Munchausen syndrome [4]  
Calendar: Year-round

## System

Coagulation

## Time to Clinical Onset

24-72 hours [3]

## Signs/Symptoms

- Bowel movements – blood or black (hematochezia) (melena)
- Mouth, gingiva – bleeding
- Nose – blood (epistaxis)
- Skin – ecchymoses
- Skin – rash, petechiae
- Sputum – blood (hemoptysis)
- Urine – blood (hematuria)
- Vagina – blood
- Vomiting – blood (hematemesis)

## Differentiation

*Includes, but not limited to:*

- All coagulopathies
- Viral hemorrhagic fevers

## Complications

*Include, but not limited to:*

- Acute blood loss
- Intracranial hemorrhage

## Laboratory

- Blood factor II – decreased
- Blood factor VII – decreased
- Blood factor IX – decreased
- Blood factor X – decreased
- Blood partial thromboplastin time (PTT) – increased
- Blood prothrombin time (PT) – increased
- Blood-specific detection – present

## ECG

- NA in absence of complications

## Imaging

- NA in absence of complications

## Other Tests

- Drug-specific detection in environmental samples



# Tabun Poisoning

## Weapon

CDC hazardous chemical category: nerve agent

## Alternate Names

GA

## Etiology

Tabun [7]

Acts by cholinergic stimulation

## Transmission

Source: Military arsenal

Entry: Contact

Inhalation

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All

Calendar: Year-round

## Systems

Nervous

Optic

## Time to Clinical Onset

Vapor: seconds

Liquid: hours



## Signs/Symptoms

- Abdomen – pain
- Arterial press – decreased (hypotension)
- Arterial press – increased
- Bowel movements, control – decrease/loss [1]
- Bowel movements – diarrhea
- Breathing – cessation [1]
- Breathing – diff, rest (rest dyspnea)
- Breathing – rapid (tachypnea)
- Chest – pain/tightness
- Consciousness – loss, prolonged (coma) [1]
- Consciousness – loss, sudden (syncope) [1]
- Cough – acute NS
- Eyes, conjunctivae – injected [2]
- Eyes, pupils – constricted (miosis) [6]
- Eyes, tearing – increased (lacrimation) [2]
- Eyes, vision – blurred
- Eyes, vision – dim
- Eyes – pain [2]
- Gait – unsteady [1]
- Head – pain (headache)
- Heart rate – decreased (bradycardia)
- Heart rate – increased (tachycardia)
- Mentation, judgement – impaired [5]
- Mentation, memory – impaired (amnesia) [5]
- Mentation – confusion [5]
- Mentation – sleepy (somnolence) [5]
- Mentation – weak (malaise) [5]
- Mood – anxious [5]
- Mood – depressed [5]
- Mood – restless/irritable [5]
- Mouth – drooling
- Muscles, local – movement, fine (fasciculations)
- Muscles – paralysis [3]
- Muscles – weak
- Nausea
- Nose, drainage – increased (rhinorrhea, coryza)
- Nose – congestion
- Seizures [1]
- Skin, local – sweating [4]

Skin, local – twitching (fasciculations) [4]  
Speech – slurred  
Sweating – increased (hyperhidrosis)  
Throat – pain/tightness  
Urination, control – decreased/absent (urinary incontinence) [1]  
Urination – frequent (polyuria)  
Vomiting

### Differentiation

*Includes, but not limited to:*

Sarin poisoning  
Soman poisoning  
VX poisoning

### Complications

*Include, but not limited to:*

Coma  
Paralysis  
Respiratory failure

### Laboratory

Blood arterial pH – increased  
Blood cholinesterase – decreased  
Blood creatine kinase (CK) – increased  
Blood WBC – increased (leukocytosis)

### ECG

Rate – rapid (sinus tachycardia)  
Rate – slow (sinus bradycardia)

### Imaging

NA in absence of complications

### Other Tests

NA in absence of complications

### Treatment – Nonpharmacologic

Airway maintenance  
Eye/skin irrigation and washing immediately ▲  
Immediate triage if cardiac activity present in absence of breathing ▲  
Remove victim from source as soon as possible

## Treatment – Pharmacologic

Antidote: atropine

Anticonvulsant

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

Protective clothing: yes

Site decontamination: yes

Other: NS

## Primary Prevention

NA

## Course

Variable with intensity of exposure

## Notes

- [1] Severe poisoning
- [2] Local eye symptoms have rapid onset after exposure (seconds to minutes)
- [3] Flaccid
- [4] Area of contact
- [5] CNS manifestations may persist for several weeks after acute effects end
- [6] Usually bilateral; may be unilateral
- [7] Clear, colorless, tasteless

<http://www.argus1.com/?tabun>

## Updates

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# Tetrodotoxin Poisoning

## Weapon

CDC hazardous chemical category: biotoxin

## Alternate Names

Fugu poisoning [4]

Pufferfish poisoning

## Etiology

Tetrodotoxin ( $C_{11}H_{17}N_3O_8$ ) [3]

Selective blockade of fast sodium channels in nerves and muscle membranes

## Transmission

Source: Pufferfish

Entry: Ingestion

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global, coasts

Populations: All

Calendar: Year-round, sporadic

## Systems

Gastrointestinal

Nervous

## Time to Clinical Onset

Minutes

## Signs/Symptoms

Abdomen – pain

Arterial press – low [2]  
Bowel movements – diarrhea  
Cranial nerves – palsy  
Dizziness (true vertigo)  
Extremities – pain, shooting (paresthesias)  
Extremities – sensations, abnormal (dysesthesias)  
Head – pain (headache)  
Heart rate – slow (bradycardia)  
Mentation – floating sensation  
Mouth – numb  
Muscles, gen – paralysis  
Muscles – pain (myalgia)  
Muscles – weak  
Nausea  
Seizures  
Sensations, abnormal (dysesthesias) [1]  
Skin – sensation, reversed hot-cold  
Speech – inarticulate (dysarthria)  
Sweating – increased (hyperhidrosis)  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Saxitoxin and other neurotoxins

### **Complications**

*Include, but not limited to:*

Cardiac dysrhythmias

Respiratory failure

Shock

### **Laboratory**

NA in absence of complications

### **ECG**

NA in absence of complications

### **Imaging**

NA in absence of complications

## Other Tests

NA in absence of complications

## Treatment – Nonpharmacologic

Cardiac pacemaker [5]

Fluids and electrolytes

Ventilation

## Treatment – Pharmacologic

Antidote: no

NS

## Treatment – Surgical/Invasive

NA

## Precautions

NA

## Primary Prevention

Cooking does not inactivate tetrodotoxin ▲

Public health control of exposure to toxic shellfish

## Course

>50% mortality in Japan ☠

## Notes

- [1] Esp lips, mouth, upper airways, fingers within minutes of ingestion
- [2] Due to weak hypotensive effect
- [3] Synthesized by bacteria *pseudomonas tetraodonis* and other species in shellfish
- [4] Japan, where tetrodotoxin is the major cause of death due to food poisoning ☠
- [5] Bradyarrhythmias

<http://www.argus1.com/?tetrodotoxin>



# Thallium Poisoning

## Weapon

CDC hazardous chemical category: metal

## Alternate Names

NA

## Etiology

Thallium [3]

Disrupts sodium-potassium ATP, esp in mitochondria

## Transmission [6]

Source: Rodenticides; electronic and chemical research

Entry: Ingestion  
Inhalation

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Populations: All

Calendar: Year-round

## Systems

Cardiovascular

Gastrointestinal

Nervous

Optic

Skin

## Time to Clinical Onset

Hours



## Signs/Symptoms [1]

Abdomen – pain [1]  
Arterial press – elevated [8]  
Bowel movements – constipation [5]  
Bowel movements – diarrhea [4]  
Bowel movements – blood or black (hematochezia) (melena)  
Chest, ant – pain/pressure/burning [8]  
Consciousness – loss, prolonged (coma)  
Extremities, feet – footdrop [10]  
Extremities, hands/nails – Aldrich-Mees lines [11]  
Extremities, hands/palms – red (palmar erythema)  
Extremities – abnormal sensations (dysesthesias) [1, 2]  
Extremities – tremors [10]  
Extremities – weakness  
Eyes, lids – drooping (ptosis) [1]  
Eyes, retina/optic nerve – inflammation  
Eyes, vision/binocular – loss, total (blindness)  
Eyes, vision – loss, spotty (scotoma)  
Eyes, vision – loss, subtotal  
Gait – ataxic [1]  
Hair – loss [1]  
Hair – pigmentation, increased  
Heart rate – increased (tachycardia) [8]  
Lips – ulcers  
Mentation – confusion  
Mentation – memory impaired (amnesia) [10]  
Mentation – psychosis  
Mouth, gingiva pigmentation – increased  
Nausea  
Seizures  
Skin – rash, nonspecific  
Vomiting

## Differentiation

*Includes, but not limited to:*

Acute porphyria  
Antimony poisoning  
Arsenic poisoning  
Guillain-Barré syndrome

Other polyneuropathies  
Selenosis

### **Complications**

*Include, but not limited to:*

Respiratory failure [9]

### **Laboratory**

Blood Hgb/Hct – decreased (anemia)  
Blood liver enzymes – increased  
Blood platelets – decreased (thrombocytopenia)  
Blood thallium – positive  
Stool blood – present  
Urine thallium – positive

### **ECG**

Rate – rapid (sinus tachycardia) [8]  
T wave – inversion, abnormal [8]

### **Imaging**

NA in absence of complications

### **Other Tests**

Electroretinography  
Electromyogram  
Nerve biopsy – demyelination

### **Treatment – Nonpharmacologic**

NS

### **Treatment – Pharmacologic**

Binding agents  
    activated charcoal  
    ferric ferrocyanide  
Diuresis  
Enhanced fecal excretion  
Hemodialysis  
Hemoperfusion  
Prussian blue [7]

## Treatment – Surgical/Invasive

NA in absence of complications

## Precautions

NA

## Primary Prevention

NA

## Course

Variable

Death may occur 1-2 weeks after exposure ☠

## Notes

- [1] Clinical triad of gastroenteritis, hair loss, peripheral neuropathy
- [2] Esp hyperesthesia of soles
- [3] Heavy metal similar to potassium
- [4] Early in course
- [5] Late in course
- [6] Also a homicidal agent
- [7] Reduces enterohepatic circulation
- [8] Cardiovascular signs begin about 1 week after clinical onset
- [9] Due to neuropathy
- [10] Residual stage about 4 weeks after onset
- [11] White bands

<http://www.argus1.com/?thallium>

## Updates

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# Trichothecene Poisoning

## Classification

CDC hazardous chemical category: biotoxin

## Alternate Names

Mycotoxins  
T2  
Yellow rain

## Etiology

Trichothecene mycotoxin [1]

Inhibits synthesis of protein and nucleic acid

## Transmission

Source:	Grains, mushrooms
Entry:	Contact Ingestion Inhalation
Human-to-Human:	No

## Predisposing/Comorbid Condition

NA

## Demographics

Location:	Global [2]
Populations:	All
Calendar:	Year-round

## Systems

Coagulation  
Gastrointestinal  
Respiratory – upper  
Skin

## Time to Clinical Onset

Minutes

## Signs/Symptoms

- Abdomen – pain
- Appetite – reduced (anorexia)
- Arterial press – low [3]
- Bowel movements, stool – blood or black (hematochezia) (melena)
- Bowel movements – diarrhea
- Breathing – diff, acute (acute dyspnea)
- Breathing – rapid (tachypnea)
- Breath sounds, gen – wheezes
- Cough – acute NS
- Dizziness (lightheaded)
- Eyes, conjunctivae – injected
- Eyes, vision – blurred
- Eyes – pain
- Eyes – tearing, excess (lacrimation)
- Gait – ataxic
- Heart rate – rapid (tachycardia) [3]
- Mentation – weakness (malaise)
- Mouth – pain/burning
- Nausea
- Nose – bleeding (epistaxis)
- Nose – drainage (rhinorrhea, coryza)
- Nose – irritation
- Nose – pain
- Nose – sneezing
- Saliva – blood
- Skin, gen – blisters
- Skin, gen – necrosis, sloughing
- Skin, gen – pain, burning
- Skin, gen – rash, erythematous
- Skin, gen – tender
- Temperature, body – decreased (hypothermia) [3]
- Vomiting

## Differentiation

*Includes, but not limited to:*

Other causes of acute multisystem disease

## Complications

Include, but not limited to:

- Coagulopathy
- Multi-organ failure

## Laboratory

- Environmental detection of agent
- Otherwise NS

## Imaging

- NA in absence of complications

## Other Tests

- NA in absence of complications

## Treatment – Nonpharmacologic

- NS

## Treatment – Pharmacologic

- Antidote: no
- NS

## Treatment – Surgical/Invasive

- NA

## Precautions

- Protective clothing: yes
- Site decontamination: yes
- Other: SCBA

## Primary Prevention

- Vaccine: no

## Course

- Variable with exposure route and intensity
- Death may occur in minutes-days ☠

## Notes

- [1] Produced by molds of genera *trichoderma*, *fusarium*, *myrotecium*, and others
- [2] Suspected bioweapon use in 1970s and 80s in SE Asia and Afghanistan
- [3] Preterminal



# VX Poisoning

## Classification

CDC hazardous chemical category: nerve agent

## Alternate Names

NA

## Etiology

Methylphosphonothiolate ( $C_{11}H_{26}NO_2PS$ )

Cholinergic stimulation

## Transmission

Source: Military weapon

Entry: Contact  
Inhalation

Human-to-Human: No

## Predisposing/Comorbid Conditions

NA

## Demographics

Location: Global

Population: All

Time: Year-round

## Systems

Nervous

## Time to Clinical Onset

Seconds (vapor form) to hours depending on dose

## Signs/Symptoms

Abdomen – cramps

Arterial press – elevated

Arterial press – low (hypotension)



Bowel movements, control – decreased/absent [1]  
Bowel movements – diarrhea  
Breathing, rate – increased (tachypnea)  
Breathing – cessation [1]  
Breathing – difficult, acute (dyspnea)  
Chest – pain/burning/tightness  
Consciousness – loss, prolonged (coma) [1]  
Consciousness – loss, sudden (syncope) [1]  
Cough – acute NS  
Eyes, pupils – constricted (miosis)  
Eyes, tearing (lacrimation) – increased  
Eyes, vision – blurred  
Eyes, vision – dim  
Eyes – pain  
Gait – unsteady [1]  
Head – pain (headache)  
Heart rate – decreased (bradycardia)  
Heart rate – increased (tachycardia)  
Mentation – confusion  
Mentation – sleepy (somnolence)  
Mouth – drooling  
Muscles – twitching  
Muscles – weak  
Nausea  
Nose, drainage – increased (rhinorrhea, coryza)  
Nose – congested  
Seizures [1]  
Skin, sweating – increased (hyperhydrosis)  
Urination, control – decreased/lost (incontinence) [1]  
Urination, frequency – increased (polyuria)  
Vomiting

### **Differentiation**

*Includes, but not limited to:*

Other nerve agents

### **Complications**

*Include, but not limited to:*

Coma

Death ☠

### Laboratory

NS in absence of complications

### ECG

Rate – rapid (sinus tachycardia)

Rate – slow (sinus bradycardia)

### Imaging

NS in absence of complications

### Other Tests

NA in absence of complications

### Treatment – Nonpharmacologic

Do not induce vomiting ▲

Eye/skin irrigation and washing immediately▲

Remove clothing immediately ▲

Ventilation

### Treatment – Pharmacologic

Antidote: atropine

### Treatment – Surgical/Invasive

NA

### Precautions

Protective clothing: yes

Site decontamination: yes

Other: SCBA

### Primary Prevention

NA

### Course

Variable, including death depending on exposure ☠

### Note

[1] Severe exposure



# Adrenal Failure

*Note: In addition to the conditions listed, all other agents that cause septic shock can also cause secondary acute adrenal failure by direct tissue damage to the adrenal or pituitary gland.*

## Alternate Names

Acute adrenal crisis

## Clinical Guide Primary Conditions

Any cause of acute adrenal hemorrhage

Leptospirosis [5]

Meningococemia [5]

## Signs/Symptoms

Abdomen, flank – pain

Abdomen – pain

Appetite – decreased (anorexia)

Arterial press – low

Breathing – rapid (tachypnea)

Chills

Consciousness – loss, prolonged (coma)

Consciousness – loss, sudden (syncope)

Dizziness (lightheaded)

Fatigue

Head – pain (headache)

Heart rate – rapid (tachycardia)

Mentation – confused

Muscles – movement, slow/sluggish

Muscles – weak [1]

Nausea

Skin – rash, nonspecific

Skin turgor – decreased (dehydration)



# Arthritis

## **Clinical Guide Primary Conditions**

- Brucellosis
- Campylobacteriosis
- Chickenpox
- Leptospirosis
- Lyme disease
- Lymphocytic choriomeningitis
- Meningococemia
- Mumps
- Psittacosis
- Rubella
- Salmonellosis
- Shigellosis
- Streptococcal pharyngitis
- Yersiniosis

## **Signs/Symptoms**

- Joint(s) – pain (arthralgia)
- Joint(s) – stiffness
- Joint(s) – swelling
- Joint(s) – tenderness, local
- Joint(s) – warmth
- Temperature, body – elevated (fever)

<http://www.argus1.com/?arthritis>



# Congestive Heart Failure

## Alternate Names

Acute cardiac decompensation

## Clinical Guide Primary Conditions

Arsine poisoning  
Ethylene glycol poisoning  
Leptospirosis  
Meningococemia  
Trichinellosis  
Yellow fever

## Signs/Symptoms

Abdomen, RUQ – pain  
Abdomen – distention  
Abdomen – fullness  
Abdomen – fluid (ascites)  
Appearance, general – wasting (cachexia)  
Appetite – decreased (anorexia)  
Arterial pressure – low  
Arterial pulse – amplitude, alternating (pulsus alternans)  
Behavior – changed [1]  
Bowel movements – diarrhea  
Breathing – diff, acute (acute dyspnea)  
Breathing – diff, effort (effort dyspnea)  
Breathing – diff, nocturnal (nocturnal dyspnea)  
Breathing – diff, reclining flat (orthopnea)  
Breathing – diff, rest (rest dyspnea)  
Breathing – rapid (tachypnea)  
Breathing – rhythmic changes (Cheyne-Stokes)  
Breath sounds – crackling (rales)  
Breath sounds – decreased



Breath sounds – wheezes  
Consciousness – loss, sudden (syncope)  
Cough – chronic NS  
Cough – nocturnal  
Extremities, lower bilat – edema  
Eyes – prominent (exophthalmos, proptosis) [2]  
Fatigue  
Head – pain (headache)  
Heart, LV apex – impulse, inferior displacement  
Heart, LV apex – impulse, lateral displacement  
Heart rate – rapid (tachycardia)  
Heart rhythm – irregular [3]  
Heart sound P2 – loud  
Heart sound – S3 LV  
Heart sound – S3 RV  
Heart sound – S4 LV  
Heart sound – S4 RV  
Heart sounds – intensity decreased  
Liver – enlarged (hepatomegaly)  
Liver – tender  
Mentation – confused [1]  
Muscles – weak  
Nausea  
Skin color – blue (cyanosis)  
Skin color – yellow (jaundice)  
Skin – itching (pruritus)  
Sleep – disturbed (insomnia)  
Spleen – enlarged (splenomegaly)  
Sputum – blood (hemoptysis)  
Urination – nighttime (nocturia)  
Venous pulse, jugular – abdominojugular reflux  
Venous pulse, jugular – elevated  
Vomiting  
Weight – gain [4]

### Laboratory

Blood arterial pO<sub>2</sub> – decreased (hypoxia)  
Blood arterial pCO<sub>2</sub> – decreased  
Blood BNP – increased ▲ [7]  
Blood creatinine – increased

Blood sodium – decreased  
Blood urea nitrogen – increased

### ECG

Abnormalities – nonspecific and variable  
Dysrhythmias, atrial [6]  
Dysrhythmias, ventricular  
Rate – rapid (sinus tachycardia)

### Imaging

Heart – enlarged  
Lungs, vasculature – congested

### Other Tests

Cardiac catheterization [5]  
Echocardiography

### Notes

- [1] Esp elderly
- [2] Due to chronic elevation of venous pressure
- [3] Esp atrial fibrillation
- [4] Unexplained
- [5] If primary or contributory cardiac etiology is possible and cannot first be resolved by noninvasive tests
- [6] Esp atrial fibrillation
- [7] Differentiation from other, noncardiac causes of acute dyspnea ▲

<http://www.argus1.com/?chf>

### Updates

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# Corneal Injury

## Alternate Names

Cornea ulcer

## Clinical Guide Primary Conditions

Ammonia poisoning  
Benzene poisoning  
Chlorine poisoning  
Lewisite  
Methyl bromide poisoning  
Osmium tetroxide poisoning  
Phosgene poisoning  
Ricin poisoning  
Smallpox  
Sulfur mustard poisoning

## Signs/Symptoms

Eyes, conjunctivae – injected  
Eyes, cornea – ulcer  
Eyes, vision – altered, nonspecific  
Eyes, vision – light sensitivity, increased (photophobia)  
Eyes – tearing, excess (lacrimation)  
Eyes – burning, itching (asthenopia)  
Eyes – pain

## Tests

Cornea fluorescein stain  
Keratometry  
Pupillary reflex  
Refraction  
Slit-lamp exam  
Tear test  
Visual acuity



# Dehydration

*Note: all causes of fever and/or severe fluid loss can cause dehydration in addition to the agents listed below.*

## **Clinical Guide Primary Conditions**

- Arsine poisoning
- Brevetoxin poisoning
- BZ poisoning
- Campylobacteriosis
- Chickenpox
- Cholera
- Clostridium perfringens* gastroenteritis
- Colchicine poisoning
- Cryptosporidiosis
- E coli* 0157:H7
- Gastroenteritis – viral
- Giardiasis
- Ricin poisoning
- Salmonellosis
- Shigellosis
- Smallpox
- Staphylococcus food poisoning
- Viral gastroenteritis
- Yersiniosis

## **Signs/Symptoms**

- Arterial press – low
- Arterial press – upright, low (orthostatic hypotension)
- Consciousness – loss, prolonged (coma)
- Eyes, tears – decreased
- Eyes – sunken
- Head, fontanelles – sunken [1]



# Disseminated Intravascular Coagulation

## Alternate Names

DIC

Purpura fulminans [2]

## Clinical Guide Primary Conditions

Carbon monoxide poisoning

Chickenpox

Colchicine poisoning

Crimean Congo hemorrhagic fever

Ebola hemorrhagic fever

Legionellosis

Leptospirosis

Listeriosis

Marburg hemorrhagic fever

Meningococemia

Plague

Psittacosis

Tularemia

Yellow fever

## Signs/Symptoms

Bleeding – easy

Extremities, fingers – bluish color [1]

## Laboratory

Blood antithrombin – variable





# Guillain – Barré Syndrome

*Note: the exact mechanism of Guillain-Barré is unknown and can follow many viral and bacterial infections in addition to those listed below.*

## Alternate Names

Acute infectious polyneuritis  
Landry's ascending paralysis  
Strohl syndrome

## Clinical Guide Primary Conditions

Avian influenza  
Campylobacteriosis  
Chickenpox  
Infectious mononucleosis  
Leptospirosis

## Signs/Symptoms

Arterial pressure – elevated [1, 7]  
Arterial pressure – low [1, 7]  
Arterial pressure – upright, low (orthostatic hyp) [7]  
Back – pain  
Cranial nerves – palsy  
Extremities – pain, shooting (paresthesias)  
Eyes, motion – reduced or paralyzed (ophthalmoplegia) [2]  
Eyes, vision – double (diplopia)  
Face, cheeks – flushed  
Face, muscles bilat – weak/paralyzed  
Heart rate – rapid (tachycardia) [3, 7]  
Heart rate – slow (bradycardia) [3, 7]  
Muscles, cranial nerve innervated – weakness [4]  
Muscles, movement – incoordinated (ataxia) [2]

Muscles, up/low unilat – paralysis (hemiplegia)  
Muscles, up/low unilat – weakness (hemiparesis)  
Muscles – pain (myalgia) [5]  
Muscles – weakness [6]  
Sensation, general deep – reduced  
Skin – sensation reduced (dysesthesia)  
Swallowing – difficult (dysphagia)  
Sweating – decreased [7]  
Sweating – increased (hyperhidrosis) [7]  
Tendon reflexes – reduced or absent  
Urination – retention [7]

### Laboratory

CSF protein – increased [8]

### ECG

Dysrhythmias, atrial  
Dysrhythmias, ventricular  
Rate – decreased (bradycardia) [3]  
Rate – increased (tachycardia) [3]

### Other Tests

EMG [9]  
Pulmonary function [10]

### Notes

- [1] Fluctuating
- [2] Miller-Fisher variant
- [3] Tachycardia more common
- [4] Landry's ascending paralysis
- [5] Esp hips, thighs, back
- [6] Symmetrical proximal and distal muscles; usually lower extremities first; evolves over days
- [7] Disturbance of autonomic function, usually lasts only days
- [8] With normal WBC
- [9] Findings consistent with demyelination
- [10] Determine respiratory neuromuscular capacity

<http://www.argus1.com/?gbs>



# Hemolytic Anemia

## Clinical Guide Primary Conditions

Anthrax  
*E coli* 0157:H7  
Infectious mononucleosis  
Phosgene poisoning  
Psittacosis

## Signs/Symptoms

Breathing – diff, effort (effort dyspnea)  
Chills  
Fatigue  
Heart rate – rapid (tachycardia)  
Skin color – pale (pallor)  
Skin color – yellow (jaundice)  
Spleen – enlarged (splenomegaly)  
Urine – dark

## Laboratory [2]

Blood bilirubin – increased [1]  
Blood haptoglobin – decreased  
Blood Hgb/Hct – decreased (anemia)  
Blood LDH – increased  
Blood RBC – decreased  
Blood reticulocyte count – increased  
Feces urobilinogen – present/increased  
Urine hemoglobin – present (hemoglobinuria)  
Urine hemosiderin – present  
Urine urobilinogen – present/increased

## ECG [2]

Rate – rapid (sinus tachycardia)



# Hepatic Failure

## **Clinical Guide Primary Conditions**

- Arsenic poisoning
- Crimera-Congo hemorrhagic fever
- Ebola hemorrhagic fever
- Infectious hepatitis
- Leptospirosis
- Lewisite poisoning
- Malaria
- Marburg hemorrhagic fever
- Meningococemia
- Methyl bromide poisoning
- Phosgene poisoning
- Phosphine poisoning
- Ricin poisoning
- Rift Valley fever
- Yellow fever

## **Signs/Symptoms**

- Consciousness – loss, prolonged (coma)
- Eyes, conjunctivae color – yellow (icterus)
- Mentation – confused
- Mentation – delirium
- Mentation – dementia, fluctuating
- Mentation – sleepiness (somnia)
- Mood – labile
- Mood – lethargic
- Mood – restless/irritable
- Muscles, fine motor movement – loss [1]
- Muscles – movement, spontaneous
- Muscles – stiffness
- Muscles – tremor, flappy
- Skin color – yellow (icterus)



# Hyperkalemia

*Note: in addition to the conditions listed, any cause of adrenal or renal failure, rhabdomyolysis, or hemolytic anemia may cause hyperkalemia.*

## Clinical Guide Primary Conditions

Anthrax  
Arsine poisoning  
Ethylene glycol poisoning  
Yellow fever

## Signs/Symptoms

Arterial pulse, amp – absent or reduced [1] ▲  
Heart, rhythm – irregular [1] ▲  
Heart rate – slow (bradycardia) [1] ▲  
Nausea

## Laboratory

Blood potassium – increased

## ECG

AV conduction – 3rd degree block  
Dysrhythmias, ventricular  
Rate – slow (sinus bradycardia)  
T wave – peaked

## Note

[1] May indicate serious cardiac arrhythmia requiring immediate ECG monitoring and treatment ▲

<http://www.argus1.com/?hyperkalemia>





# Meningitis/Encephalitis

## **Clinical Guide Primary Conditions**

Anthrax  
Arsine poisoning  
Avian influenza  
Brucellosis  
Campylobacteriosis  
Chickenpox  
Cholera  
Dengue  
Glanders  
Infectious hepatitis  
Infectious mononucleosis  
Influenza  
Lassa fever  
Leptospirosis  
Listeriosis  
Lyme disease  
Malaria  
Meningococemia  
Mercury poisoning  
Monkeypox  
Mumps  
Parvovirus 19  
Pertussis  
Plague  
Psittacosis  
Q fever  
Rift Valley fever  
Rocky Mountain spotted fever  
Rubella  
Rubeola

Salmonellosis  
Smallpox  
Streptococcal pharyngitis  
Trichinellosis  
Tularemia  
West Nile fever  
Yellow fever  
Yersiniosis

### Signs/Symptoms

Abdomen – pain  
Arterial press, gen – elevated  
Bowel movements, control – loss  
Bowel movements – diarrhea  
Chills  
Consciousness – loss, prolonged (coma)  
Cranial nerves, general – palsy  
Eyes, motion – jerky (nystagmus)  
Eyes, motion – reduced or paralyzed (ophthalmoplegia)  
Eyes, vision – field defects  
Eyes, vision – light sensitivity, increased (photophobia)  
Gait – ataxic  
Head – pain (headache)  
Heart rate – slow (bradycardia)  
Mentation – confused  
Mentation – delirium  
Mentation – sleepy (somnia)  
Mentation – weakness (malaise)  
Mood – labile  
Mood – lethargic  
Mood – restless, irritable  
Muscles, up/low unilat – weakness (hemiparesis) [1]  
Muscles – pain (myalgia)  
Muscles – paralysis  
Nausea  
Neck, posterior – pain  
Neck, posterior – stiff (meningismus)  
Seizures  
Sign: Brudzinski's  
Sign: Kernig's



# Myocarditis

## **Clinical Guide Primary Conditions**

Arsine poisoning  
Avian influenza  
Chickenpox  
Dengue  
Ebola hemorrhagic fever  
Infectious nucleosis  
Influenza  
Lassa fever  
Legionellosis  
Leptospirosis  
Lyme disease  
Lymphocytic choriomeningitis  
Marburg hemorrhagic fever  
Meningococemia  
Mumps  
Psittacosis  
Q fever  
Rocky Mountain spotted fever  
Rubeola  
Shigellosis  
Smallpox  
Trichinellosis  
Typhus – scrub  
West Nile fever  
Yersiniosis

## **Signs/Symptoms [7]**

Breathing – diff, effort (effort dyspnea) [8]  
Breathing – diff, reclining flat (orthopnea) [8]  
Breathing – diff, rest (rest dyspnea) [8]

Chest, ant – pain, nonpleuritic rest  
Chest, ant – pain, pleuritic [2]  
Chest, ant – palpitations  
Chest – rales [8]  
Cough – acute NS [3]  
Extremities, lower bilat – edema  
Fatigue  
Heart, LV apex – murmur, systolic [6, 8]  
Heart – friction rub  
Heart rate – rapid (tachycardia) [4]  
Heart rhythm – irregular [5]  
Heart sound S1 – soft  
Heart sound – S3 LV [8]  
Joints – pain (arthralgia) [3]  
Mentation – weakness (malaise)  
Muscles – pain (myalgia)  
Temperature, body – elevated (fever)  
Urine – decreased (oliguria) [8]

### Laboratory

Blood troponin I – increased  
Blood troponin T – increased  
Other cardiac enzymes – increased

### ECG

Dysrhythmias, atrial  
Dysrhythmias, conduction  
Dysrhythmias, ventricular  
Q wave – abnormal [1]  
ST-T wave – nonspecific abnormality

### Imaging

Heart, general – enlarged [8]  
Lungs, vasculature – congested [8]

### Other Tests

Myocardial biopsy

### Notes

- [1] Esp Coxsackievirus infection
- [2] Pericardial involvement



# Noncardiac Pulmonary Edema

## **Clinical Guide Primary Conditions**

- Ammonia poisoning
- Arsine poisoning
- Barium poisoning
- Benzene poisoning
- Bromine poisoning
- Carbon monoxide poisoning
- Chlorine poisoning
- Cholera
- Cyanide poisoning
- Ethylene glycol poisoning
- Hantavirus pulmonary syndrome
- Hemorrhagic fever with renal syndrome
- Lewisite poisoning
- Malaria
- Mercury poisoning
- Methyl bromide poisoning
- Methyl isocyanate poisoning
- Opioid poisoning
- Osmium tetroxide poisoning
- Phosgene poisoning
- Phosphine poisoning
- Ricin poisoning
- Rocky Mountain spotted fever
- Smallpox
- Sulfuryl fluoride poisoning
- Sulfur mustard poisoning

## **Signs/Symptoms**

- Breathing – diff, acute (acute dyspnea)
- Breathing – diff, effort (effort dyspnea)





# Orchitis

## **Clinical Guide Primary Conditions**

- Brucellosis
- Ebola hemorrhagic fever
- Glanders
- Infectious mononucleosis
- Lassa fever
- Lymphocytic choriomeningitis
- Marburg hemorrhagic fever
- Mumps
- Rubella
- Smallpox

## **Signs/Symptoms**

- Lymph nodes, inguinal – enlarged
- Lymph nodes, inguinal – tender
- Pelvis, groin – swelling
- Penis, ejaculation – pain
- Penis, intercourse – pain
- Penis, semen – blood (hematospermia)
- Penis – discharge
- Prostate – enlarged
- Prostate – tender
- Scrotum – swollen
- Temperature, body – elevated (fever)
- Testicles – pain/heaviness
- Testicles – swelling
- Testicles – tender
- Urination – pain

## **Imaging**

- Doppler ultrasound testicle
- Nuclear medicine scan testicle



# Osteomyelitis

## **Clinical Guide Primary Conditions**

- Brucellosis
- Chickenpox
- Glanders
- Meningococemia
- Q fever
- Salmonellosis
- Smallpox
- Streptococcal pharyngitis
- Tularemia

## **Signs/Symptoms**

- Bone, local – pain
- Bone, local – tender
- Bone, overlying skin – red
- Bone, overlying soft tissue – swelling
- Chills
- Mentation – weakness (malaise)
- Nausea
- Sweating – increased (hyperhidrosis)
- Temperature, body – elevated (fever)

## **Laboratory**

- Blood alkaline phosphatase – increased
- Blood culture – positive [1]
- Blood WBC – increased (leukocytosis) [1]

## **Imaging [2]**

- Bone changes may be diagnostic



# Pancreatitis

## **Clinical Guide Primary Conditions**

- Cryptosporidiosis
- Ebola hemorrhagic fever
- Infectious mononucleosis
- Legionellosis
- Marburg hemorrhagic fever
- Mumps
- Organophosphate poisoning
- Psittacosis
- Typhoid fever
- West Nile fever

## **Signs/Symptoms**

- Abdomen – pain
- Abdomen – tender
- Chills
- Mood – anxious
- Muscles – weak
- Nausea
- Skin color – yellow (jaundice) [1]
- Stools – fatty
- Sweating – increased (hyperhidrosis)
- Temperature, body – elevated (fever)
- Weight – loss
- Vomiting

## **Laboratory**

- Blood amylase – increased
- Blood bilirubin – increased [1]
- Blood calcium – decreased
- Blood glucose – increased



# Pericarditis

*Note: often occurs concurrently with myocarditis.*

## **Clinical Guide Primary Conditions**

- Avian influenza
- Influenza
- Infectious mononucleosis
- Lassa fever
- Legionellosis
- Leptospirosis
- Listeriosis
- Lyme disease
- Meningococemia
- Psittacosis
- Q fever
- Salmonellosis
- Sulfuryl fluoride poisoning
- Tularemia
- Typhoid fever

## **Signs/Symptoms**

- Abdomen, epigastrium – pain
- Breathing – difficult, rest (rest dyspnea)
- Chest – pain, left supraclavicular
- Chest – pain, nonpleuritic [1]
- Chest – pain, pleuritic [1]
- Consciousness – loss, sudden NS (syncope)
- Cough – acute nonspecific
- Fatigue
- Heart, lower LSB – friction rub
- Heart, mid LSB – friction rub
- Hiccups





# Pneumonia

*Note: pneumonia can occur due to infection by the primary agent or secondarily due to damage and compromise of pulmonary tissue to defense against outside bacteria.*

## **Clinical Guide Primary Conditions**

- Ammonia poisoning
- Avian influenza
- Botulism
- Brucellosis
- Chickenpox
- Chlorine poisoning
- Cholera
- Glanders
- Infectious mononucleosis
- Influenza
- Listeriosis
- Methyl bromide poisoning
- Methyl isocyanate poisoning
- Omsk hemorrhagic fever
- Osmium tetroxide poisoning
- Pertussis
- Radiation poisoning
- Rocky Mountain spotted fever
- Rubeola
- Smallpox
- Streptococcal pharyngitis
- Sulfur mustard poisoning
- Trichinellosis
- Tularemia
- Typhus – epidemic
- Typhus – scrub
- Yellow fever

## Signs/Symptoms

Appetite – decreased (anorexia)  
Breathing, rest – difficult (rest dyspnea)  
Breathing – rapid (tachypnea)  
Breath sounds, local – bronchial  
Breath sounds, local – coarse (rhonchi, local)  
Breath sounds, local – crackling (rales, local)  
Breath sounds, local – decreased  
Chest, ant – pain, pleuritic  
Chest, lat – pain, pleuritic  
Chest, local – percussion dullness  
Chest, post – pain, pleuritic  
Chest – fremitus, vocal  
Chest – friction rub, pleural  
Chest – pectoriloquy, local  
Chills  
Cough – acute NS  
Cough – productive  
Fatigue  
Head – pain (headache)  
Mentation – confused [1]  
Nausea  
Sputum – blood (hemoptysis)  
Sputum – purulent  
Sweating – increased (hyperhidrosis)  
Temperature, body – elevated (fever)  
Vomiting

## Laboratory

Blood culture  
Blood WBC – increased (leukocytosis)  
Pleural fluid bacterial stain  
Pleural fluid culture  
Sputum stain  
Sputum WBC

## Imaging

Chest – infiltrates and other abnormalities depending on type and duration



# Renal Failure

*Note: Renal failure can be caused by direct tissue damage from the causative agent or by sufficiently severe and prolonged hypotension, especially when prior renal disease is present.*

## **Clinical Guide Primary Conditions**

- Arsenic poisoning
- Arsine poisoning
- Barium poisoning
- Benzene poisoning
- Cholera
- Colchicine poisoning
- Crimean-Congo hemorrhagic fever
- Ebola hemorrhagic fever
- E coli* 0157:H7
- Ethylene glycol poisoning
- Leptospirosis
- Lewisite poisoning
- Malaria
- Marburg hemorrhagic fever
- Meningococemia
- Methyl bromide poisoning
- Phosgene poisoning
- Phosphine poisoning
- Radiation poisoning
- Rocky Mountain spotted fever
- Sulfuryl fluoride poisoning
- Tetrodotoxin poisoning
- Trichothecene poisoning
- Typhus – epidemic
- Typhus – murine
- Typhus – scrub
- Yellow fever

## Signs/Symptoms

Abdomen, flank – pain  
Appetite – reduced (anorexia)  
Arterial press – elevated  
Bleeding – easy  
Body, general – edema (anasarca)  
Bowel movements, stool – blood or black (hematochezia)  
(melena)  
Consciousness – loss, prolonged (coma)  
Extremities, lower bilat – edema  
Extremities – tremors  
Fatigue  
Hiccups  
Mentation – concentration impaired  
Mentation – confused  
Mentation – delirium  
Mentation – hallucinations  
Mentation – sleepiness (somnia)  
Mentation – nonspecific changes  
Mood – labile  
Mood – lethargic  
Mood – restless/irritable  
Muscles – movement, slow/sluggish  
Nausea  
Nose – blood (epistaxis)  
Seizures  
Sense of taste – metallic  
Skin – bruising, easy  
Urination – nighttime (nocturia)  
Urine – absent (anuria)  
Urine – reduced (oliguria)  
Vomiting

## Laboratory

Blood arterial pH – decreased (acidosis)  
Blood creatinine – increased  
Blood creatinine clearance – decreased  
Blood potassium – increased  
Blood urea nitrogen – increased  
Urine – abnormal per underlying cause



# Respiratory Failure

*Note: respiratory failure is more likely to occur in the presence of prior lung disease and settings of abnormal tissue oxygen exchange, such as anemia.*

## **Clinical Guide Primary Conditions**

- Anthrax
- Arsenic poisoning
- Benzene poisoning
- Botulism
- Chlorine poisoning
- Colchicine poisoning
- Cyanide poisoning
- Hantavirus pulmonary syndrome
- Leptospirosis
- Lewisite poisoning
- Malaria
- Meningococemia
- Mercury poisoning
- Methyl bromide poisoning
- Nicotine poisoning
- Organophosphate poisoning
- Phosgene poisoning
- Psittacosis
- Ricin poisoning
- Rocky Mountain spotted fever
- Sarin poisoning
- SARS
- Sodium monofluoroacetate poisoning
- Strychnine poisoning
- Sulfuryl fluoride poisoning
- Tabun poisoning
- Tetrodotoxin poisoning
- Thallium poisoning
- Trichinellosis
- Trichothecene poisoning



- Tularemia
- Typhus – murine
- Western equine encephalitis
- West Nile fever

**Signs/Symptoms**

- Breathing – diff, acute (acute dyspnea)
- Breathing – diff, rest (rest dyspnea)
- Breathing – rapid (tachypnea)
- Consciousness – altered
- Fatigue
- Head – pain (headache)
- Heart rate – rapid (tachycardia)
- Mentation – concentration impaired
- Mentation – confused
- Mentation – sleepiness (somnolence)
- Mood – anxious
- Mood – depressed
- Seizures
- Skin color – blue (cyanosis)

**Laboratory**

- Blood arterial pO<sub>2</sub> – decreased (hypoxia)
- Blood arterial pCO<sub>2</sub> – increased
- Blood arterial pH – decreased (acidosis)

**Imaging**

Chest/lung findings vary according to pulmonary etiology and may be normal if cause is extra-pulmonary, i.e., paralysis of chest muscles

<http://www.argus1.com/?respfailure>

**Updates**

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# Rhabdomyolysis

## **Clinical Guide Primary Conditions**

- Avian influenza
- Barium poisoning
- Carbon monoxide poisoning
- Colchicine poisoning
- Cyanide poisoning
- Influenza
- Leptospirosis
- Listeriosis
- Tularemia

## **Signs/Symptoms**

- Fatigue
- Joints, gen – pain (arthralgia)
- Muscles – pain (myalgia)
- Muscles – stiff
- Muscles – tender
- Muscles – weak
- Seizures
- Urine – dark
- Weight – gain

## **Laboratory**

- Blood creatine phosphokinase (CPK) – increased
- Blood creatinine – increased
- Blood myoglobin – increased
- Blood potassium – increased [2]
- Urine hemoglobin – present (hemoglobinuria) [1]
- Urine myoglobin – present



# Thrombocytopenia

## Clinical Guide Primary Conditions

Brucellosis  
*E coli* 0157:H7 [3]  
Chickenpox  
Colchicine poisoning  
Meningococemia  
Radiation poisoning  
Psittacosis  
Rubella

## Signs/Symptoms [1]

Bleeding, gen – minimal trauma/spontaneous  
Skin – ecchymoses  
Skin – rash, petechiae  
Skin – rash, purpura

## Laboratory [1]

Blood, platelets – decreased (thrombocytopenia)

## Note

[1] PT and PTT normal

<http://www.argus1.com/?thrombocyto>

## Updates

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DIFFERENTIAL  
DIAGNOSIS  
BY SYSTEM

*Note: The page numbers following each diagnosis refer the reader to the discussion in the text.*

## **Cardiovascular**

- Arsenic poisoning, 285–288
- Arsine poisoning, 289–292
- Barium poisoning, 293–296
- Benzene poisoning, 297–300
- Carbon monoxide poisoning, 312–316
- Colchicine poisoning, 321–324
- Crimean-Congo hemorrhagic fever, 46–50
- Cyanide poisoning, 325–329
- Digitalis poisoning, 330–333
- Ethylene glycol poisoning, 338–341
- Hemorrhagic fever with renal syndrome, 88–91
- Lassa fever, 104–108
- Leptospirosis, 114–119
- Lyme disease, 124–128
- Nicotine poisoning, 354–357
- Phosphine poisoning, 375–379
- Sodium monofluoroacetate poisoning, 396–398
- Thallium poisoning, 418–421
- Trichinellosis, 222–226
- Yellow fever, 270–273

## **Coagulation**

- Bolivian hemorrhagic fever, 15–18
- Carbon monoxide poisoning, 312–316
- Chlorine poisoning, 317–320
- Colchicine poisoning, 321–324
- Crimean-Congo hemorrhagic fever, 46–50
- Dengue, 55–59
- Ebola hemorrhagic fever, 67–71

Hemorrhagic fever with renal syndrome, 88–91  
Lassa fever, 104–108  
Leptospirosis, 114–119  
Marburg hemorrhagic fever, 138–141  
OMSK hemorrhagic fever, 159–162  
Rift Valley fever, 182–185  
Rocky Mountain spotted fever, 186–190  
Super warfarin poisoning, 407–409  
Trichothecene poisoning, 422–425  
Typhus – epidemic, 237–241  
Yellow fever, 270–273

### Gastrointestinal

Anthrax, 3–9  
Arsenic poisoning, 285–288  
Arsine poisoning, 289–292  
Avian influenza, 10–14  
Barium poisoning, 293–296  
Benzene poisoning, 297–300  
Botulism, 19–24  
Brevetoxin poisoning, 301–303  
Bromine poisoning, 304–307  
Brucellosis, 25–29  
Campylobacteriosis, 30–33  
Carbon monoxide poisoning, 312–316  
Cholera, 39–42  
*Clostridium perfringens* gastroenteritis, 43–45  
Colchicine poisoning, 321–324  
Crimean-Congo hemorrhagic fever, 46–50  
Cryptosporidiosis, 51–54  
Digitalis poisoning, 330–333  
Ebola hemorrhagic fever, 67–71  
*E coli* 0157:h7, 60–62  
Epsilon toxin – *clostridia perfringens*, 72–74  
Giardiasis, 75–78  
Influenza, 100–103  
Lassa fever, 104–108  
Legionellosis, 109–113  
Listeriosis, 120–123  
Organophosphate poisoning, 362–366



Osmium tetroxide poisoning, 367–370  
Phosphine poisoning, 375–379  
Radiation poisoning, 380–383  
Ricin poisoning, 384–387  
Salmonellosis, 199–202  
Shigellosis, 206–209  
Staphylococcus food poisoning, 215–217  
Sulfur mustard poisoning, 403–406  
Tetrodotoxin poisoning, 414–417  
Thallium poisoning, 418–421  
Trichinellosis, 222–226  
Trichothecene poisoning, 422–425  
Typhoid fever, 232–236  
Typhus – epidemic, 237–241  
Typhus – murine, 242–245  
Typhus – scrub, 246–249  
Viral gastroenteritis, 254–256  
West Nile fever, 261–265  
Yellow fever, 270–273  
Yersiniosis, 274–277

### **Hematopoietic/Immune**

Arsine poisoning, 289–292  
Benzene poisoning, 297–300  
Colchicine poisoning, 321–324  
Cyanide poisoning, 325–329  
Malaria, 133–137  
Meningococcemia, 146–150  
Parvovirus B19, 163–166  
Radiation poisoning, 380–383  
Typhoid fever, 232–236

### **Liver/Biliary Tract/Pancreas**

Brucellosis, 25–29  
Colchicine poisoning, 321–324  
Crimean-Congo hemorrhagic fever, 46–50  
Dengue, 55–59  
Infectious hepatitis – acute, 92–95  
Infectious mononucleosis, 96–99  
Leptospirosis, 114–119

Lyme disease, 124–128  
Malaria, 133–137  
Marburg hemorrhagic fever, 138–141  
Phosphine poisoning, 375–379  
Q fever, 177–181  
Rift Valley fever, 182–185  
Rocky Mountain spotted fever, 186–190  
Tularemia, 227–231  
Typhoid fever, 232–236  
Yellow fever, 270–273

### **Lymphatic**

Anthrax, 3–9  
Brucellosis, 25–29  
Glanders, 79–83  
Infectious mononucleosis, 96–99  
Lassa fever, 104–108  
Lyme disease, 124–128  
Monkeypox, 151–154  
Plague, 167–171  
Rubella – acquired, 191–194  
Streptococcal pharyngitis, 218–221  
Tularemia, 227–231  
Typhoid fever, 232–236  
Typhus – scrub, 246–249  
West Nile fever, 261–265

### **Musculoskeletal**

Anthrax, 3–9  
Avian influenza, 10–14  
Barium poisoning, 293–296  
Brucellosis, 25–29  
Carbon monoxide poisoning, 312–316  
Colchicine poisoning, 321–324  
Dengue, 55–59  
Glanders, 79–83  
Influenza, 100–103  
Lassa fever, 104–108  
Leptospirosis, 114–119

Lyme disease, 124–128  
Lymphocytic choriomeningitis, 129–132  
Meliodosis, 142–145  
Parvovirus B19, 163–166  
Q fever, 177–181  
Ricin poisoning, 384–387  
Rocky Mountain spotted fever, 186–190  
Rubella – acquired, 191–194  
Trichinellosis, 222–226  
Typhus – murine, 242–245  
West Nile fever, 261–265

## Nervous

Anthrax, 3–9  
Benzene poisoning, 297–300  
Bolivian hemorrhagic fever, 15–18  
Botulism, 19–24  
Brevetoxin poisoning, 301–303  
Brucellosis, 25–29  
BZ poisoning, 308–311  
Carbon monoxide poisoning, 312–316  
Colchicine poisoning, 321–324  
Crimean-Congo hemorrhagic fever, 46–50  
Cyanide poisoning, 325–329  
Dengue, 55–59  
Digitalis poisoning, 330–333  
Eastern equine encephalitis, 63–66  
Ebola hemorrhagic fever, 67–71  
Elemental mercury poisoning—acute, 334–337  
Epsilon toxin – *clostrida perfringens*, 72–74  
Ethylene glycol poisoning, 338–341  
Lassa fever, 104–108  
Legionellosis, 109–113  
Listeriosis, 120–123  
Lyme disease, 124–128  
Lymphocytic choriomeningitis, 129–132  
Malaria, 133–137  
Meningococcemia, 146–150  
Methyl bromide poisoning, 346–349

Mumps, 155–158  
Nervous, 375–379  
Nicotine poisoning, 354–357  
OMSK hemorrhagic fever, 159–162  
Opioid poisoning, 358–361  
Organophosphate poisoning, 362–366  
Plague, 167–171  
Q fever, 177–181  
Rift Valley fever, 182–185  
Rocky Mountain spotted fever, 186–190  
Salmonellosis, 199–202  
Sarin poisoning, 391–395  
Sodium monofluoroacetate poisoning, 396–398  
Sulfuryl fluoride poisoning, 399–402  
Tabun poisoning, 410–413  
Tetrodotoxin poisoning, 414–417  
Thallium poisoning, 418–421  
Typhus – epidemic, 237–241  
Typhus – murine, 242–245  
Venezuelan equine encephalitis, 250–253  
VX poisoning, 426–429  
West Nile fever, 261–265  
Western equine encephalitis, 266–269

## **Optic**

Ammonia poisoning, 281–284  
Avian influenza, 10–14  
Benzene poisoning, 297–300  
Botulism, 19–24  
Bromine poisoning, 304–307  
Carbon monoxide poisoning, 312–316  
Chlorine poisoning, 317–320  
Cyanide poisoning, 325–329  
Dengue, 55–59  
Ebola hemorrhagic fever, 67–71  
Influenza, 100–103  
Lassa fever, 104–108  
Leptospirosis, 114–119  
Lewisite poisoning, 342–345

Lyme disease, 124–128  
Methyl bromide poisoning, 346–349  
Methyl isocyanate poisoning, 350–353  
Organophosphate poisoning, 362–366  
Osmium tetroxide poisoning, 367–370  
Phosgene poisoning, 371–374  
Q fever, 177–181  
Ricin poisoning, 384–387  
Rift Valley fever, 182–185  
Riot control agents poisoning, 388–390  
Rocky Mountain spotted fever, 186–190  
Sarin poisoning, 391–395  
Sulfur mustard poisoning, 403–406  
Tabun poisoning, 410–413  
Thallium poisoning, 418–421  
Trichinellosis, 222–226  
Tularemia, 227–231  
Typhus – epidemic, 237–241  
Typhus – murine, 242–245  
West Nile fever, 261–265

## **Oropharynx**

Ammonia poisoning, 281–284  
Anthrax, 3–9  
Avian influenza, 10–14  
Bromine poisoning, 304–307  
Chickenpox, 34–38  
Chlorine poisoning, 317–320  
Crimean-Congo hemorrhagic fever, 46–50  
Dengue, 55–59  
Glanders, 79–83  
Infectious mononucleosis, 96–99  
Influenza, 100–103  
Lassa fever, 104–108  
Mumps, 155–158  
Phosgene poisoning, 371–374  
Radiation poisoning, 380–383  
Riot control agents poisoning, 388–390  
Smallpox, 210–214

Streptococcal pharyngitis, 218–221  
Sulfuryl fluoride poisoning, 399–402  
Tularemia, 227–231  
Viral rhinitis, 257–260

### Renal/Genitourinary

Arsine poisoning, 289–292  
Colchicine poisoning, 321–324  
*E coli* 0157:h7, 60–62  
Ethylene glycol poisoning, 338–341  
Hemorrhagic fever with renal syndrome, 88–91  
Leptospirosis, 114–119  
Marburg hemorrhagic fever, 138–141  
Melioidosis, 142–145  
Mumps, 155–158  
Yellow fever, 270–273

### Respiratory – Lower

Anthrax, 3–9  
Avian influenza, 10–14  
Bromine poisoning, 304–307  
Carbon monoxide poisoning, 312–316  
Chlorine poisoning, 317–320  
Colchicine poisoning, 321–324  
Cryptosporidiosis, 51–54  
Cyanide poisoning, 325–329  
Elemental mercury poisoning—acute, 334–337  
Epsilon toxin – *clostridia perfringens*, 72–74  
Hantavirus pulmonary syndrome, 84–87  
Legionellosis, 109–113  
Melioidosis, 142–145  
Methyl isocyanate poisoning, 350–353  
Opioid poisoning, 358–361  
Organophosphate poisoning, 362–366  
Osmium tetroxide poisoning, 367–370  
Phosphine poisoning, 375–379  
Plague, 167–171  
Psittacosis, 172–176  
Q fever, 177–181

- Ricin poisoning, 384–387
- Rubeola, 195–198
- SARS, 203–205
- Sulfur mustard poisoning, 403–406
- Trichinellosis, 222–226
- Tularemia, 227–231
- Typhus – epidemic, 237–241
- Typhus – scrub, 246–249

### **Respiratory – Upper**

- Ammonia poisoning, 281–284
- Avian influenza, 10–14
- Brevetoxin poisoning, 301–303
- Bromine poisoning, 304–307
- Chickenpox, 34–38
- Cyanide poisoning, 325–329
- Elemental mercury poisoning—acute, 334–337
- Influenza, 100–103
- Lewisite poisoning, 342–345
- Methyl bromide poisoning, 346–349
- Methyl isocyanate poisoning, 350–353
- Osmium tetroxide poisoning, 367–370
- Phosgene poisoning, 371–374
- Psittacosis, 172–176
- Ricin poisoning, 384–387
- Riot control agents poisoning, 388–390
- Rubeola, 195–198
- Sulfuryl fluoride poisoning, 399–402
- Sulfur mustard poisoning, 403–406
- Trichothecene poisoning, 422–425

### **Skin**

- Ammonia poisoning, 281–284
- Anthrax, 3–9
- Arsine poisoning, 289–292
- Benzene poisoning, 297–300
- Bromine poisoning, 304–307
- Carbon monoxide poisoning, 312–316
- Chickenpox, 34–38
- Chlorine poisoning, 317–320

Dengue, 55–59  
Ebola hemorrhagic fever, 67–71  
Glanders, 79–83  
Lassa fever, 104–108  
Leptospirosis, 114–119  
Lewisite poisoning, 342–345  
Lymphocytic choriomeningitis, 129–132  
Melioidosis, 142–145  
Meningococemia, 146–150  
Methyl bromide poisoning, 346–349  
Methyl isocyanate poisoning, 350–353  
Monkeypox, 151–154  
Osmium tetroxide poisoning, 367–370  
Parvovirus B19, 163–166  
Phosgene poisoning, 371–374  
Radiation poisoning, 380–383  
Ricin poisoning, 384–387  
Rift Valley fever, 182–185  
Riot control agents poisoning, 388–390  
Rocky Mountain spotted fever, 186–190  
Rubella – acquired, 191–194  
Rubeola, 195–198  
Smallpox, 210–214  
Sulfur mustard poisoning, 403–406  
Thallium poisoning, 418–421  
Trichinellosis, 222–226  
Trichothecene poisoning, 422–425  
Tularemia, 227–231  
Typhus – epidemic, 237–241  
Typhus – murine, 242–245  
Typhus – scrub, 246–249  
West Nile fever, 261–265



# SYMBOLS AND ABBREVIATIONS

## Abbreviations

ADH	Antidiuretic hormone
AIDS	Autoimmune deficiency syndrome
ANT	Anterior
ART	Arterial
AV	Atrioventricular
BLOOD	Blood or bleeding
BNP	B-type natriuretic peptide
BP	Blood pressure
BSL	Biosafety level
CDC	Centers for Disease Control
CNS	Central nervous system
COPD	Chronic obstructive pulmonary disease
CSF	Cerebrospinal fluid
CT	Computed or computerized tomography
DIC	Disseminated intravascular coagulation
DIFF	Difficult
EM	Electron microscopy
EMG	Electromyogram
ELISA	Enzyme-Linked ImmunoSorbent Assay
ESP	Especially
GEN	General
GI	Gastrointestinal
HBO	Hyperbaric oxygenation
HCT	Hematocrit
HGB	Hemoglobin
IV	Intravenous
LAT	Lateral
LDH	Lactic dehydrogenase
LE	Lower extremity
LSB	Left sternal border
LSD	Lysergic acid diethylamide

LUQ	Left upper quadrant
LV	Left Ventricle
MIP	Metacarpal interphalangeal
NA	Not applicable
ND	Not determined; inadequate evidence or data
NS	Non-specific
PIP	Proximal interphalangeal
POST	Posterior
PRESS	Pressure
PT	Prothrombin time
PTT	Partial thromboplastin time
RBC	Red blood cells
RV	Right ventricle
S3	Third heart sound
S4	Fourth heart sound
SCBA	Self contained breathing apparatus
SE	Southeast
TEMP	Temperature
UE	Upper extremity
USA	United States of America
WBC	White blood cells
WHO	World Health Organization
IE	Such as, for example
ECG	Electrocardiogram

## Symbols

- ☠ Relates to fatality
- ▲ Warning, caution, danger ▲
- [ ] Indicates “Note” at end of disease, with number in brackets
- ( ) Medical term or clarifying word
- ? Uncertain fact or status
- < Less than
- > Greater than
- / And, or
- + Positive for