



Communicable Disease and Funeral Professionals

1 CE Hour

Erin L. Wilcox

Funeral Service Academy

PO Box 449
Pewaukee, WI 53072

www.funeralcourse.com
support@funeralcourse.com
888-909-5906



APFSP Provider 1107

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Final Exam – Communicable Disease and Funeral Professionals (1 CE Hour)

1. Direct transmission refers to an infectious agent that is transferred from a reservoir to a susceptible host by _____.
 - a. Animate intermediaries (vectors)
 - b. Direct contact or droplet spread
 - c. Inanimate objects (vehicles)
 - d. All of the above

2. The route of spread of Hepatitis B to healthcare workers, including funeral professionals, is primarily by _____.
 - a. Direct contact with an open sore on an infected body
 - b. Needlestick or other sharps injury
 - c. Sharing embalming equipment
 - d. The birthing process

3. Infectious HIV has been reported in the pleural fluid, pericardial fluid, and blood of infected dead human remains after storage at 2 degrees Celsius for up to _____ post mortem.
 - a. 24 hours
 - b. 48 hours
 - c. 16.5 days
 - d. 3 weeks

4. Two common bacterial pathogens that may be potentially contracted by funeral service professionals through _____ are Methicillin-Resistant *Staphylococcus aureus* (MRSA) and *Streptococcus pyogenes*.
 - a. Airborne vectors
 - b. Gastrointestinal contamination
 - c. Mucocutaneous contamination
 - d. Prion transmission



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5. Upon manipulating dead human bodies, funeral service professionals, particularly embalmers, can come into direct contact with leaking fecal material. This could lead to transmission of _____ via the fecal-oral route.

- a. Non-typhoidal Salmonella
- b. SARS
- c. Zika
- d. None of the above

6. Per a Johns Hopkins University study, funeral home employees who engaged in embalming were _____ to have a positive tuberculin skin test when compared to the funeral home employees who did not embalm bodies

- a. Five times as likely
- b. Just as likely
- c. Not as likely
- d. Twice as likely

7. The Centers for Disease Control and Prevention (CDC) advises that dead human bodies known to be infected with _____ should not be washed or cleaned, should not be embalmed, and medical devices or equipment (such as IVs) should not be removed. The body should be cremated or buried as soon as possible in a metal casket.

- a. Ebola
- b. HIV/AIDS
- c. MRSA
- d. Zika

8. It should be noted that _____ is always dangerous in the embalming room if formaldehyde chemicals are present as the mixture produces a deadly gas.

- a. Bleach
- b. Cidex
- c. Mr. Clean
- d. None of the above

9. Per OSHA's Bloodborne Pathogens Standard, sharps containers should NOT _____.

- a. Be easily accessible to personnel
- b. Be kept on the floor or on counters where cabinets obstruct access
- c. Be located as close as is feasible to the immediate area where sharps are used
- d. All of the above

10. Per OSHA's Personal Protective Equipment Standard, _____ are required to provide appropriate personal protective equipment suitable for the job being done.

- a. Clients
- b. Employees
- c. Employers
- d. None of the above

CONTINUING EDUCATION for Funeral Directors & Embalmers

Communicable Disease and Funeral Professionals

1 CE Hour

Learning Objectives:

This course presents an overview of the communicable diseases most likely to impact funeral professionals, and discusses ways in which they can protect themselves. By the end of the course, learners should be familiar with:

- ❑ Transmission of Communicable Diseases
- ❑ Common Communicable Diseases
 - Hepatitis B, Hepatitis C, Human Immunodeficiency Virus (HIV), Methicillin-Resistant *Staphylococcus aureus* (MRSA), *Streptococcus pyogenes*, Non-typhoidal Salmonella, *Mycobacterium tuberculosis*, Severe Acute Respiratory Syndrome (SARS), Creutzfeldt-Jakob disease (CJD)
- ❑ Other Communicable Diseases of Current Concern
 - The Zika Virus, Ebola, Healthcare Settings
- ❑ Sterilization Techniques in the Embalming and Preparation Room
- ❑ Risk Education Methods
 - Bloodborne Pathogens Standard, Personal Protective Equipment Standard

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Communicable Diseases

Communicable diseases are those that can be transmitted directly or indirectly from one individual to another.¹ These diseases can be passed from person to person in a variety of different ways, including contact with blood and bodily fluids.

Although there is an abundance of research available regarding healthcare workers and their risk of exposure to communicable diseases, there are not many published studies about the risk of exposure to communicable diseases to those in the funeral profession. However, in 1996, the Centers for Disease Control and Prevention (CDC) issued a study report indicating that there is ample reason for concern about the exposure funeral service professionals, particularly embalmers, may have to bloodborne pathogens and airborne pathogens.² This is why it is important for funeral service professionals, particularly those who handle dead human bodies, to refresh and maintain their knowledge of communicable diseases.

In this course, we will discuss the multiple ways communicable diseases can be spread, exploring each transmission method relevant to funeral professionals. We will also take a closer look at the many communicable diseases, some very common and some not as well known, that should be of concern to funeral service professionals. Finally, since the routine tasks carried out by funeral professionals put them at significant risk of exposure to infectious agents, we will take an in-depth look at the implementation and effectiveness of the essential infection control practices that should be observed at funeral homes and crematories.³

Transmission of Communicable Diseases

There are several different ways an infectious agent may be transmitted from its natural reservoir to a susceptible host.

Direct transmission refers to an infectious agent that is transferred from a reservoir to a susceptible host by **direct contact** or **droplet spread**.⁴ Direct contact occurs through skin-to-skin contact, needlesticks, kissing, and sexual intercourse.⁵ Direct contact could also refer to contact with soil or vegetation that is harboring an infectious organism.⁶ Droplet spread refers to spray with relatively large, short-range aerosols produced by sneezing, coughing, or even talking.⁷ This

Exam Question

1. Direct transmission refers to an infectious agent that is transferred from a reservoir to a susceptible host by _____.

- a. Animate intermediaries (vectors)
- b. Direct contact or droplet spread
- c. Inanimate objects (vehicles)
- d. All of the above

mode of transmission is classified as direct because transmission is by direct spray over a few feet, prior to the droplets hitting the ground or another surface.⁸ Droplet transmission could also be through subsequent touching of mucous membranes of the mouth, nose, and eyes when hands are contaminated with infective agents.

Indirect transmission refers to the transfer of an infectious agent from a reservoir to a host by **suspended air particles (airborne)**, **inanimate objects (vehicles)**, or **animate intermediaries (vectors)**.⁹ Airborne transmission happens when an infectious agent is carried by dust or droplet nuclei suspended in air.¹⁰ Droplet nuclei are dried residue of less than 5 microns in size.¹¹ In contrast to droplets that fall to the ground within a few feet, droplet nuclei may remain suspended in the air for long periods of time and may be blown over great distances.¹² Vehicles that may indirectly transmit an infectious agent include food, water, biologic products such as blood, and fomites (inanimate objects such as handkerchiefs, bedding, or surgical scalpels).¹³ A vehicle may passively carry a pathogen, or the vehicle may provide an environment in which the agent grows, multiplies, or produces toxin.¹⁴ Vectors such as mosquitoes, fleas, and ticks may carry infectious agents through purely mechanical means or they may support growth or changes in the agent.¹⁵

Mode of Transmission	Communicable Disease Examples
Direct Contact	gonorrhea, hookworm, head lice, MRSA, hepatitis B, hepatitis C, HIV
Droplet Spread	influenza, pertussis
Airborne Transmission	Tuberculosis, SARS
Vehicle Transmission	hepatitis A, norovirus, <i>Clostridium botulinum</i>
Vector Transmission	<i>Shigella</i> , <i>Yersinia pestis</i> , dengue fever, malaria

For funeral professionals, a couple of these modes of transmission are more relevant than others in terms of potentially contracting an infectious agent. Exposure by way of splashes to the mucous

1 Mullins, 24

2 Mayer, 49

3 Davidson & Benjamin Jr., 655

4-15 CDC, Principles of Epidemiology

membranes, inhalation of aerosolized body fluids, and direct inoculation can result in infectious diseases caused by multiple species of bacteria, viruses, and prions.¹⁶ In addition, the routine transport, contact, and embalming of dead human bodies place the funeral professional in a position to be exposed to multiple infectious agents that are transmissible by mucocutaneous contamination (contact or droplet transmission), aerosolization, and direct inoculation.¹⁷

Since funeral service professionals rarely know the cause of death or other conditions of the dead human body upon removal or delivery, it is very important to utilize **Universal Precautions**: treat every body as if it had a communicable disease, and properly utilize personal protective equipment. We will return to Universal Precautions as we address the OSHA Bloodborne Pathogens Standard and Personal Protective Equipment (PPE) Standard, which will be discussed in further detail later in the course.

Common Communicable Diseases

The three most common pathogenic viruses that funeral service professionals are at risk of exposure to are the **Hepatitis B virus**, the **Hepatitis C virus**, and the **Human Immunodeficiency virus (HIV)**.¹⁸

Hepatitis B

Hepatitis B is a contagious liver disease that ranges in severity from a mild illness lasting a few weeks to a serious, lifelong illness.¹⁹ Hepatitis B can be defined as either “acute” or “chronic,” and is the result of an infection with the Hepatitis B virus.²⁰ Acute Hepatitis B is a short-term illness that occurs within the first 6 months after someone is exposed to the Hepatitis B virus and can, but does not always, lead to chronic infection.²¹ Chronic Hepatitis B is a long-term illness that occurs when the Hepatitis B virus remains in a person’s body for an extended period of time.²²

In the United States, anywhere from 850,000-2.2 million people are living with Hepatitis B.²³ In 2014 alone, the Hepatitis B virus infected an estimated 19,200 people in the United States.²⁴ However, the number of reported cases is often lower: many people do not know they are infected or may not have symptoms, and thus do not seek the attention of medical or public health officials.²⁵

Hepatitis B can be spread through blood, semen, or other body fluids. If these body fluids infected with

the Hepatitis B virus enter the body of a person who is not infected, that person is at risk of becoming infected. Activities that may lend to the spread of Hepatitis B include:

- the birthing process (spread from an infected mother to her baby)
- sex with an infected partner
- sharing needles, syringes, or other drug-injection equipment
- sharing items such as razors or toothbrushes with an infected person
- direct contact with the blood or open sore of an infected person
- exposure to blood from needlesticks or other sharps instruments²⁶

According to studies, nearly 10,000 healthcare workers (including funeral professionals) are infected with Hepatitis B every year.²⁷ The route of spread of Hepatitis B to healthcare workers, including funeral professionals, is primarily by needlestick or other sharps injury.²⁸ The approximate incidence rate of contracting the Hepatitis B virus this way is 30%.²⁹ Funeral professionals should also be aware of the possibility of direct contact with blood or open sores during the handling of dead human bodies of infected persons and in the embalming of these dead human bodies.

Hepatitis B is still transmittable after death, which causes the dead human body to remain infectious. The Hepatitis B virus can survive outside the body at least 7 days.³⁰ During that time, the virus can still cause infection if it enters the body of a person who is not infected.³¹ While sterilization is always important, it is critical to properly sterilize all instruments used during the embalming or preparation of a dead human body suspected of being infected with Hepatitis B, as well as all floors and surfaces in the embalming area.

A final reminder: infected individuals carrying the virus may be asymptomatic – may never even know that they are infected with the Hepatitis B virus!

16-18 Davidson & Benjamin Jr., 655-656

19-26 CDC, Hepatitis B

27 Mullins, 398-399

28-29 Hardin, 76

30-31 CDC, Hepatitis B

Exam Question

2. The route of spread of Hepatitis B to healthcare workers, including funeral professionals, is primarily by _____.

- a. Direct contact with an open sore on an infected body
- b. Needlestick or other sharps injury
- c. Sharing embalming equipment
- d. The birthing process

– but are still able to transfer the virus to others.³² Thus, funeral service professionals also may not be aware a deceased is infected with the viruses, even if they have the death certificate with causes of death.

According to the Occupational Safety and Health Administration (OSHA)'s Bloodborne Pathogen Rule, all funeral home employees whose job description requires them to come in contact with body fluids or items soiled with body fluids are to be given the Hepatitis B vaccine at no cost to the employee.³³ The employee may choose not to receive the vaccination. If so, he or she must sign a declination form.³⁴ However, the employee must first go through appropriate training regarding Hepatitis B and the efficacy, safety, method of administration, and benefits of the Hepatitis B vaccination, and must indicate that they understand that the vaccine is provided free of charge.³⁵ If any employee that initially signed the declination form decides at any point while still employed at the funeral home and while still exposed to body fluids or items soiled with body fluids that they want the vaccine, they can request it and the employer must provide it at no cost to the employee.³⁶

Hepatitis C

Hepatitis C is an inflammatory disease of the liver caused by the Hepatitis C virus.³⁷ It is spread through direct contact with blood or other body fluids.³⁸

Most cases of Hepatitis C are transmitted through the use of illegal injected drugs.³⁹ There is no vaccine for Hepatitis C. There are, however, current drugs that promise to “cure” those with Hepatitis C, or clear the virus from the body.⁴⁰

The risk for Hepatitis C infection after a needlestick or sharps injury is thought to be only about 3%.

HIV

The human immunodeficiency virus (HIV) weakens a person's immune system by destroying important cells that fight disease and infection.⁴¹ It is the virus that causes AIDS (acquired immunodeficiency syndrome). There is no effective cure for HIV. In the United States, HIV is commonly transmitted from person to person through sexual intercourse

and sharing needles or syringes.⁴² HIV can also be transmitted from mother to child during pregnancy, birth, or breastfeeding, as well as by being stuck with an HIV-contaminated needle or other sharp object.⁴³ This is how funeral service professionals can be contaminated in the workplace: According to the Centers for Disease Control and Prevention (CDC), HIV can live in a used needle up to 42 days depending on temperature and other factors.⁴⁴

Scientists estimate that the risk of HIV infection from being stuck with a needle used on an HIV-infected person is less than 1%.⁴⁵ However, HIV can potentially also be dangerous to funeral service professionals because of its ability to survive after the death of the infected body. Infectious HIV has been reported in the pleural fluid, pericardial fluid, and blood of infected dead human remains after storage at 2 degrees Celsius for up to 16.5 days post mortem.⁴⁶ Viable HIV was also recovered from bone fragments, brain, bone marrow, spleen, and lymph nodes from an infected dead human body with AIDS at autopsy six days after death.⁴⁷

To keep the risk of infection low, funeral service professionals handling infected dead human remains should use Universal Precautions. Appropriate personal protective equipment should be utilized, and instruments and surfaces should be properly sterilized and disinfected post-embalming or preparation. (For more information on Universal Precautions and sterilization methods, please see the appropriate sections later in the course.)

Two common bacterial pathogens that may be potentially contracted by funeral service professionals through mucocutaneous contamination (contact or droplet transmission) are **Methicillin-Resistant *Staphylococcus aureus* (MRSA)** and ***Streptococcus pyogenes***.⁴⁸

32 Hart & Loeffler, 221

33-36 OSHA 3128

37-39 Mullins, 399

40 Liver Foundation, Can Hepatitis C Be Cured?

41-45 CDC, HIV/AIDS

46 Douceron, Deforges, Gherandi, Sobel & Patriot

47 Nyberg, Suni & Haltia

48 Davidsdon & Benjamin Jr., 655

Exam Questions

3. Infectious HIV has been reported in the pleural fluid, pericardial fluid, and blood of infected dead human remains after storage at 2 degrees Celsius for up to _____ post mortem.
 - a. 24 hours
 - b. 48 hours
 - c. 16.5 days
 - d. 3 weeks

4. Two common bacterial pathogens that may be potentially contracted by funeral service professionals through _____ are Methicillin-Resistant *Staphylococcus aureus* (MRSA) and *Streptococcus pyogenes*.
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 - b. Gastrointestinal contamination
 - c. Mucocutaneous contamination
 - d. Prion transmission

Methicillin-Resistant *Staphylococcus aureus* (MRSA)

Methicillin-resistant *Staphylococcus aureus*, or MRSA, has established itself as a community-acquired infectious agent with increasing frequency.

MRSA is a type of staph bacteria that is resistant to many antibiotics.⁴⁹ In a healthcare setting, such as a hospital or a nursing home, MRSA can cause severe problems. These problems include bloodstream infections, pneumonia, and surgical site infections.⁵⁰ If MRSA is not treated quickly, these infections can cause sepsis and death.⁵¹ MRSA is usually spread by direct contact with an infected wound.⁵² To know if MRSA is the cause of an infection, laboratory cultures of the bacteria must be performed.⁵³

Because of the prevalence of MRSA in the population – studies show that two in 100 people carry MRSA⁵⁴ – the funeral professional has a potential risk of exposure from the remains of individuals who died in a health care facility or another setting.⁵⁵

Funeral service professionals often must go into hospitals and nursing homes to remove the dead human body and take it to the nursing home; in doing so, removal technicians may come into contact with an infected wound. Likewise, once at the funeral home, the embalmer or crematory technician may come into contact with an infected wound.

If a bacteria culture was performed on the deceased patient, the hospital or nursing home will generally let the funeral service professionals know that the deceased patient is infected with MRSA; nevertheless, funeral service professionals should be acutely aware of any infected wounds, regardless of whether it is known if the dead human body was infected with MRSA or not.

Streptococcus pyogenes

Group A *Streptococcus*, or *Streptococcus pyogenes*, can cause both noninvasive and invasive diseases such as strep throat, scarlet fever, and post-strep glomerulonephritis.⁵⁶ It is very common, and something that funeral service employees should be aware of as a bloodborne pathogen. Group A *Streptococcus* has been shown to survive in dead human bodies that were victims of invasive disease, presenting a serious infectious risk to the funeral professionals.⁵⁷ It may be transmitted by direct contact and as a result of direct inoculation

following even minor nicks to the skin during an autopsy or embalming.⁵⁸

A gastrointestinal organism that funeral service professionals may come into contact with is **non-typhoidal Salmonella**.⁵⁹

Non-typhoidal Salmonella

According to the World Health Organization, person-to-person transmission of the Salmonella bacteria occurs through the fecal-oral route.⁶⁰ Upon manipulating dead human bodies, funeral service professionals, particularly embalmers, can come into direct contact with leaking fecal material.⁶¹ This could lead to transmission of the bacteria via the fecal-oral route.⁶²

Airborne infectious agents that funeral service professionals should be aware of are *Mycobacterium tuberculosis* and the virus responsible for **severe acute respiratory syndrome (SARS)**.⁶³

Mycobacterium tuberculosis

Tuberculosis, often referred to as TB, is caused by the *Mycobacterium tuberculosis* bacteria spread through the air from one person to another. The tuberculosis bacteria are put into the air when a person with tuberculosis of the lungs or throat coughs, speaks, or sings.⁶⁴ If people nearby breathe in the bacteria, they could potentially become infected. Once the bacteria is breathed into the lungs, it begins to grow.⁶⁵ It can then move through the blood to other parts of the body, including the kidney, spine, and brain. The bacteria in the lungs and throat can be infectious, but the bacteria in other parts of the body, such as the kidney or the spine, is usually not infectious.⁶⁶

A Centers for Disease Control and Prevention (CDC) report concluded that funeral service professionals, particularly those who engage in embalming, have an elevated risk of contracting tuberculosis as a result of their contact with dead human bodies.⁶⁷ Likewise, a Johns Hopkins University

49-54 CDC, MRSA

55 Davidson & Benjamin Jr., 656

56 CDC, Group A Streptococcus

57-59 Davidson & Benjamin Jr., 656

60 WHO, Salmonella

61-63 Davidson & Benjamin Jr., 656

64-66 CDC, Tuberculosis

67 Mayer, 50

Exam Question

5. Upon manipulating dead human bodies, funeral service professionals, particularly embalmers, can come into direct contact with leaking fecal material. This could lead to transmission of _____ via the fecal-oral route.

- a. Non-typhoidal Salmonella
- b. SARS
- c. Zika
- d. None of the above

study concluded that funeral home employees who worked as embalmers had a greater exposure risk to tuberculosis than funeral home employees who did not embalm dead human bodies.⁶⁸ This particular study found that 101 out of 864 (or 11.7%) funeral home employees who volunteered to be tested reacted to the tuberculin skin test.⁶⁹ From here, it was determined that the funeral home employees who engaged in embalming were twice as likely to have a positive tuberculin skin test when compared to the funeral home employees who did not embalm bodies.⁷⁰

While there is a vaccine available for tuberculosis, it is not widely used in the United States and does not always protect people from getting tuberculosis.⁷¹ The tuberculosis vaccine should be considered for only very select people who meet specific criteria and in consultation with a tuberculosis expert. Health care workers considering this option should be counseled regarding the risks and benefits associated with both the tuberculosis vaccination and the treatment of latent tuberculosis infection.⁷² Funeral service professionals are not generally advised to receive the tuberculosis vaccination. However, it is often recommended that a TB skin test be administered prior to beginning work in a health care setting, including in a funeral home. That way, if a person is suspected of being infected with bacteria while on the job, the time period can be narrowed down should the individual test positive for being infected with the bacteria. This skin test does not indicate the progression of the tuberculosis disease, only the presence of the *Mycobacterium tuberculosis* bacteria.⁷³

Severe acute respiratory syndrome (SARS)

The virus responsible for severe acute respiratory syndrome, or SARS, is the coronavirus.⁷⁴ This virus seems to spread quickly and can be very dangerous. While there have not been any known cases of SARS reported anywhere in the world since 2004,⁷⁵ it is best if funeral service professionals know of the risk of airborne infectious agents and this is one to note.

Another important infectious disease of concern to funeral service professionals is the prion transmitted Creutzfeldt-Jakob disease (CJD).

Creutzfeldt-Jakob disease (CJD)

The mode of transmission of prions is not completely understood, with 85% of patients showing no recognizable pattern of transmission,

but it is known that iatrogenic CJD has been passed from cadavers to recipients of human growth hormone, dura mater, and corneal grafts as well as between living patients following use of contaminated neurosurgical equipment.⁷⁶ Because prions are not destroyed by either formaldehyde or glutaraldehyde and because their concentration is highest in cerebrospinal fluid and nervous system tissue, embalming is not recommended for autopsied or traumatized bodies.⁷⁷ If it must be done, the guidelines set forth by the World Health Organization should be utilized.

It is strongly recommended that disposable instruments, masks, gowns, and puncture-resistant gloves be used whenever possible. Bodies of autopsied CJD patients should be placed on a waterproof sheet to collect all fluids.⁷⁸ The entire body should be washed with bleach, rinsed, and sanitized before dressing.⁷⁹ All collected fluids should be held in a suitable container and later treated (see below).

All work surfaces and instruments should be disinfected after a suspected or confirmed CJD dead human body was treated. The surfaces can be disinfected by flooding with undiluted bleach. All collected fluids should be disinfected by adding 40 grams of sodium hydroxide pellets per liter of collected fluid, with the mixture being stirred after a few minutes and care taken to avoid spillage.⁸⁰ It should be left undisturbed for at least one hour, and then disposed of like other mortuary waste.⁸¹

Embalming a body that has not been autopsied should be done in the usual way, with Universal Precautions utilized.

Other Communicable Diseases of Current Concern

There are some communicable diseases that have been of concern recently in the healthcare world, including the **Zika virus** and **Ebola**. For this reason, funeral service professionals should be aware of their existence and know a bit about their transmission and the disease process.

68-70 Mayer, 50
71-73 CDC, Tuberculosis
74-75 CDC, Severe Acute Respiratory Syndrome
76-77 Davidson & Benjamin Jr., 656
78-81 CDC, Information for Funeral and Crematory Practitioners

Exam Question

6. Per a Johns Hopkins University study, funeral home employees who engaged in embalming were _____ to have a positive tuberculin skin test when compared to the funeral home employees who did not embalm bodies.
- Five times as likely
 - Just as likely
 - Not as likely
 - Twice as likely

Zika Virus

The Zika Virus has caused concern lately, specifically in the southeastern United States and among travelers coming back into the United States from Central and South American and the Caribbean. Zika is spread mostly by the bite of an infected *Aedes* species mosquito.⁸² Local mosquito-borne Zika virus transmission has been reported in the continental United States.⁸³ Zika can also be passed from a pregnant woman to her fetus. Infection during pregnancy can cause certain birth defects.⁸⁴ Sexual transmission, and very likely blood transfusion transmission, is also possible with Zika.⁸⁵ There is currently no vaccine available for Zika. Since Zika is not likely to cause death, except maybe in immunosuppressed individuals and the elderly, funeral service employees are not likely to encounter this virus much as an occupational hazard. Whether or not it is known if a dead human body is infected with Zika, it is best to use Universal Precautions.

Ebola

Ebola, although rare, has proved to be a relevant contagious disease with well-publicized recent cases here in the United States. The Ebola virus can be detected throughout the bodies of patients who die of the disease, and can be transmitted in postmortem care settings.⁸⁶ Transmission of the virus is by laceration and puncture with contaminated instruments used during postmortem care, through direct handling of human remains without recommended PPE, and through splashes of blood or other body fluids such as urine, saliva, feces, or vomit to unprotected mucosa such as eyes, nose, or mouth during postmortem care.⁸⁷ Aerosolization cannot be definitely excluded as a mode of transmission.⁸⁸

The CDC recommends close collaboration with public health officials in the state or local jurisdiction to safely handle and care for these individuals.⁸⁹ The CDC also advises that these dead human bodies should not be washed or cleaned, should not be embalmed, and medical devices or equipment (such as IVs) should not be removed.⁹⁰ The body should be cremated or buried as soon as possible in a metal casket.⁹¹ Basically, the funeral service professional will be responsible for removal from the hospital, storage as needed at the funeral facility, and final disposition of cremation (preferred) or immediate burial.

Many other communicable diseases are less serious and less common; however, the funeral service professional should be keenly aware of what is out there. Each of the following are generally found in a healthcare setting, which is where many dead human bodies are transported from before they arrive at the funeral home, and where many funeral service professionals spend a lot of time making removals of dead human bodies.

- *Clostridium difficile* – a bacteria that causes a healthcare-associated infection, which people getting medical care can catch in the hospital or other facility. This bacteria was estimated to have caused almost half a million infections in the United States in 2011, with 29,000 of those dying within 30 days of initial diagnosis.⁹² Older adults receiving medical care are particularly vulnerable.
- *Klebsiella* – a type of Gram-negative bacteria that can cause different types of healthcare-associated infections, including pneumonia, bloodstream infections, wound or surgical site infections, and meningitis.⁹³ *Klebsiella* bacteria are normally found in the human intestines where they are natural flora (do not cause disease) and in human feces.⁹⁴ *Klebsiella* bacteria have recently developed antimicrobial resistance, and commonly occur in healthcare settings among sick patients being treated for other conditions.⁹⁵ Healthy people usually do not get *Klebsiella* infections, and the bacteria is spread through person-to-person contact.⁹⁶
- *Acinetobacter baumannii* – another bacteria that causes a healthcare-associated infection. These infections typically occur in intensive care units and healthcare settings housing very ill patients and rarely occur outside of healthcare settings.⁹⁷ The bacteria is spread through person-to-person contact or contact with contaminated surfaces.⁹⁸
- Vancomycin-resistant Enterococci (VRE) – specific types of antimicrobial-resistant bacteria that are resistant to vancomycin, which is the drug most often used to treat infections cause by enterococci.⁹⁹ Enterococci are bacteria that are

82-85 CDC, Zika Virus

86-87 CDC, Ebola

88 Davidson & Benjamin, 656

89-91 CDC, Ebola

92-99 CDC, Healthcare-associated Infections

Exam Question

7. The Centers for Disease Control and Prevention (CDC) advises that dead human bodies known to be infected with _____ should not be washed or cleaned, should not be embalmed, and medical devices or equipment (such as IVs) should not be removed. The body should be cremated or buried as soon as possible in a metal casket.

- a. Ebola
- b. HIV/AIDS
- c. MRSA
- d. Zika

normally present in the human intestines and in the female genital tract and can sometimes cause infections.¹⁰⁰ Most vancomycin-resistant enterococci infections occur in hospitals, making it a healthcare-associated infection.¹⁰¹

- Vancomycin-intermediate *Staphylococcus aureus* (VISA) and Vancomycin-resistant *Staphylococcus aureus* (VRSA) – another healthcare-associated infection, these *Staphylococcus aureus* bacteria are resistant to vancomycin.¹⁰² However, as of October, 2010, all VRSA isolates have been susceptible to other FDA-approved drugs.¹⁰³
- *Pseudomonas aeruginosa* – these bacteria generally cause infections in people in the hospital and/or with weakened immune systems.¹⁰⁴ Infections of the blood, pneumonia, and infections following surgery can lead to severe illness and death in these people.¹⁰⁵

Sterilization Techniques in the Embalming and Preparation Room

It is vital that instruments, equipment, and services be properly sterilized after each embalming, regardless of whether or not the decedent had a communicable disease or not. If a communicable disease was present, it is of particular importance.

As will be discussed below as part of the OSHA Bloodborne Pathogens Standard, only products or chemicals that are listed by the EPA or FDA as registered disinfectants or sterilants may be used to decontaminate surfaces or instruments that have been contaminated with blood or other potentially infectious materials.¹⁰⁶ Always check the label to be sure this is the case. The effectiveness of these products and chemicals is governed by strict adherence to the instructions on the label,¹⁰⁷ so be sure to always follow all instructions on the label exactly as they are to ensure proper disinfecting or sterilizing.

A mixture of 1 part sodium hypochlorite, also known as household bleach, to 10 to 100 parts water is considered adequate for surfaces.¹⁰⁸ All surfaces in the embalming room should be disinfected in this way after an embalming or any preparation of a dead human body. This solution must be made up daily to be effective. Also, it should be noted that bleach is always dangerous in the embalming room if formaldehyde chemicals are present as the mixture produces a deadly gas. Use cautiously.

Exam Question

8. It should be noted that _____ is always dangerous in the embalming room if formaldehyde chemicals are present as the mixture produces a deadly gas.

- Bleach
- Cidex
- Mr. Clean
- None of the above

All instruments MUST be disinfected with either EPA or FDA approved cold sterilants after each use.¹⁰⁹ Approved cold sterilants might be something like Cidex® or Wavicide Disinfectant® (formerly known as DSD). Again, the label must indicate that it is registered with the EPA or FDA. Cleaning products such as soap and water, Lysol®, Mr. Clean®, Scrubbing Bubbles®, and similar products ARE NOT ACCEPTABLE for disinfecting or sterilizing contaminated instruments.¹¹⁰

Risk Education Methods

Funeral homes can be proactive in preventing the spread of communicable diseases from the deceased to the funeral professional by having effective control practices in place at their funeral homes and crematories. However, in order for these to be effective, funeral professionals must be compliant and follow these practices.

Bloodborne Pathogens Standard

Funeral homes fall under the mandates of the Occupational Safety Hazard Association (OSHA)'s Bloodborne Pathogens Standard (29 CFR 1910.1030).¹¹¹ This standard requires employers to have a written exposure control plan and meet the methods of compliance.¹¹² The methods of compliance include the practice of Universal Precautions (as previously discussed), the implementation of engineering and work practice controls, and the provision of personal protective equipment.¹¹³ All methods of compliance, or action items, will be discussed in depth below.

NOTE: Funeral homes are not part of the surveillance program that exists to monitor the exposure events of healthcare workers to HIV, Hepatitis B, Hepatitis C, and *Mycobacterium tuberculosis* (TB)¹¹⁴ – thus, it is hard to determine the effectiveness of their specific adherence to the OSHA standard. Nevertheless, these compliance items were put into place by the federal government to protect all employees from exposure to potentially deadly pathogens as much as possible.

Occupational exposure is considered reasonably anticipated skin, eye, mucous membrane, or parenteral

100-105 CDC, Healthcare-associated Infections

106 OSHA Bloodborne Pathogens Standard

107-110 OSHA Compliance Guidance for Funeral Homes, 12

111 Davidson & Benjamin Jr., 657

112-113 OSHA Bloodborne Pathogens Standard

114 CDC Tuberculosis in the United States

contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.¹¹⁵ This basically includes all employees at a funeral home. Thus, every funeral home that conducts embalming must develop an exposure control plan, or a bloodborne pathogen program, designed to minimize or eliminate employees' exposures to bloodborne pathogens.¹¹⁶ This exposure control plan must be in writing. Employees must be made aware of the written program and know where the program is kept.¹¹⁷ The written exposure control program must be reviewed at least annually, with this review documented. As a note, even employees who are only occasionally exposed to bloodborne pathogens as an occupational exposure must be included in the exposure control plan. It is best if funeral homes do an in-service with all funeral service employees to review the exposure control plan.

The OSHA Bloodborne Pathogens Standard also requires that the Hepatitis B vaccination must be offered to all employees who are potentially exposed at the funeral home.¹¹⁸ Again, this could potentially include any and all funeral service professionals working in a funeral home. For employees who already have had the series, an attempt should be made to obtain a record that the vaccinations were performed. If records cannot be obtained, then the employees should sign a vaccine declination form.¹¹⁹

Another action item in the Bloodborne Pathogens Standard indicates that funeral homes must investigate and/or document the use of engineering controls which reflect the best bloodborne pathogen exposure control technology available.¹²⁰ Note: non-managerial employees must be involved in this process and their input must be documented.¹²¹ Preventing exposures requires a comprehensive program, including **engineering controls** and proper **work practice controls**.¹²² (Engineering controls are those mechanical systems and devices engineered into the architecture of a building or item.¹²³ Some examples of these engineering controls might include safer disposable scalpels, blunted suture needles, and safer hypodermic syringes. Work practice controls are controls that reduce the likelihood of exposure by altering the manner in which a task is performed: like no-hands procedures in handling contaminated sharps, and eliminating hand-to-hand instrument passing.¹²⁴ This investigation of engineering and work practice controls should be the primary means of eliminating or minimizing employee exposure. Finally, it is important that funeral homes implement these feasible controls, document the engineering control investigation, and then review the safer devices at least annually to determine if newer technology is available.¹²⁵



Safety Scalpels



Safety Syringes

In the spirit of this action item, commercially available products that are designed to eliminate infection from sharps injuries must be used, including safety disposable scalpels, blunted suture needles, and safety hypodermic needles.¹²⁶ Some needles have to be re-used; these should only be used when absolutely necessary. Otherwise, safety hypodermic syringes should be used.¹²⁷ DO NOT remove disposable needles from the syringe with hands, forceps or otherwise, but dispose of the needle AND the syringe to reduce exposure to bloodborne pathogens.¹²⁸

The next Bloodborne Pathogens action item encompasses the idea that employees must be protected from puncture wounds caused by syringes, scalpels, suturing needles, and other sharps instruments.¹²⁹ The best way to do this is to use syringes, scalpels, suturing needles, and other sharps instruments which are specifically designed to prevent puncture wounds.¹³⁰ DO NOT leave any exposed or used disposable needles on the instrument tray. Dispose of all sharps in appropriate sharps disposal containers.



Sharps Disposal Container

- 115 Mayer, 695
- 116 OSHA Bloodborne Pathogens Standard
- 117 OSHA Compliance Guidance for Funeral Homes, 8
- 118 OSHA Bloodborne Pathogens Standard
- 119 OSHA Compliance Guidance for Funeral Homes, 9
- 120 OSHA Bloodborne Pathogens Standard
- 121-122 OSHA Compliance Guidance for Funeral Homes, 10
- 123-124 Mayer, 695
- 125-128 OSHA Compliance Guidance for Funeral Homes, 10
- 129 OSHA Bloodborne Pathogens Standard
- 130 OSHA Compliance Guidance for Funeral Homes, 11

A post-exposure evaluation and follow-up procedure must be in place in the event of an employee's exposure to blood or body fluids, and specifically in the event of a puncture wound from a suturing needle, or a needlestick.¹³¹ An exposure incident is defined as a specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.¹³² After an exposure incident is reported, the employee must provide a CONFIDENTIAL medical evaluation and follow-up to the affected employee.¹³³ This medical evaluation should include the identification and documentation of the disease status of the source individual, or the dead human body with which the incident occurred, if this is available and can be obtained. The employee MUST be sent to a medical facility that is capable of providing treatment in accordance with the latest CDC guidelines for the post-exposure care of individuals who have been exposed to human blood or other potentially infectious bodily fluids.¹³⁴

Universal Precautions is an approach to infection control in which all human blood and certain human body fluids are treated as if they are contaminated with a bloodborne pathogen.¹³⁵ Employees must use "Universal Precautions" with all dead human bodies.¹³⁶ Funeral homes should ensure that all employees are adequately trained to understand the concept of "Universal Precautions" and use them in ALL procedures where there is potential for contact with bloodborne pathogens, specifically every time an embalming is done.¹³⁷

Absolutely no drinking or eating should be allowed in work areas, especially embalming rooms, where there is a reasonable likelihood of exposure to blood or body fluids.¹³⁸ Funeral service professionals should be sure not to allow ANY food or drink in the embalming room. Besides that, handling contact lenses and applying cosmetics or lip balm should be avoided in the embalming hood and all areas with the likelihood of exposure.¹³⁹

Funeral facilities must have a written housekeeping schedule for those areas of the facility which may be contaminated with blood and body fluids.¹⁴⁰ The funeral home should determine and then implement an appropriate written schedule for cleaning and decontamination based upon the location with the funeral home, type of surface to be cleaned, type of soil present, and tasks or procedures being

performed in the area.¹⁴¹ As a note, ALL equipment, environmental, and working surfaces must be cleaned and decontaminated after contact with blood or other potentially infectious materials.

Only products or chemicals that are listed by the EPA or FDA as registered disinfectants or sterilants may be used to decontaminate surfaces or instruments that have been contaminated with blood or body fluids.¹⁴² Be sure to check the label to ensure that you are using only products or chemicals that are listed by the EPA or FDA as registered disinfectants or sterilants.¹⁴³

Use tongs or forceps to reach into the cleaning containers to pick up sharps.¹⁴⁴ Reusable sharps, such as suture needles, that have been contaminated with blood or other potentially infectious materials should not be stored or processed in a manner that requires employees to reach by hand into the containers where these sharps have been placed.¹⁴⁵ Funeral homes should provide and REQUIRE the use of tongs or forceps for this task.

Scrub sponges and other potentially contaminated instrument cleaning tools must be stored properly.¹⁴⁶ Once a sponge, scrub brush, or other cleaning tool has been used to clean contaminated instruments, those cleaning tools should be placed into a closeable container.¹⁴⁷ This container must only be used for such purpose and must be clearly labeled with a biohazard symbol, or simply use a red container to identify its contents as biohazard.¹⁴⁸

Attach a biohazard warning label to containers of potentially infectious material.¹⁴⁹ All contaminated articles should be labeled, including instrument trays, mop and bucket, trash cans used for biohazard storage, refrigerators and freezers containing blood or other potentially infectious materials, and any other container used to store or transport blood or other

131 OSHA Bloodborne Pathogens Standard

132 Mayer, 695

133-134 OSHA Compliance Guidance for Funeral Homes, 11

135 Mayer, 695

136 OSHA Bloodborne Pathogens Standard

137 OSHA Compliance Guidance for Funeral Homes, 11

138 OSHA Bloodborne Pathogens Standard

139 OSHA Compliance Guidance for Funeral Homes, 11

140 OSHA Bloodborne Pathogens Standard

141 OSHA Compliance Guidance for Funeral Homes, 12

142 OSHA Bloodborne Pathogens Standard

143-145 OSHA Compliance Guidance for Funeral Homes, 12

146 OSHA Bloodborne Pathogens Standard

147-148 OSHA Compliance Guidance for Funeral Homes, 13

149 OSHA Bloodborne Pathogens Standard

Exam Question

9. Per OSHA's Bloodborne Pathogens Standard, sharps containers should NOT _____.

- a. Be easily accessible to personnel
- b. Be kept on the floor or on counters where cabinets obstruct access
- c. Be located as close as is feasible to the immediate area where sharps are used
- d. All of the above

potentially infectious materials.¹⁵⁰ In addition, the warning labels must be red or orange in color with a biohazard symbol. The lettering on the labels should be black.

Trash cans used for containment of biohazards must be lined with biohazard bags. The regulated waste must be placed in a container that can be closed or covered with a lid.¹⁵¹

As a recommendation, it is best to use trashcans with foot pedal operation for the lid to prevent contaminating the lid with blood or other potentially infectious materials.

Sharps containers must be easily accessible to personnel and located as close as is feasible to the immediate area where sharps are used.¹⁵² The closer the sharps container is to where the sharps instruments are being used, the less risk involved. The longer an employee is handling a contaminated sharps instrument, the greater the risk to the employee. The sharps container should be placed so as to ensure that an employee will not be stuck while trying to place a sharps instrument in the sharps container.¹⁵³ The sharps container should not be kept on the floor or on counters where cabinets obstruct access.

As a final action item at a funeral home, employees with occupational exposure to bloodborne pathogens MUST be trained on the safety procedure related to blood or other potentially infectious materials.¹⁵⁴ Funeral homes MUST provide training PRIOR to initial exposure, which means before an employee starts working in a situation where they may be exposed to blood or other potentially infectious materials. This would include all embalmers, crematory operators, removal technicians, as well as others at the funeral home involved in the handling and care of the dead human bodies. Training MUST then be provided AT LEAST yearly after the initial training. The training must provide specific details related to the exposure control plan and the post-exposure evaluation and follow-up. Each potentially exposed employee at the funeral home should have a training record containing the following: dates of training sessions, the contents or a summary of the training sessions, the names and qualifications of the persons conducting the training, and the names and job titles of all persons attending the training sessions. These training records must be maintained for AT LEAST three years from the date of the training. It is critical to be sure these trainings include ALL elements required by OSHA as specified in the Bloodborne Pathogens Standard.¹⁵⁵

Although NOT REQUIRED by OSHA for funeral homes, a log to document sharps related injuries is highly recommended.¹⁵⁶ If a funeral home is to keep a log, the log must include the type and brand of device involved in the incident, the department or work area where the exposure incident occurred, and an explanation of how the incident occurred.¹⁵⁷

Personal Protective Equipment Standard

OSHA has established a Personal Protective Equipment Standard (29 CFR 1910.132). Personal protective equipment is specialized clothing or equipment worn by an employee for protection against a hazard.¹⁵⁸ Examples of this might include gloves, masks, gowns, and face shields. Personal protective equipment is only considered to be suitable and appropriate if it prevents blood or other potentially infectious substances from passing through, or otherwise reaching, the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of time and use.¹⁵⁹

Employers are required to provide appropriate personal protective equipment suitable for the job being done. All employers are required to make an assessment of the hazards in their workplaces, and for any hazards identified, the employer must certify that the personal protective equipment which has been selected is that which is most appropriate for the hazard and that employees have been properly trained to use the personal protective equipment.¹⁶⁰

There are specific requirements of this standard for funeral homes. Funeral homes should consult the safety data sheets (SDS) of all chemicals used to determine proper personal protective equipment for them. If air sampling indicates that exposure to formaldehyde during embalming exceeds the limits permitted by OSHA, then a respirator that protects against formaldehyde must be worn.¹⁶¹ Personal protective equipment should literally cover the funeral service professional from head to toe, with absolutely no exposed skin.¹⁶² Gloves for use during

- 150 OSHA Compliance Guidance for Funeral Homes, 13
- 151-152 OSHA Bloodborne Pathogens Standard
- 153 OSHA Compliance Guidance for Funeral Homes, 13
- 154 OSHA Bloodborne Pathogens Standard
- 155 OSHA Compliance Guidance for Funeral Homes, 14
- 156 OSHA Bloodborne Pathogens Standard
- 157 OSHA Compliance Guidance for Funeral Homes, 14
- 158 Mayer, 695
- 159 Mayer, 54
- 160 OSHA Personal Protective Equipment Standard
- 161 OSHA Compliance Guidance for Funeral Homes, 17

Exam Question

10. Per OSHA's Personal Protective Equipment Standard, _____ are required to provide appropriate personal protective equipment suitable for the job being done.

- a. Clients
- b. Employees
- c. Employers
- d. None of the above

embalming should be of sufficient thickness to provide protection; 13 mil thickness or greater latex or nitrile gloves should be utilized.¹⁶³ Also during an embalming, embalmers should wear a surgical cap, hood, or other suitable head covering with all hair being tucked up underneath the head covering.¹⁶⁴ The embalmer's mouth, nose, and chin should be covered by a tuberculosis rated surgical mask, as well as the embalmer's forehead, cheeks, and neck being protected by a splash barrier such as safety glasses, goggles, or a combination face-eye shield.¹⁶⁵ The arms, torso, and legs should be protected by a garment or combination of garments that provide suitable coverage.¹⁶⁶ The feet should be covered by a suitable water-resistant, nonslip foot wear or water-resistant, nonslip shoe coverings.¹⁶⁷ In addition, employers must make accommodations to clean, launder, or otherwise dispose of contaminated personal protective equipment, as well as the repair or replacement of damaged personal protective equipment.¹⁶⁸ The personal protective equipment must be removed immediately upon leaving the work area and placed into a designated area or container for storage, washing, decontamination, or disposal.¹⁶⁹

The five action items that go with the Personal Protective Equipment Standard are discussed below:

Funeral homes must assess the tasks conducted at the funeral home to determine what personal protective equipment is needed (as mentioned above).¹⁷⁰ A personal protective equipment hazard assessment of the workplace should be conducted and then documented in writing.

Where the use of personal protective equipment is required, the employees who must wear the personal protective equipment must be trained.¹⁷¹ The training for employees should include when the personal protective equipment is necessary, what personal protective equipment is necessary, how to properly put on and take off, adjust, and wear the personal protective equipment, limitations of the personal protective equipment, and the proper care, maintenance, useful life and disposal of the personal protective equipment.¹⁷²

Wear gloves that are designed for protection against the hazards found in the embalming room.¹⁷³ For gloves, nitrile or butyl gloves are recommended for exposure to formaldehyde-containing solutions and blood or other potentially infectious materials. Check with glove manufactures to ensure they offer proper protection against formaldehyde and blood exposures. For jobs that have a high risk of cut or puncture injuries, gloves with an interposed layer of cut-proof synthetic mesh should be strongly considered.¹⁷⁴

Wear eye protection that is appropriate for hazards in the embalming room.¹⁷⁵ Funeral homes must provide eye protection that is appropriate to the tasks being conducted and to the chemicals being used.

Finally, funeral homes must provide an emergency eyewash and shower in the embalming room.¹⁷⁶ The location should be no more than 10 seconds travel time from the anticipated exposure points. As a rule of thumb, 100 feet can be traveled in 10 seconds if there are no obstacles.¹⁷⁷ The eyewash and shower can be used for both bloodborne pathogens emergencies and chemical emergencies.

Conclusion

All of the risk control methods established by OSHA are in place for a reason: to protect the employee. The bottom line, though, is that EVERY funeral service professional must be aware of both hazards and protections in order to give themselves the lowest risk of being exposed to a communicable disease.

Protect yourself. No one else can if you do not.

162-164 Mayer, 54

165-169 Mayer, 55

170-171 OSHA Personal Protective Equipment Standard

172 OSHA Compliance Guidance for Funeral Homes, 17

173 OSHA Personal Protective Equipment Standard

174 OSHA Compliance Guidance for Funeral Homes, 17

175-176 OSHA Personal Protective Equipment Standard

177 OSHA Compliance Guidance for Funeral Homes, 17

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1. (A) (B) (C) (D)
2. (A) (B) (C) (D)
3. (A) (B) (C) (D)
4. (A) (B) (C) (D)
5. (A) (B) (C) (D)
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9. (A) (B) (C) (D)
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