Infectious Diseases and the Fire and Emergency Services
Infectious Diseases and the Fire And Emergency Services

Department of Occupational Health and Safety
International Association of Fire Fighters, AFL-CIO, CLC

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This IAFF manual, *Infectious Diseases and the Fire and Emergency Service*, is designed as a guide to assist the fire fighter, EMT, and Paramedic in communicable disease prevention in today’s fire service across the United States and Canada. Preventing infectious or communicable disease exposure on the job demands vigilance, especially in the face of devastating diseases such as AIDS and hepatitis C. OSHA’s Bloodborne Pathogen Standard and its recent revisions highlight the continuing importance of preventing occupational infectious disease. In addition, the IAFF continues in its legislative efforts to obtain notification laws and further infectious disease protection for our members in the United States and Canada.

This manual is intended to broaden the fire service’s approach to implementing a successful infectious disease prevention program and provide valuable insight into the interpretation of laws, regulations, and standards for the protection of fire fighters, EMTs and paramedics. It was developed by the IAFF Department of Occupational Health and Safety with the assistance of our Medical Residency Program. The Medical Residency Program, now entering its sixteenth year, has provided numerous services to the IAFF and our affiliates. This manual once again highlights the importance of this program.

We encourage all locals to support the issue of an infectious disease program for all members. Such a program should be the objective of every fire department in cooperation with its local IAFF affiliate.

We all realize the hazards of fire fighting and emergency medical response and that we are continually exposed to communicable diseases on the job. Every year the *IAFF Death and Injury Survey* documents these exposures with increasing frequency. We need to strengthen our efforts for the protection from exposures to tuberculosis, hepatitis, HIV and all other communicable diseases. We need for our fire departments and health care providers to have informed knowledge regarding our occupation and for our occupational exposures to infectious diseases. For this reason this manual has been developed to assist locals in the implementation of a fire department occupational infection control program. The manual has incorporated the resources of occupational medicine, NFPA and government standards, legal decisions, fire department policies and relevant documents to make a comprehensive guidebook of value to all our members.

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INTRODUCTION

Over the past several years the issue of infectious (communicable) disease in the fire service has taken on a new and urgent meaning with the advent of AIDS, hepatitis, and tuberculosis. However, the range of diseases that may affect fire fighters, EMTs, and paramedics goes well beyond this list. The IAFF 1998 Death and Injury Survey reports that 1 out of every 32 fire fighters was exposed to tuberculosis, 5.8% exposed to hepatitis B, 6.5% exposed to hepatitis C, 14.6% exposed to human immunodeficiency virus, and 43.3% exposed to some other communicable disease.

This document is intended as a resource for all those interested in the prevention and control of infectious disease within the fire service. The goal of the manual is to provide a background in the nature of the infections of concern to fire fighters and how they are recognized and prevented. Applicable contagious disease standards and legislation of interest to the emergency responder also are addressed within this manual.

Infectious disease is an area of rapidly changing conditions. Some of the controversies that may be expected in the next several years include the issue of baseline screening for hepatitis B and C, mandatory testing for HIV, and whether to regulate exposures for non-bloodborne pathogens such as tuberculosis. While this guide may discuss some of these issues, this will continue to be an evolving field.

IAFF POLICY

This document is intended to support the provisions of the IAFF Executive Board policy on infectious diseases. Every attempt is made within this manual to substantiate, support, and provide recommendations for our locals to establish similar policies within their departments for the health and welfare of our fellow brothers and sisters.

The policy has been updated by the IAFF due to current concern regarding the risk of transmission of HIV, hepatitis C, and other infectious diseases to emergency response personnel. Therefore, the Executive Board developed and adopted the following position statement and recommended guidelines to address this issue:

The IAFF Executive Board supports the *Fire Service Joint Labor Management-Wellness Fitness Initiative* and NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, as it relates to fire department medical programs (Chapter 8). Specifically, the IAFF supports NFPA 1500, Section 8-4.1, which states:

*The fire department shall have an officially designated physician who shall be responsible for guiding, directing, and advising the members with regard to their health, fitness, and suitability for various duties.*

With this section in mind, the IAFF Executive Board does believe a policy that specifies limitations on HIV-infected fire fighters, EMTs or paramedics is necessary. If there is clear evidence that such workers pose a significant risk of transmitting infection through an inability to meet basic infection control standards or guidelines, appropriate limitations of duty should be instituted.
Through the Fire Service Joint Labor Management Wellness-Fitness Initiative and NFPA 1500, fire departments are responsible for evaluating the health status of all fire fighters, EMTs, and paramedics and their ability to perform assigned duties.

The IAFF also demands that all fire departments adopt NFPA 1500, especially in light of the requirements on implementing a fire department infection control program. Such a program must include policy guidelines for the prevention of transmission of bloodborne pathogens and other infectious diseases during fire fighter, EMT, and paramedic response activities as well as guidelines for improving infection control practices. The fire department must be responsible for providing barrier protection equipment (gloves, protective garments, etc.), safer needle devices, supplies, proper disinfection facilities, and appropriate training.

The fire department must implement annual training for all fire department personnel in universal blood and body fluid precautions, barrier techniques, safer needle devices, and other scientifically accepted infection control policies. Such training also should provide information on infectious disease risk factors and the contagiousness and transmission of infectious disease as well as information on the availability and merits of voluntary, confidential or anonymous counseling and testing as a personal health measure for fire department personnel. Training materials must include information on exposure to infectious diseases and reproductive health.

The fire department must establish procedures for the evaluation of work limitations for employees with an infectious disease who in the course of performing their duties demonstrate evidence of functional impairment or inability to adhere to standard infection control practices or who present an excessive risk of infection to patients or fire department members. The fire department physician must evaluate fire fighter, EMT and paramedic job duties to determine job limitations, if any, in the event of an individual’s infectious disease. The evaluation should include an assessment of any factors that may compromise the performance of job duties, as well as a review of scientifically and medically accepted infection control practices. Factors include illness or presence of exudative or weeping lesions that may interfere significantly with the fire fighters’, EMTs’ and paramedics’ ability to perform their jobs and provide quality care. Both physical and mental competencies are also to be considered. Additionally, the fire department physician should review the immunologic status of the fire fighter, EMT and paramedic and susceptibility to infectious diseases.

The fire department physician must assist with developing policies addressing limited duty assignment for non-infectious personnel where there is a greater potential for that individual to contract an infectious disease. Fire fighters, EMTs and Paramedics with extensive skin lesions or severe dermatitis on hands, arms, head, face, or neck must be evaluated to determine whether they should engage in direct patient contact, handle patient care equipment, or handle medical waste until such time that they are healed.

Occupational contagious diseases are infectious diseases that are contracted through the course of a person performing his or her work. These contagious diseases are usually caused by viruses or bacteria, though in some occupations parasitic agents are important. Occupationally contracted contagious diseases are considered compensable through the workers’ compensation system, just like any other occupationally-caused disease. The infectious diseases of primary concern to fire fighters include hepatitis B virus (HBV); hepatitis C virus (HCV); human immunodeficiency virus (HIV), which is the viral agent responsible for causing the Acquired Immunodeficiency Syndrome (AIDS); and tuberculosis (TB). Other infectious diseases of importance to fire fighters, although not as occupationally common, include the hepatitis viruses A, D, and E; herpes; influenza; lyme disease; meningitis; mumps; scabies; and tetanus.

While working, fire fighters often respond to emergency situations involving victims who have been injured and are actively bleeding. The victim may require extrication from a difficult
to access accident scene, such as a motor vehicle accident or poorly accessible building. There
may be broken glass or other sharp objects at the scene that are poorly visualized, and the
lighting at the scene may be minimal. In addition, if the victim is exsanguinating and needs to
be extricated quickly to save his/her life, the emergency provider may act in haste, with
disregard for his or her own safety. Fire fighters also may be involved in emergency medical
treatment at the scene, including intravenous line insertion and blood drawing. The infectious
disease status of the victim is almost never known to the fire fighter while he or she is rendering
emergency services. All of these factors combine to place the fire fighter at increased risk of
contracting a bloodborne contagious disease through a puncture wound, skin abrasion or
laceration that can become contaminated with infected blood or other potentially infectious
material.

Education and training are the most effective means available to limit the risk of contracting
a bloodborne contagious disease in fire fighters. The risk of contracting an infectious disease,
and methods used to avoid exposure, should be a part of every fire fighter’s education.
Universal precautions, such as the wearing of protective gloves, safety glasses, masks, and
gowns, should be used whenever exposure to blood and/or other bodily fluids is possible.
These precautions should be taken whether or not the infectious status of the patient is known.
The regulations outlined by the Occupational Safety and Health Administration (OSHA)
outlined in 29 CFR 1910.1030, Bloodborne Pathogens, require any personnel who are
potentially exposed to bloodborne pathogens to be equipped with personal protective equipment
sufficient to prevent such exposures.

The few seconds that it takes for the fire fighter to don protective gear in order to protect
himself or herself will not make a significant difference in the survival of the patient. Fire
fighters should be trained to automatically don protective gear, to carefully evaluate possible
hazards at the scene that may cause lacerations or abrasions, and to maximize the lighting
available at the scene as much as possible to better visualize the hazards.
This section describes communicable diseases that may pose an occupational risk to the fire fighter and EMT. Each blood, air, soil, or vector borne disease will be described in terms of its pathophysiology, symptoms, and prevention strategies.

Exposure to bloodborne pathogens can occur through many mechanisms: needle sticks, being splashed with blood or body fluids on the mucous membranes (the mouth, eyes, and nose), even in some cases human bites (although the risk of transmission of HIV in human bites is extremely low). If you are exposed to a bloodborne pathogen or think you have been exposed, it is important to seek medical attention as soon as possible. Early follow-up helps to clarify your risks of developing disease, improves your physician’s ability to treat you, and helps in any subsequent decisions regarding compensation.

Arthropod-borne diseases are diseases that are transmitted via a vector, usually an arthropod or other insect, or they are diseases that have developed and become infectious within the arthropod. The arthropod acts to carry the disease from an infected individual to a noninfected individual. Emergency responders are at risk of contracting these diseases during field operations and through close contact with the general public. Fire fighters and EMTs should be aware of insect bites, and be cautious of insects found on skin, hair, or clothing. Medical attention should be sought as quickly as possible for suspicious findings.

### Hepatitis

“Hepatitis” means “inflammation of the liver.” It may be caused by viruses, chemicals, drugs, autoimmune diseases, and a number of other conditions. The infections that cause hepatitis are many; most are caused by viruses, and it is this viral hepatitis that is the object of recent concern. The symptoms of hepatitis include jaundice (a yellow-green coloring of the skin or eyes), pain in the “stomach” or abdomen, fatigue and diarrhea.

The major viruses that cause hepatitis include hepatitis A, hepatitis B, and hepatitis C. Other less common bloodborne hepatitis viruses include hepatitis D, which is also known as the "delta" virus, and hepatitis E. Some of these viruses are more important than others to fire fighters.

#### Hepatitis A

Hepatitis A is known as Infectious Hepatitis. This disease is often associated with fecal contamination of water and is spread person-to-person through poor sanitary habits and the intake of uncooked food or unclean water. Bloodborne transmission of hepatitis A is, however, rare. It takes about 15-50 days to develop symptoms of hepatitis A after exposure, and symptoms usually disappear even without treatment about two weeks later. This illness is most commonly seen among children and young adults, and outbreaks are not uncommon at camps or military posts. A vaccine for hepatitis A is currently available, but is not recommended for healthcare workers, fire fighters, EMTs, or paramedics. Anyone exposed to hepatitis A can receive a shot of immune globulin (IG) to prevent infection. Although this is the most common type of viral hepatitis, it should not be a problem for most fire fighters, unless their meals are prepared by an infected person or they are infected by contaminated materials at a fire.
Hepatitis B

Hepatitis B is a serious disease that is responsible for an estimated 4,000 to 5,000 deaths each year in the United States due to cirrhosis and liver cancer. Persons infected with the hepatitis B virus run the risk of developing severe health complications, including becoming a hepatitis B carrier, developing cirrhosis, liver cancer, liver failure, and death. Blood infected with the hepatitis B virus is much more infectious than HIV infected blood, and the proportion of the United States population infected with hepatitis B is much higher than the proportion infected with HIV.

Hepatitis B is spread in much the same manner as HIV virus, through sexual relations, sharing needles, or contact with blood and other body fluids. In the past, this disease has been passed through blood transfusions, but now all blood is rigorously screened for hepatitis B before it is given to patients, and those with the illness are not allowed to donate blood. Several groups are noted to have a high risk of hepatitis B, including parenteral (IV) drug abusers, heterosexuals with multiple partners, homosexual men, clients and staff in institutions for the retarded, prisoners, and patients of hemodialysis centers.

Vaccination is the best defense against contracting hepatitis B. The 1991 OSHA Bloodborne Pathogen Standard requires employers to make the hepatitis B vaccine available free of charge to all workers at risk of exposure. People who have received the hepatitis B vaccine and have developed immunity to the virus are at virtually no risk for infection. Studies show that most people who are vaccinated do develop protective antibodies against the virus. For an unvaccinated person, the risk of contracting hepatitis B from a single exposure to HBV-infected material ranges from 6-30% (between 1 in 16 to 1 in 3 chance), depending on the status of the source individual. If you are exposed, it is an OSHA requirement to have blood drawn as soon as possible to determine your baseline serologic status, which is a test to see if you have protective antibodies (since these take several weeks to develop, blood drawn immediately after exposure will not develop antibodies as a result of that exposure right away). If you do not have protective antibodies, your physicians may decide to give you the vaccine. You also may receive hepatitis B Immune Globulin (HBIG), which provides some additional level of protection through what is sometimes called “passive immunity.” Ultimately, however, the hepatitis B vaccine is a safe, highly effective method of protecting fire fighters from contracting hepatitis B on the job. This vaccine is recommended for all fire fighters, EMTs and paramedics.

Hepatitis C

Hepatitis C was formerly known as "non-A, non-B hepatitis" and is currently considered to be a more serious threat to fire fighters, paramedics, and EMTs than hepatitis B virus. According to the Centers for Disease Control (CDC), hepatitis C is the most common chronic bloodborne infection in the United States. It is primarily spread through contact with blood infected with the hepatitis C virus (HCV), but can also be spread through sexual contact. Transmission of HCV through sexual contact occurs less frequently than with HBV or HIV. An increased risk of contracting the hepatitis C virus has been associated with injecting drug use, chronic hemodialysis patients, sex contacts of infected persons, persons with multiple sex partners, recipients of transfusions before July 1992, recipients of clotting factors made before 1987, and infants born to infected women. Given that there are more than 3.9 million people infected with HCV in the United States alone and the nature of the job that fire fighters, paramedics, and EMTs perform, it is likely that emergency response personnel may come into contact with groups of the population who have hepatitis C. The CDC states that for healthcare workers and emergency response personnel, the risk of contracting HCV after a needlestick or cut exposure to HCV-infected blood is approximately 1.8%.

More than 70% of all persons infected with HCV will develop chronic liver disease. In comparison, less than 10% of those infected with HBV will develop chronic disease. Severe
liver damage, including cirrhosis, can occur with chronic HCV infection, and is currently the leading medical reason for liver transplants in the United States. It is estimated that 5 to 7 percent of people with HCV will die from their infection.

A blood test for hepatitis C antibodies is available. Routine testing is only recommended for certain high-risk groups, such as injecting drug users or recipients of transfusion prior to July 1992. Baseline testing is currently recommended for health care and emergency response personnel after exposure to HCV-positive blood.

There is no vaccine against hepatitis C and no treatment after an exposure that will prevent infection. Immune globulin has not been shown to be effective and is not recommended for post-exposure prophylaxis. People with chronic HCV infections can be treated with drugs such as alpha interferon and ribavirin, but this treatment is only effective in 10-40% of people. For all of these reasons, following recommended infection control practices is imperative for preventing HCV infection.

**Hepatitis D**

Hepatitis D virus (HDV) is also known as the delta virus and is a defective virus that requires the presence of hepatitis B virus to replicate. People infected with both HDV and HBV tend to have more severe liver disease than those infected with HBV alone. The prevalence of HDV in the United States and Canada is very low and since the presence of HBV is necessary for HDV to replicate, vaccination against HBV also protects against hepatitis D infection.

**Hepatitis E**

Fortunately, hepatitis E has not yet spread around the U.S. It is found in other parts of the world, including Mexico, and has been seen in U.S. travelers returning from some of these countries. Hepatitis E virus (HEV) is spread primarily through water contaminated with feces and its prevention centers on providing clean water supplies. It is associated with an acute illness similar to that seen with hepatitis A and does not cause chronic infection. It is most common among young and middle-age adults, and there is no vaccine available.

**Prevention strategies**

Fire fighters, paramedics, and EMTs are at risk for exposure to any of these types of viral hepatitis, but hepatitis A, B, and C are the most common concerns. By ensuring that only safely prepared food and water are consumed, especially when traveling outside the country, exposure to both hepatitis A and E can be minimized. The vaccine for hepatitis B will protect against both hepatitis B and D. Following the guidelines in OSHA’s standard for Occupational Exposure to Bloodborne Pathogens, fire fighters can lessen their risk of contracting hepatitis C, any other viral hepatitis, and even AIDS.

The effects from all the forms of hepatitis discussed here can be additive. A fire fighter who drinks heavily, has inhaled toxic chemicals and then gets hepatitis B may greatly increase his chance of permanently damaging his liver and shortening his life. Take the time to follow these precautions and protect yourself and your liver.

**Human Immunodeficiency Virus (HIV)**

Human immunodeficiency virus (HIV) is the virus responsible for the Acquired Immunodeficiency Syndrome (AIDS). AIDS was first recognized in the U.S. in the early 1980s, when two unusual diseases (Kaposi’s sarcoma, a type of cancer, and Pneumocystis carinii, an organism that causes pneumonia in people with impaired immune systems) began to appear in homosexual men. Since that time, our understanding of the disease has progressed rapidly,
although measures to prevent the spread of the disease have lagged behind. It is not an understatement to say that AIDS is the most serious public health threat the world has seen in the past 50 years. There is no part of the U.S., or the world, for that matter, that can be considered “safe” from the threat of HIV and AIDS.

HIV is a virus of the type known as retroviruses. These viruses infect certain cells in the body, incorporating their viral genetic material into the cell’s own DNA. The body’s cells then begin to produce the virus, and in the process, may themselves be killed. In the case of HIV, this virus infects only selected cells in the body, of which the most important are certain infection-fighting white blood cells known as lymphocytes, specifically those lymphocytes known as “helper cells” (which can be identified because they carry a marker called “CD4”). HIV can also infect certain cells in the nervous system.

Transmission of HIV

HIV has been found in several body fluids, including blood, semen, vaginal secretions, breast milk, saliva, and tears. However, there is no evidence that HIV can be spread by casual contact with someone infected with HIV, or through contact with sweat, saliva or tears. At this point, it is fairly well established that HIV is spread through direct contact with blood or blood products, semen, or vaginal secretions, and is acquired through “high-risk” activities including sexual intercourse (vaginal or anal), direct injection of contaminated blood by transfusion or the use of contaminated needles, or contact with contaminated blood or blood products. In addition, HIV may be transmitted from a mother to an offspring either through transmission directly to the fetus before it is born, or through breast feeding with infected breast milk.

Occupational transmission occurs primarily through accidental injection from contaminated needles, although there have been cases of contamination occurring through splashes of mucous membranes with contaminated blood. In contrast to hepatitis B virus, which is easily transmitted, studies of health care workers have consistently shown that the risk of becoming infected with HIV after a needle stick is very small, less than 1 percent, and the risk of transmission by splashing of mucous membranes is even less. Although there has been considerable public concern expressed over the potential for infected health care workers, there is only one documented case of a health care professional infecting his patients (a dentist in Florida). Several ongoing studies by the Centers for Disease Control have failed to find any other such cases, even among infected surgeons.

Testing for HIV infection

HIV infection can be detected, even in asymptomatic individuals, with a blood test. The first, more sensitive test detects human antibodies to HIV through a test known as an EIA, or enzyme immunosorbent assay. Ordinarily, this test will detect HIV antibodies in almost every person infected with the virus, with two exceptions. The first exception is in individuals with recently acquired HIV infection. The “seroconversion period” refers to this early period of infection before the development of HIV antibodies and a positive EIA test. This seroconversion period may last between one and six weeks. The second exception occurs in patients with late-stage clinical HIV who may have a decrease in HIV antibodies, and therefore, have a negative EIA test.

Persons are informed they are positive only when they are repeatedly reactive by EIA and are confirmed positive using a second test, usually a western blot test. A reactive result from an EIA that is confirmed by a western blot test means that a person is infected with HIV. This two-part testing regimen insures that results are more than 99% accurate.

A rapid test for detecting HIV antibodies in 5 to 30 minutes has been developed. Only one test is currently licensed by the Food and Drug Administration (FDA) for use in the United
Acute HIV infection is a flu-like illness that usually occurs shortly after initial infection with HIV. It may be so mild as to be undetectable, and many individuals with HIV infection will be unable to remember any illness associated with their initial exposure.

In asymptomatic HIV infection, there is no indication that the individual is infected. However, the HIV antibody test will be positive, and the individual is still capable of infecting others because there are virus particles in his or her bloodstream.

Symptomatic HIV infection refers to a variety of progressive signs and illnesses. For some, the only sign of disease initially is persistent swollen lymph nodes (lymphadenopathy). As the disease progresses, the individual may develop AIDS-related complex (ARC), which consists of a number of signs and symptoms, such as fever, weight loss, diarrhea, malaise, lower than normal T-cell count, neurological symptoms, bacterial infections, and fungal infections. During this stage of HIV infection, people are sick without a specific AIDS-defining illness.

People are considered to have full-blown AIDS when their T-cell counts drop below 200 or they have had an AIDS-defining illness. As a person’s T-cell count decreases, the risk of getting a severe disease or “opportunistic infection” increases. Examples of AIDS-defining illnesses include pneumocystis carinii pneumonia (PCP), toxoplasmosis of the brain, Kaposi's sarcoma, esophageal candidiasis, and cytomegalovirus retinitis. It is estimated that about half the people with HIV develop AIDS within 10 years of becoming infected. This time period varies greatly from person to person and can depend on many factors.

HIV Exposure, Detection, and Prophylaxis

Following an exposure to blood or blood products (or other potentially infectious materials) contaminated with HIV, the exposed individual should have blood drawn to determine his or her baseline HIV status. The development of antibodies following infection usually takes a few weeks to several months, and 95% of people who become infected will develop antibodies within 6 months. After an occupational exposure, the CDC recommends that HIV antibody testing be performed for at least 6 months after an exposure. Post-exposure testing is generally done at 6 weeks, 12 weeks, and 6 months. A shift to seroconversion assumes that baseline testing showed the exposed individual as not already infected. At all stages, testing should be accompanied by a discussion with a counselor and the employee, indicating why the test is done, its limitations, and its implications.
Any worker who has been exposed to HIV should be immediately evaluated and, if appropriate, offered post-exposure prophylaxis (PEP), which refers to drugs that can prevent HIV transmission. In order to determine if PEP is appropriate, workers need to have an exposure assessment done by an experienced professional. If it is determined that PEP is appropriate, workers need to be informed that the drugs used for PEP have side effects, that they do not always work in preventing transmission, and that the worker has the option not to take these drugs. In addition, workers should be aware that data is limited regarding toxic side effects of these drugs in pregnant women or people not infected with HIV.

If deemed appropriate, PEP should be started as soon as possible after the exposure (i.e., within hours rather than days) and should be administered for 4 weeks if tolerated. Although animal studies suggest that PEP is not effective if it is started more than 24-36 hours after an exposure, the window of opportunity in humans is still unknown. Therefore, PEP should be started in humans even if the exposure occurred more than 36 hours ago.

Current CDC recommendations state that PEP regimen selection should be based on information about the exposure event and the exposure source, including T-cell counts, viral load, and disease stage. Most HIV exposures will require a two-drug regimen, while the addition of a third drug is considered only for exposures that pose an increased risk for transmission or where resistance to the other drugs used for PEP is known or suspected. The two-drug regimen is most commonly used following exposures and typically consists of zidovudine (AZT) and lamivudine (3TC). The addition of a protease inhibitor as a third drug after high-risk exposures is done to reduce viral replication. Zidovudine, which is also known as AZT, ZDV, or Retrovir, is the only drug that has been conclusively shown to prevent HIV transmission in humans. The use of AZT in pregnant HIV-positive women and their infants has been shown to reduce transmission of the virus to the infants by 67%.

There are side effects associated with taking PEP drugs such as AZT, 3TC, and protease inhibitors. Approximately 50-90% of people experience at least one side effect from their PEP regimen. Sometimes people have to stop taking these drugs because they cannot tolerate these side effects. The side effects usually related to the two-drug regimen (usually AZT and 3TC) consist of nausea, diarrhea, mild anemia, fatigue, and flu-like symptoms. While large doses of these drugs have been shown to produce tumors in animals, their long-term effects are unknown in humans and the benefits of using these drugs, especially in pregnant women, outweigh the risks. The use of a protease inhibitor as a third PEP drug has been associated with serious drug interactions (if the patient is taking other drugs), kidney stones, diarrhea, anemia, and sugar metabolism problems such as diabetes. The long-term effects of protease inhibitors on humans is currently unknown and under investigation.

In conclusion, if someone is exposed to HIV they need to be immediately evaluated by a trained professional. This professional shall assess the exposure, perform a medical examination, and recommend a PEP regimen, if appropriate. While taking drugs for PEP is an individual’s choice, it is currently recommended to be beneficial by the CDC and should be started as soon as possible after an exposure.

Herpes Simplex

Fire Fighters may repeatedly come in contact with the Herpes Simplex virus (HSV). HSV infections are among the most common maladies affecting humans. The Herpes Simplex virus family is responsible for illnesses such as chicken pox, infectious mononucleosis, and the common fever blister or cold sore. Genital herpes is also an infectious disease caused by the HSV Type II virus, but is not considered an occupational concern for fire fighters.

The principle mode of spread for the HSV is through direct contact of infected secretions. Oral or genital secretions from a symptomatic or asymptomatic infected individual are the
primary source of virus. The virus HSV-1, spread through oral secretions, is an occupational hazard to emergency response personnel performing respiratory care. Individuals with active lesions can infect others. Fire fighters, EMTs and paramedics should be aware of the potential for infection.

Preventive measures on the job for emergency response personnel with the potential to come in contact with the HSV include the universal precautions that should be applied to all patient care situations. Specifically, response personnel should wear gloves when in direct contact with potentially infectious lesions. Fire fighters, EMTs, and paramedics also should be provided health education and personal hygiene directed toward minimizing the transfer of infectious material.

**Tuberculosis**

Tuberculosis is a disease caused by a family of organisms known as *Mycobacteria*. The disease commonly known as tuberculosis (TB) is caused by one species of *Mycobacteria*, called *Mycobacterium tuberculosis* (*M. tuberculosis*). Other members of the *Mycobacterium* have been found to infect people with compromised immune systems such as AIDS or cancer patients on chemotherapy. These organisms (*Mycobacterium avium intracellulare, Mycobacterium kansasii*), ordinarily pose no risk to normal individuals.

TB is an ancient disease that used to be widely feared throughout the world, accounting for large numbers of deaths and chronically ill persons. In part, this is because TB thrives and spreads best in crowded conditions among people with weakened resistance, conditions often found among the poor. After several decades of declining incidence, the number of new cases of TB rose in the late 1980s and early 1990s. Even though the last seven years has seen steadily declining rates of TB infection, there are still an estimated 10 to 15 million Americans infected with the TB bacteria, who have the potential to develop active disease in the future. In addition, the development of multi-drug resistant TB (MDR-TB), which is a strain of TB that is resistant to standard drug therapies, is increasing in certain parts of the world and continues to be a concern in the United States and Canada. Despite declining rates, TB is still a major concern to public health officials. Populations at high-risk for TB include prisoners, indigents, recent immigrants, institutionalized patients, AIDS patients, and those living in congested urban areas where there is poor social conditions. Fire fighters and EMS personnel are routinely exposed to all of these populations. In the IAFF “1998 Death and Injury Survey,” tuberculosis exposures accounted for 29.8% of all communicable disease exposures.

Tuberculosis is transmitted by individuals with active infection through airborne respiratory droplets, produced by coughing, sneezing, or even talking. These respiratory droplets can survive suspended in the air for several minutes, particularly if there is poor air circulation, so that the person with TB does not even have to be in the room for the air to be infectious. However, in circulating air the number of infectious respiratory droplets quickly drops off. The TB germs are also killed by sunlight and ultraviolet light.

In a normal person with a normal immune system, exposure to *M. tuberculosis* is followed by a strong immune response. The droplet with the organism is inhaled deep into the lungs, where the organism initially multiplies. A healthy immune system is able to contain the infection easily, but while the infection may be controlled by the immune system, the organism will remain dormant in the body, and can become active again, even may years later unless treated medically. That is the reason that TB testing, and a complete course of treatment, are necessary to protect against later illness.

While healthy individuals are able to contain their infection, people with any type of depressed immune systems, either from illness (for example, AIDS, cancer, or alcoholic liver
disease) or from poor living conditions (malnutrition) may go on to develop active tuberculosis. The most common form of active TB is pulmonary (lung) TB, which progresses from non-specific symptoms (fatigue, weight loss, night sweats) to the chronic cough, coughing up blood-streaked sputum, and wasting. The importance of this is that even relatively asymptomatic individuals may spread infection through occasional cough, sneeze, or even conversation.

Finally, even healthy individuals who successfully combat their infection may be at risk of reactivating their original infection later in life. This reactivation can occur as a result of an illness, depressed immune system, or simply because of advancing age. This is why it is important to look for signs of TB exposure in asymptomatic individuals, so that they can be treated to kill the dormant TB germs that might otherwise remain to cause infection later in life. The death rate for untreated TB is approximately 40-60%, but with appropriate treatment, people with drug-susceptible TB can be cured more than 90% of the time.

**Tuberculosis testing**

The most effective means of controlling tuberculosis is through early detection and treatment. Tuberculosis exposure is detected through a test known by its initials, “PPD” (which stands for Purified Protein Derivative), or sometimes, “Tuberculin test.” In this test, a small amount of purified TB protein (which is not capable of causing disease) is injected just under the skin. If the body has been exposed to TB previously, the immune system will recognize and attack the protein, causing localized redness and induration. The test is read by a nurse or physician after 48-72 hours, and the results interpreted as positive, negative, or indeterminate. If the test is positive, the individual has most likely been exposed to TB at some point, and appropriate recommendations are made by the physician. If you have been exposed to someone with active TB, your first PPD may be negative because your immune system can take several weeks to react to the test. For this reason, it is recommended that you receive a second skin test 10 to 12 weeks after the last time you were exposed to the infectious person. If the second test is negative, you probably do not have TB.

A “PPD converter” is someone who has had a negative skin test in the past and now has a positive skin test. On average, people infected with TB have a 10% chance of developing active TB disease at some point in their lives. The risk of developing active disease is greatest in the first year after infection, but active disease may not occur until many years later.

Patients who are new “PPD converters” are first examined and given a chest X-ray to see if they have any sign of active infection. If not, they should be treated with isoniazid (INH) for 6-12 months to reduce their chances of developing active TB later on. People should not drink alcoholic beverages during the months they are taking INH because it can be dangerous to their health. There is a minor risk of developing INH-induced hepatitis (inflammation of the liver), particularly among individuals older than 35, so blood tests are done to check the liver enzymes periodically. While the hepatitis is completely reversible with discontinuation of the drug and occurs in only a small number of the individuals taking the drug, it must be weighed against the small chance of developing TB, which can be a fatal infection. Even older individuals can be safely treated with INH with careful monitoring. Also, it is important to know that if one has been successfully treated for tuberculosis, re-infection in a normal healthy person is rare, due to acquired immunity. However, in rare circumstances it may be possible to become re-infected, particularly if the immune system becomes compromised for any reason.

Active tuberculosis is detected through a chest X-ray, combined with finding the TB germs in the sputum, either under the microscope or by culturing them. Your doctor may also check your blood or urine, or do other tests to see if the TB bacteria are in places besides your lungs. This is often a long and difficult process, and it is common to treat persons with suspected TB while waiting for their tests to become final. If you have TB disease, you must take medicine to cure the disease.
The most common reason for treatment failure is that medicine is not taken for the entire time prescribed. The multi-drug resistant TB strains found in various parts of North America and around the world are due to the fact that many people take their medicine for less than the prescribed amount of time, and instead of killing all the germs, it selects for those TB germs that are able to resist the medicines best.

Patients who are found to have active TB must take at least 3 drugs for a prolonged period of time, to completely eradicate the active infection. The most important thing to do if a PPD is positive or indeterminate is to ensure that there is close medical follow-up. Even if employees are not treated for their infection, they may need to be followed with periodic chest X-rays to ensure they remain free of active disease.

For employees who have had negative PPD skin tests in the past and no other sources of exposure, it is likely that a new PPD conversion is due to “on-the-job” exposure. They should be eligible for workers’ compensation for any medical bills or lost work time incurred due to this exposure now or at any time in the future.

Employees who have never had a skin test for TB in the past, and who have no prior history of significant TB exposure, must also be assumed to have obtained their TB exposure on the job, and are thus entitled to the same workers’ compensation benefits as the PPD converters. This may be a problem if any of these patients are immigrants from countries where TB is endemic.

Employees who have had a positive skin test in the past obviously have had TB exposure prior to this episode, and would not be eligible for workers’ compensation. However, they should be followed by a physician to ensure they do not develop signs of active TB.

A case of tuberculosis must be reported to the state Public Health department. However, the employee’s right to privacy is protected as in other cases of reportable illnesses. It is important to realize that people who have a positive skin test to TB, but who do not have active TB, do not pose any risk to others. In addition, after an initial period, even individuals with active TB who are undergoing appropriate therapy are non-infectious.

Preventing the Transmission of TB

In October 1994, the CDC issued guidelines for tuberculosis prevention. These CDC guidelines are a much stronger document in favor of fire fighter and emergency responder protection than past guidelines. Significant changes include the recommended use of HEPA respirators as the primary means of personal protective equipment and the inclusion of EMS personnel in the definition of Health Care Worker (HCW).

Furthermore, the document states that a tuberculosis control plan is required by emergency medical services and that at a minimum, it should contain the following components:

- An annual risk assessment
- A written TB infection-control plan that is evaluated and revised on a regular basis
- Protocols for identifying and managing patients who may have active TB
- Training, education, and screening of HCWs
- Protocols for problem evaluation
- Protocols for coordination with the public health department when necessary

Additional recommendations specific to EMS include placing a surgical mask over a patient’s mouth and nose if they have confirmed or suspected active TB. EMS personnel should wear appropriate respiratory protection when transporting such patients. If possible, the windows of the vehicle should be kept open and the heating and air-conditioning system should be set on a nonrecirculating cycle. EMS personnel should also be included in a comprehensive
PPD screening program. They should receive a baseline PPD test and follow-up testing as indicated by the risk assessment. They should also be included in the follow-up of contacts of a patient with infectious TB.

**Influenza**

Influenza is a yearly concern of health professionals as it is a constantly changing and highly infectious virus. The illness commonly associated with influenza is better known as “The Flu”. Most often present in the fall and winter months, the flu can reach epidemic proportions in many geographic areas and communities.

It is generally believed that the influenza virus is commonly spread through respiratory droplets of an infectious person. This person to person transmission of the virus can occur through respiratory aerosols produced by coughing, sneezing, and talking. A single infected individual can transfer the virus to a large number of susceptible persons.

Fire fighters should be aware of its characteristic onset. The flu usually presents itself suddenly with chills, followed rapidly by fatigue, headache, and generalized myalgia. Fever, cough, and viral upper respiratory infection also accompanies this illness. The flu tends to last 24 hours to several days.

Emergency responders should protect themselves from this seasonal virus through yearly shots of the flu vaccine. While the vaccine can not provide absolute immunity due to the virus’ ability to constantly mutate, it can provide some measure of protection. It is important to realize that the nature of contact with the generalized population and life within the fire station can predispose the fire fighter to succumbing to this virus.

**Mumps**

Mumps is primarily a disease of childhood. However, it does occur in adolescents and adults. Although mumps has been controlled through vaccination, its presence within society still lingers. Mumps is usually characterized as an acute viral disease with fever, swelling and tenderness of the salivary glands.

Mumps has been controlled through vaccination of young children, but the greatest risk of infection has now shifted towards older children and young adults. Individuals born before 1957 tend to be naturally immune through previous exposures, despite not having had clinical disease or vaccination.

Mumps is most common in the winter and spring months. Mumps is commonly spread by droplet infection and through the direct contact of saliva of an infected person. The incubation period of the disease ranges from 2 to 4 weeks. Mumps can be prevented through vaccination, which is usually provided to the individual as a child.

If a fire fighter or emergency responder has been exposed to the mumps virus, he or she should be quarantined until medical evaluation has been completed. Likewise, due the high infectivity of the virus, all other susceptible individuals within the station house should be medically evaluated and provided vaccination if indicated.
Tetanus

Tetanus is an acute disease produced by spore forming bacteria commonly found in soil, street dust, and animal or human feces. The spores are introduced into a wound, laceration or puncture and start to produce a highly toxic material that causes painful muscular contractions and rigidity, usually within 14 days of infection. The disease can be fatal if untreated.

Tetanus can be prevented through proper immunization. If a fire fighter or other emergency response personnel has received a wound from a soiled object he or she should attempt to cleanse the wound immediately and report this as soon as possible. An examining physician will determine the time since the individuals last immunization. A booster shot of Td anti-toxin should given every 10 years. If the fire fighter sustained a significant or contaminated wound he or she should receive an additional booster shot, if a tetanus toxiod shot has not been received within 5 years prior to the injury.

Lyme Disease

Lyme disease is an infectious disease spread by ticks. In general it is not of concern to fire fighters, but since it is a risk for outdoor workers, it is included here.

Lyme disease is caused by the microorganism *Borrelia burgdorferi*. The disease was first recognized as a clinical disease in 1977 after a group of children in Lyme, Connecticut came down with similar symptoms and were found to be infected. Since that time, it has become recognized as the most common vector-borne disease (that is, a disease that is transmitted through other animal intermediates) in the U.S. The disease has several stages, starting in most people with a characteristic “bulls-eye” rash and proceeding to a flu-like illness within days or weeks of exposure. If untreated, there can be severe, chronic, disabling effects including persistent arthritis and effects on the cardiovascular and nervous systems. It is important to know that Lyme disease can be successfully treated even in its later stages, so seeking medical attention can be valuable even long after an exposure.

Those at risk for Lyme disease are individuals who are at risk for exposure to ticks, including outdoor workers in areas with woods and fields. Ordinarily fire fighters will not be exposed because of their clothing and equipment, and because the environment during the time they are exposed usually is inhospitable to the ticks (wildfires). However, they should be aware of the risk on those occasions when they find themselves in terrain where ticks are known, and take precautions. The CDC’s recommendations for preventing and controlling Lyme disease include avoiding tick habitats whenever possible and use of appropriate clothing and insect repellants like DEET. Since transmission is unlikely to occur before 36 hours of tick attachment, the CDC also recommends daily checks for ticks and prompt removal using fine-tipped tweezers. If a fire fighter or emergency responder has been bitten by a tick, he or she should seek medical attention if any signs or symptoms of early Lyme disease develop over the ensuing days or weeks.

There is a vaccine available against Lyme disease that is safe for use in persons aged 15-70. The CDC recommends that decisions regarding the use of this vaccine be made on the basis of assessment of individual risk, taking into account both geographic risk and a person’s activities and behaviors relating to tick exposure.

Scabies & Lice

Scabies and Lice are classified as parasitic diseases of the skin caused by mites and lice. In Scabies, the mites penetrate the skin by digging burrows. The mite lays its eggs underneath the
skin causing intense itching. It is this intense itching that causes the greatest problems for an infected individual. The itching can lead to dermal lesions which in turn can become infected.

Scabies is quite common, especially in crowded areas of poor sanitation. The mite is easily transmitted through skin-to-skin contact and it is not particular as to its host. Individuals living in close quarters in the fire station may be at risk of infecting each other. The scabies can be carried into the station from home (and vice versa), or potentially contracted through daily contact with the public.

Personal hygiene and sanitation in the fire station are very important. Bed linens and clothing should be regularly laundered after each use. An infested individual should be excluded from work for 24 hours after treatment. Individuals who have had skin-to-skin contact with the infested individual should be treated prophylactically to prevent additional scabies infections. Other individuals within the fire station should be evaluated for unrecognized cases. Topical treatment, frequent bathing, and changes of clothing and bed linen are required to eradicate the parasite.

Lice infestations (called “pediculosis” in medicalese) are caused by small parasites that live entirely on humans. The female lice hold on to skin or hairs and lay their eggs (nits). Both the adults and the immature larvae feed on human blood, and the small bites from the lice are intensely irritating. The bites cause the individual infested to repeatedly scratch which can lead to secondary infections. It is important to treat all potentially infected sources to eliminate re-infection. As a hygiene problem, the fire department should take the same precautions with lice as they do with scabies to prevent the spread of the lice among its members.

Rabies

Rabies is rare in the United States and Canada. It is known to be primarily a disease of animals. If a fire fighter is bitten or scratched by a wild animal or stray domestic animal he or she should seek medical evaluation immediately. The wound also should be attended to immediately with a thorough cleaning and flushing. The animal should be isolated by the proper agency for evaluation of the presence of the rabies virus.

Employers and employees both clearly have a right to be concerned about on-the-job impairment due to an infectious disease. Though the potential of transmitting an infection to co-workers or patients during emergency care is remote, this also may be an area of concern. Employers may be liable in tort law if they are aware that an employee’s job performance is hampered by an infectious disease. The legal issue may be compounded if no steps are taken to address the problem and that employee transmits such a disease, or because of reduction of physical or mental capacities, injures a co-worker in an on-the-job accident. Conversely, employers’ testing programs for infectious disease programs should not violate individual rights.

Careful attention must be paid to the means by which employers seek to create an infection free workplace. Principles of public safety and efficient performance must be balanced against individuals’ reasonable expectations of privacy. In particular, the confidentiality of any employee medical records produced from department-required testing should be treated the same as with any other medical record. Legal rights of individual employees should not be sacrificed as employers haphazardly rush to implement a testing program.

Pre-employment medical screening is done during training or as part of the application process. Under most circumstances, infectious disease testing of applicants should be part of the hiring process only to assure that the individual is functionally capable of performing the
duties of a fire fighter, EMT and/or paramedic. The employer, however, must administer the
tests for job related reasons and must administer them in a nondiscriminatory manner. An
employer’s desire to avoid hiring fire fighters whose physical or mental capacities are
diminished or who may infect other personnel may meet that standard. For example, an
applicant with chronic active hepatitis may not be a proper candidate for fire fighting activities
due to contagiousness of the disease or functional incapacitation of the individual. The
Americans with Disabilities Act (ADA) however, prohibits employers from discriminating
against hiring individuals that are either HIV-positive or have AIDS, unless the individual is
physically or mentally unable to pass validated entry standards.

Periodic physical examination of which laboratory testing of blood and body fluids, and
infectious disease testing (e.g. TB testing) are a routine component, should be permissible as
long as the testing is related to the nature of the job. However, if the physical examinations
are instituted as a subterfuge to require infectious disease testing, are administered only
infrequently or are not administered to all employees, the tests should be struck down as
violating the Fourth Amendment.

Most of the concern for testing for infectious disease on a periodic basis surrounds HIV
infection. To begin, there is a remote risk of HIV infection from occupational exposure. This
risk is diminished substantially for transmission by a fire fighter, EMT or paramedic to a patient
or co-worker. These risks, to date, have not been quantified in the fire service. Therefore, for
HIV testing fire department policies should be designed with the following objectives:

- Encouragement of fire fighters, EMTs, and paramedics to learn
  their HIV status, through their personal health care provider, to
  protect and improve their own health;

- Encouragement of HIV-infected fire fighters, EMTs, and para-
  medics to inform fire departments when there is risk of compro-
  mised job performance;

- Assurance that limitation of work responsibilities remain indi-
  vidualized based on functional ability and infection control
  status.

At the present time, such periodic or annual testing for all fire fighters needs serious
consideration and medical community input prior to implementation. The costs for such
testing are substantial and the overall accuracy of the testing, especially the specificity of such
testing, certainly play a significant role in this decision making process. Therefore, such testing
would presently be of minimal value in seeking to minimize the number of infected individuals
on the fire department. It would likely result in some false positive tests which could have
devastating consequences.

However, post-exposure evaluations must be made available to all fire department
personnel after an exposure occurs in accordance with OSHA guidelines. There is no
significant argument against these post-exposure tests and the IAFF certainly encourages such
testing. If an individual’s on-the-job exposure to blood or body fluids causes an infection to
manifest, the fire department has the responsibility to provide early diagnosis and treatment
to that individual.

An important consideration to proper medical testing is confidentiality, something that is
mandated by OSHA regulations. It is difficult to overemphasize the crucial importance of
maintaining confidentiality. If fire fighters don’t believe the records are confidential, then the
records will be inaccurate and/or incomplete, and much less useful. The confidentiality issue also gives rise to the following:

- Who will own the records?
- Who is authorized to see them?
- Where and how will they be stored?
- If computerized, are they really secure?

Confidentiality also has legal implications, since failure to maintain confidentiality can result in a lawsuit. Apart from the physical security of records, it is important to consider just how much information is needed for personnel functions. Fire department management needs to know only whether or not a fire fighter can do his/her job, or if not what specific restrictions apply. Specific medical diagnosis must not be revealed to management. If medical surveillance is to be meaningful, records must be as complete as possible. Only with confidentiality of records is this possible.

**Exposure Reporting**

An occupational exposure is an exposure during the performance of job duties that may place a worker at risk of infection. Exposure is defined as a percutaneous injury (e.g., needle stick or cut with a sharp object), contact of mucous membranes, or contact of skin (especially when the exposed skin is chapped, abraded, or afflicted with dermatitis or the contact is prolonged or involving an extensive area) with blood or other body fluids to which universal precautions apply.

**Reporting Procedures, Record Keeping, and Confidentiality**

Your fire department must have standard procedures for the reporting and managing of exposures. Post-exposure management should include counseling of fire fighters and their families.

Exposures should be documented and recorded in the fire fighters’ confidential medical record. **Once again, the importance of maintaining confidentiality cannot be overemphasized.** Relevant information for the fire fighters’ medical record include the following:

- Date and time of exposure;
- Job duty being performed by the fire fighter at time of exposure;
- Details of exposure, including amount of fluid or material, type of fluid or material, and severity of exposure (e.g., for a percutaneous exposure, depth of injury and whether the fluid was injected; for a skin or mucous membrane exposure, the extent and duration of contact and the condition of the skin such as chapped, abraded, or intact);
- Description of source of exposure, including, if known, whether the source material contained HBV, HCV, HIV, or other infectious diseases; and
- Details about counseling, post-exposure management, and follow-up.
Post-Exposure Management Procedures

The Centers for Disease Control (CDC) has published post-exposure management procedures for exposures to HBV, HCV, HIV, and other infectious diseases. These procedures are widely accepted, and are updated regularly to reflect advances in medical knowledge. Their use is highly recommended. For exposures to other diseases (e.g., tuberculosis), the CDC publication, *Guidelines for Infection Control in Hospital Personnel*, written by Walter W. Williams, MD, MPH is a useful reference.

The local health department or an Infection Control Committee at a local hospital can also provide valuable assistance regarding post-exposure management procedures.

Designated Local Hospital Liaison

Your fire department must have a designated infection control officer. This officer should maintain communications between the fire department and the health care facility and other health care professionals.
OSHA STANDARD ON BLOODBORNE PATHOGENS

On December 2, 1991 the Occupational Safety and Health Administration promulgated a new standard for bloodborne pathogens that greatly changed how fire fighters, emergency response personnel and all other workers potentially exposed to bloodborne diseases should be trained and equipped to protect themselves from infections. The standard, which is known as the Bloodborne Pathogens standard (29 CFR 1910.1030) was published in the Federal Register on December 6, 1991 (56 FR 64004) and was revised on November 5, 1999 (CPL 2-2.44D). This memorandum will summarize the key points of the standard as well as what it means for fire fighters, emergency responders, and others.

The rationale for the standard is described in the extensive introductory text. While HBV, HCV, and HIV are specifically identified in the standard, the term “bloodborne pathogen” refers to any microorganism that is present in human blood or other potentially infectious material that can infect and cause disease in exposed persons. These microorganisms include but are not limited to HBV, HCV, HIV, human T-lymphotrophic virus Type 1, and pathogens causing malaria, syphilis, babesiosis, brucellosis, leptospirosis, arboviral infections, relapsing fever, Creutzfeldt-Jakob disease, and viral hemorrhagic fever. In essence, OSHA recognizes that bloodborne pathogens, including (but not limited to) hepatitis B Virus (HBV), hepatitis C Virus (HCV), and Human Immunodeficiency Virus (HIV), among others, account for significant morbidity and mortality in the workplace. In the preamble to the final standard, OSHA estimates that, “for every 1000 workers with occupational exposure to blood or other potentially infectious material, between 83 and 113 will become infected with HBV over the course of their working lifetime because of occupational exposure to the virus. Of these, 21 to 30 will suffer clinical illness and 4 to 6 will need hospitalization. Between 4 and 12 of the cases with clinical illness will become chronic carriers, and 1 to 3 of them will suffer from chronic hepatitis. HBV infection from occupational exposure will lead to the death of 2 to 3 of these 1000 exposed workers.”

The standard relies on several mechanisms to protect workers. It calls for identifying workers at risk through exposure control plans; it sets requirements for limiting exposure to those workers through a combination of engineering controls, personal protective equipment, and worker training, and it calls for hepatitis vaccination to be offered to all at-risk employees at no cost to the employees. OSHA estimates that universal vaccination of at-risk employees would prevent from 244,00 to 274,000 cases of HBV infection over 45 years, resulting in the saving of some 5,400 to 6,100 lives over that time. Finally, there is a provision for post-exposure evaluation and follow-up, so that workers who are exposed on the job can receive proper assessment of their risk and appropriate treatment and documentation.

Highlights of the Standard

The following is a summary of the most important parts of the standard applicable to fire fighters. This is not a word-for-word transcription of the standard, and does not contain all of the provisions of the standard. It also does not contain the preamble to the standard, which contains some of OSHA’s explanations for various provisions. Where appropriate, some of these comments have been added. However, this summary should not substitute for the regulatory text itself.
- Employers must develop comprehensive exposure control plans and review them at least annually. This plan describes how the employer will meet the overall goals of the standard (minimizing employee exposures) and the specific elements of the program.

- Employers must develop exposure determinations, which list job classifications, activities, and potential for exposures to infectious materials.

- Universal precautions shall be followed whenever the potential for exposure exists.

- Engineering and work practice controls shall be used by employers to eliminate or minimize employee exposures. OSHA’s 1999 revision of the standard requires employers to use engineering controls such as safer medical devices. Safer medical devices include equipment like needleless systems, sharps with engineered sharps injury protection, and plastic capillary tubes. Where occupational exposures remain after these controls are instituted, personal protective equipment (PPE) is also to be used. There must be a regular maintenance and replacement schedule for engineering controls.

- Hand washing facilities will be accessible to all employees, or, where this is not feasible, antiseptic hand cleaner with cloth or paper towels. Hands must be washed after removal of PPE; hands, mucous membranes, or other exposed skin must be washed after exposure to blood or other infectious materials.

- Sharps may not be bent, recapped, or removed unless there is no feasible alternative. If they must be recapped or removed, it must be through a one-handed technique.

- Workplace practices are specified, including immediate safe disposal of sharps, prohibition against eating, drinking, or other practices in areas where there is a “reasonable likelihood” of occupational exposure, and a requirement that blood and other potentially infectious materials be handled in a way so as to minimize potential exposures. [Note: In the summary and explanation, OSHA states, “[The] Agency recognizes that circumstances could arise which would require employees to remain in ambulances for extended periods of time. It is not the Agency’s intent to prohibit these employees from eating or drinking during such extended periods. Therefore, eating and drinking in ambulance cabs is permitted under the final standard provided the employer has implemented procedures to wash up and change contaminated clothing prior to entering the cab. In addition, employers must prohibit the consumption, handling, storage, and transport of food and drink in the rear of the vehicle.”]

- Potentially contaminated equipment must be inspected and decontaminated, if necessary, before servicing or shipping.

- Personal protective equipment (PPE) shall be provided at no cost to all employees and accessible in situations where there is occupational exposure. The PPE will be considered “appropriate” if it prevents penetration of the potentially infectious material to the employee’s skin, street clothing, or mucous membranes. [Note: In the summary and
explanation, OSHA states, “Based upon the information provided in the comments, OSHA has concluded that minimization of mouth-to-mouth resuscitation is prudent practice and that the most effective means to do so is to require ventilation devices be provided for resuscitation. Consequently, these devices have been retained under the requirements for provision of personal protective equipment. In addition...these devices are to be readily accessible to employees who can reasonably be expected to resuscitate a patient.”

• The employer is responsible for seeing that the employees use the appropriate PPE. The employer may show that the employee “temporarily and briefly” declined to use PPE if the employee judged that use of the PPE would have prevented the delivery of health care or increased the hazard to the employee or a co-worker; however, the circumstances of the occurrence are supposed to be investigated so as to prevent similar events in the future. [Note: In the summary and explanation, OSHA discusses at length the rationale for providing an exemption to the use of PPE. “...The types of circumstances which OSHA envisions may necessitate invocation of the exemption are those which require an on-the-spot decision and would not be conducive to awaiting approval or disapproval of the employer...OSHA does not intend to compel an employee to bypass the use of appropriate personal protective equipment against the employee’s will...Utilization of the exemption is to occur, as stated in the standard, only in rare and extraordinary circumstances which are unexpected and threaten the life or safety of the patient, worker, or co-worker...It should also be understood that the decision not to use personal protective equipment is to be made on a case-by-case basis and in no way is to be generally applied to a particular work area or recurring task...”]

• PPE must be accessible at the worksite or issued to employees. For people with sensitivity to the gloves ordinarily provided, alternatives (hypoallergenic gloves or glove liners, for example) must be provided. [Note: In the summary and explanation to the standard, OSHA commented on the need for accessibility in cases where it was not possible to return to a “home base” between emergency calls. “OSHA agrees...that...”accessible” would be on-scene, either on an individual’s person or on the vehicle, depending upon the nature of the equipment...[The] second set of clothing could be kept on the ambulance or employees could be provided with several sets of replaceable coveralls to be kept on the vehicle. The employer’s responsibility to ensure accessible personal protective equipment for employees at non-fixed worksites cannot be overemphasized. (emphasis added). ]

• PPE shall be cleaned, laundered, and disposed of as appropriate by the employer at no cost to employees. It shall also be repaired or replaced at no cost. If penetrated with blood or other potentially infectious materials, the garment shall be removed immediately. PPE must be removed prior to leaving the work area, and placed in a designated area or container for storage, washing, decontamination, or disposal.

• Gloves shall be worn in all situations where it may be “reasonably anticipated” there may be contact with blood or “other potentially infectious materials, mucous membranes, and non-intact skin; when performing vascular access procedures (except in volunteer blood banks
under specified conditions); and when handling or touching contaminated items or surfaces.” Disposable gloves must be disposed of after use or if they are contaminated, torn, or punctured; they may not be washed or decontaminated.

- **Masks, eye protection, and face shields** shall be used whenever potentially infectious material may be “reasonably anticipated” from splashes, spray, spatter, etc.

- **Gowns, aprons, and other protective body clothing** may be used depending on the type of situation.

- **Housekeeping** requirements include an appropriate written schedule for cleaning and decontamination of the worksite (based on the activity or potential contamination of the area), cleaning and decontamination of equipment, environmental and working surfaces after contact with blood or other potentially infectious materials; prompt removal of protective coverings (plastic, aluminum foil, or imperviously-backed absorbent paper) immediately if they become contaminated or on a regular schedule; inspection and decontamination of bins, pails, cans, and similar waste receptacles; removal of broken glassware with mechanical means (brush and dustpan, tongs, or forceps); and storage of reusable sharps in such a fashion that employees do not have to reach into a container with their hands.

- **Sharps must be disposed of** in appropriate containers. **Containers for sharps** shall be closable, puncture resistant, leakproof on the sides and bottom, labeled and color-coded, easily accessible, maintained upright, and replaced routinely. When removed from the area of use, the containers must be closed prior to removal, placed in a secondary container if leakage is possible, and may not be reopened in any way that would expose an employee to the risk of an injury.

- **Other regulated waste** (materials that have come in contact with or could release infectious material) must be placed in containers that are closable, do not leak, are color-coded, and are closed prior to removal. If the outside of the container is itself contaminated, it must be placed in a secondary container that is similarly constructed.

- **Contaminated laundry** must be bagged or containerized at the location where it was used without any sorting or rinsing, and shall be transported in labeled or color-coded containers or bags to the laundry facility. Employees who handle the laundry must wear gloves and other appropriate PPE.

- **Hepatitis B vaccine** shall be made available to **all employees who have occupational exposures, at no cost to the employees**. The vaccine shall be made available “after the employee has received the training required” (see below) and “within 10 working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.” Vaccinations are to be given by or under the supervision of a licensed physician or other health care professional according to the recommendations of the CDC/U.S. Public Health Service. Participation in a **prescreening program** (a
program to screen people for previous exposure to hepatitis B) can not be made a prerequisite for receiving hepatitis B vaccination. If an employee initially declines vaccination but decides later to get vaccinated, the employer shall make the vaccine available at no cost. If an employee declines to receive the vaccination, he/she must sign a waiver described in the standard. If at some point the CDC/U.S. Public Health Service recommends that people who have had the vaccination series should receive routine booster doses, they shall be made available to all employees at no cost.

• Post-exposure evaluations and follow-up, including prophylaxis in the case of exposure, are also to be made immediately available to all employees at no cost and at a reasonable place. After the exposure incident is reported, the employer shall make available to the employee a confidential medical evaluation and follow-up, which includes at least:

  • Documentation of the route of exposure and circumstances under which it occurred;

  • Identification and documentation of the “source individual” (the individual whose blood or body fluids were the source of the exposure) unless that identification is not feasible or is prohibited by state or local law; once the source individual is identified, his blood shall be tested for HIV, HBV, and HCV infectivity (if patient consent for testing is legally required it must be obtained before his blood can be tested; if consent is required but not obtained that must be established by the employer; if consent is not required then the source individual’s blood will be tested and the results documented). Testing is not required if the source individual is already known to be infected with HIV, HBV, or HCV. Once the source individual’s status for HIV, HBV, and HCV infectivity is known, that information is made available to the exposed employee, as well as any “laws or regulations concerning disclosure of the identity and infectious status of the source individual;”

  • Testing of the employee for HBV, HVC, and HIV serologic status as soon as feasible after consent is obtained. The employee may consent to give blood but not have HIV serologic testing; if so, the blood must be stored for at least 90 days, so that the employee can later elect to have the sample analyzed;

  • Post-exposure prophylaxis, when medically indicated, as recommended by the CDC/U.S. Public Health Service;

  • Counseling; and

  • Evaluation of reported illnesses.

• The standard defines information provided to the healthcare professional, including a copy of the regulation for the healthcare professional providing the hepatitis B vaccination, and, for the healthcare professional providing care after an exposure incident, a copy of the regulation, a description of the employee’s duties, documentation of the route(s) and circumstances of the exposure, results of any blood testing on the source
A training program must be provided at no cost during working hours to all employees with occupational exposures. Training must be provided at the time an employee is initially assigned to a job where occupational exposure may take place, within 90 days after the effective date of the standard (March 3, 1992) and at least annually thereafter. Employees who have already had some training in bloodborne pathogens in the year prior to the standard only need training on subjects which their previous training did not cover. There must also be training updates when the tasks or procedures done by the employee change or create a new exposure. The training must include at a minimum, a copy and explanation of the standard, general explanations of the epidemiology and symptoms of bloodborne diseases, how bloodborne diseases are transmitted, the employer’s exposure control plan and how the employees can obtain a copy, how to recognize tasks that may involve exposures to bloodborne pathogens, the methods (and limitations of those methods) that will prevent exposures to bloodborne pathogens, including appropriate engineering controls, PPE, and work practices.

Within 15 days of the completion of the healthcare professional’s evaluation, the employer must obtain and provide to the employee a copy of the **healthcare professional’s written opinion**, which shall include only:

- For hepatitis B vaccination, only whether vaccination is indicated and whether the employee has received it;

- For a post-exposure evaluation, only that the employee has been informed of the results of the evaluation, and that the employee has been told about “any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.”

**Warning labels** must be affixed to “containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials”; there are exceptions for red bags or red containers, blood or blood components that have been released for transfusions or other clinical uses, individual containers of blood or other potentially infection materials that are placed within a properly labeled container, or regulated waste that has been decontaminated. The label must include the biohazard legend:

![BIOHAZARD](image)

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the “types, proper use, location, removal, handling, decontamination and disposal” of PPE, the selection of appropriate PPE, information on hepatitis B vaccination, including the benefits and the fact that it is no cost to the employee, actions and procedures to be followed in the even of exposure and a description of the post-exposure evaluation, and labeling and signing requirements.

• The employer is required to **maintain records** according to the following schedule: **medical records** (including the employee’s name, social security number, hepatitis B vaccination status, all examinations and evaluations required under the standard, healthcare professionals’ written opinions, and information provided to the healthcare professionals) for the duration of employment plus at least 30 years; and **training records** for 3 years from the date on which the training occurred. Medical records are confidential and may not be disclosed or reported without the employee’s written consent. Medical records are to be available to employees and to anyone having written consent of the employees upon request. Training records are available to the employee or employee representative upon request.

**Effective Dates of the Standard**

The standard became effective 90 days since its publication in the Federal Register (March 6, 1992). The employer’s Exposure Control Plans should have been completed within 60 days of the effective date (May 5, 1992). The Information and Training and Record keeping requirements were to take effect within 90 days of the effective date (June 4, 1992). The provisions on Engineering and Work Practice controls, PPE, Housekeeping, HIV and HBV research laboratories, hepatitis B vaccination and Post-Exposure evaluation and follow-up, and labels and signs, were to take effect 120 days after the effective date (July 6, 1992). The revised provisions concerning annual reviews of exposure control plans, use of effective engineering controls, recommendations for HCV prevention and control, and updated guidelines for post-exposure evaluations and vaccination recommendations.

**Applicability of the Standard**

Who is affected by this standard? The standard applies to “[All] occupational exposure to blood or other potentially infectious materials...” Specifically, “occupational exposure” means, “reasonably anticipated skin, eye, mucous membrane, or parenteral (intravascular) contact with blood or other potentially infectious materials that may result from the performance of an employee’s duties.” This means that any fire fighter who may have contact with blood or other materials, either as a first responder or in any other way that is work-related, is subject to the provisions of the standard. In its Regulatory Impact and Regulatory Flexibility Analysis, “...OSHA based its estimate of the population at risk on survey responses which indicated essentially all EMT’s to be exposed (98 percent)...and 80 percent of all fire fighters to be exposed.” If there is any doubt, the assumption should be that anyone who could possibly be exposed to bloodborne pathogens should be assumed to be at risk, should be immunized, and should adhere to the other provisions of the standard.

Under the Occupational Safety and Health Act of 1970, federal OSHA has no direct enforcement authority to ensure that state and local governments comply with health and safety standards, such as the OSHA Fire Brigade Standard, for public employees. However, the OSHA law does permit other methods to be utilized in order to maximize the protection of public employees’ health and safety.
In addition, federal OSHA has issued a set of rules and regulations which would allow for the development of a state plan applicable and enforceable for public employees in states where an approved state plan does not yet exist. These rules and regulations, 29 CFR 1956, entitled “State Plans for the Development and Enforcement of State Standards Applicable to State and Local Government Employees in States Without Approved Private Employee Plans” sets forth the requirement that states without approved plans must develop a safety and health plan for public employees similar to those required for states with approved plans if they wish to receive federal financial support for public employee safety and health programs.

OSHA announced on December 2, 1991 that it would be sending letters to the governors of states which do not yet have approved state plans, “to encourage them to extend the protections of the standard to public sector employees.”

Finally, Executive Order 12196 issued February 26, 1980 and implemented December 21, 1980 requires that all federal agencies comply with the same safety and health requirements as private employees. Thus, federal fire fighters are protected under federal OSHA safety and health standards.

The coverage of public employees under minimum acceptable standards as promulgated by federal OSHA becomes important when we consider this infection control regulation. This standard is enforceable for all public fire fighters in states with approved federal OSHA plans. However, all U.S. and Canadian fire fighters should consider this to be the minimum acceptable standard for protection from bloodborne pathogens.

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*For state and local government employees only.

In lieu of federal OSHA enforcement of health and safety standards, a state may opt to implement their own enforcement program providing federal OSHA has approved their state safety and health plan. Section 18 of the Occupational Safety and Health Act requires that a state must provide satisfactory assurance that it will establish and maintain an effective and comprehensive occupational safety and health program for all public employees as effective as that contained in the approved state plan covering private employees. OSHA has given the State Plan states 6 months from the publication date of the final standard to adopt a comparable standard that is “at least as effective” as the OSHA standard. All fire departments, whether state, county, or municipal, in any of the states or territories where an OSHA State Plan agreement is in effect has the protection of the minimally acceptable health and safety standards promulgated by federal OSHA. Individual states may provide more stringent standards, if they wish to do so.

The following twenty-six states/territories have State OSHA Plans:

- Alaska
- Arizona
- California*
- Connecticut*
- Hawaii
- Indiana
- Iowa
- Kentucky
- Maryland
- Michigan
- Minnesota
- Nevada
- New Jersey
- New Mexico
- New York*
- North Carolina
- Oregon
- Puerto Rico
- South Carolina
- Tennessee
- Utah
- Vermont
- Virginia
- Virgin Islands
- Washington
- Wyoming
- Alaska
- Arizona
- California*
- Connecticut*
- Hawaii
- Indiana
- Iowa
- Kentucky
- Maryland
- Michigan
- Minnesota
- Nevada
- New Jersey
- New Mexico
- New York*
- North Carolina
- Oregon
- Puerto Rico
- South Carolina
- Tennessee
- Utah
- Vermont
- Virginia
- Virgin Islands
- Washington
- Wyoming

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NFPA 1500 Requirements

The NFPA 1500, *Standard on Fire Department Occupational Safety and Health Program*, was developed to provide a consensus standard for an occupational safety and health program for the fire service. The intent of this standard is to provide the framework for a safety and health program for a fire department or any type of organization providing similar services.

Section 8-5.1 of the NFPA 1500 Standard provides the following requirement when dealing with infection control:

*The fire department shall actively attempt to identify and limit or prevent the exposure of members to infectious and contagious diseases in the performance of their assigned duties.*

Section 8-5.2 continues with:

*The fire department shall operate an infection control program that meets the requirements of NFPA 1581, Standard on Fire Department Infection Control Program. When appropriate, inoculations, vaccinations, and other treatment shall be made available.*

The NFPA 1500 Standard also provides the following appendix item in regard to contagious diseases:

*When fire department members routinely respond to emergency medical incidents, the fire department should consult with medical professionals and agencies on measures to limit the exposure of members to infectious and contagious diseases. This should include the provision and maintenance of equipment to avoid or limit direct physical contact with patients, when feasible.*

NFPA 1500 also addresses protective clothing for emergency medical operations. Section 5-5.1 states:

*Members who perform emergency medical care or otherwise may be exposed to blood or other body fluids shall be provided with emergency medical garments, emergency medical face protection devices, and emergency medical gloves that meet the applicable requirements of NFPA 1999, Standard on Protective Clothing for Emergency Medical Operations.*

NFPA 1581 Requirements

The NFPA 1581, *Standard on Fire Department Infection Control Program* (2000), addresses the provision of minimum requirements for infection control practices within a fire department. The purpose of the standard is “to provide minimum criteria for infection control in the fire station, in the fire apparatus and during procedures at an incident scene, and at any other area where fire department members are involved in routine or emergency operations.” (1-2.1)

Program Components

The fire department infection control program must have a written policy statement. Such a policy statement should clearly define the department’s mission in limiting the exposure of members to infectious diseases during the performance of their assigned duties and while in the fire station living environment. Examples of generic policy statements are found in the appendix of NFPA 1581.

Training and education of fire service and emergency personnel is an important component of any fire department infection control program. “*The training program shall include proper*
The use of personal protective equipment, standard operating procedures for safe work practices in infection control, proper methods of disposal of contaminated articles and medical waste, cleaning and decontamination, exposure management, and medical follow-up.” (2-3.2) In addition, the “education program shall provide information on epidemiology, modes of transmission, and prevention of diseases.” (2-3.3) Fire fighters and emergency responders should be educated on the diseases that have the potential for occupational exposure. These diseases are discussed in the beginning of this manual.

The infection control program should have an experienced individual within the department designated as the infection control officer. The officer has the responsibility to maintain communication between the fire department and all community health care professionals. The infection control officer also has the responsibility to examine compliance procedures and engineering controls, investigate exposure incidents, notify members of exposure, properly document the exposure, and ensure medical follow-up is received by the individual following an exposure.

Exposure to a infectious or contagious disease requires prompt action, particularly if the individual does not have adequate immunity to the disease. The standard requires that the fire department have established procedures for reporting an exposure incident and provides instructions for the treatment of an exposure. The exposed area should be washed immediately, reported to the infection control officer within 2 hours of the exposure incident, and treated by the fire department physician as soon as practical, but at least within 24 hours. All exposures of an individual to an infectious or contagious disease, while on or off the job, should become a part of that person’s confidential health file. In addition, the information from the duty-related exposure should be made anonymous and added to the department’s health data base.

The standard outlines the recommended facilities for infection control within the department. These recommendations also comply with CDC and OSHA regulations. The fire department should be equipped with facilities for disinfection, cleaning, and storage. The appendix of NFPA 1581 provides recommendations for fire department apparatus and for the building of new fire stations. Consideration of infection control measures should be applied to bathrooms, kitchens, sleeping areas, laundry facilities, equipment storage areas, cleaning areas, disinfection facilities, and disposal areas.

The standard details the protection of the fire fighter and other emergency responders while performing emergency medical operations. Personnel physical condition, protective clothing and equipment, and operational techniques are provided minimum standards for infection control.

The infection control program outlined within the standard also addresses skin washing practices, disinfectant handling and use, cleaning of contaminated emergency medical equipment, disposal of infectious materials, and the laundering of linens. As an important factor in infection control, the standard addresses hand washing with, “Hands shall be washed as follows: (1) After each emergency medical incident; (2) Immediately or as soon as possible after removal of gloves or other personal protective equipment; (3) After cleaning and disinfecting emergency medical equipment; (4) After cleaning personal protective equipment; (5) After any cleaning function; (6) After using the bathroom; (7) Before and after handling food or cooking and food utensils.” (6-1.1) As another important factor in infection control, cleaning and disinfection of equipment and clothing should be performed in the proper area and on a regular basis and/or immediately following an exposure incident. Under no circumstances should contaminated equipment or clothing be taken home for cleaning.

The appendix material includes methods for disinfection and sterilization of equipment used in emergency medical operations. Cleaning procedures for structural fire fighting protective clothing details proper washing instructions, spot cleaning and pretreating of a soiled area, and the selection of proper cleaning products.
The fire department must provide the following protective clothing and equipment for each of its members during medical emergencies:

- single use medical gloves;
- fluid resistant clothing;
- pocket masks and/or NIOSH-approved respirators;
- splash resistant eyewear and face protection devices;
- respiratory assist devices;
- approved sharps containers; and
- leakproof bags.

Standards for Purchasing Protective Clothing and Equipment

NFPA 1500 also addresses protective clothing for emergency medical operations. Section 5-5.1 states:

Members who perform emergency medical care or are otherwise likely to be exposed to blood or other body fluids shall be provided with emergency medical garments, emergency medical face protection devices, and emergency medical gloves that meet the applicable requirements of NFPA 1999, Standard on Protective Clothing for Emergency Medical Operations.

NFPA 1999 specifies “minimum documentation, design criteria, performance criteria and test methods for new single-use and multiple-use emergency medical protective clothing, including garments, gloves, and face protection devices.” (1-1.1) This standard was developed to provide biological protective clothing, gloves and facewear for fire fighters, EMT and paramedics to utilize during emergency medical operations. The standard is the only standard, both from within and outside the fire service, that includes performance tests to ensure that each type of clothing resists penetration to bloodborne pathogens. Garments also are required to meet stringent requirements for liquid tight integrity in those areas of the garment that are designed to provide protection, material strength and physical hazard resistance, seam strength, and closure strength. Gloves are tested for tensile strength and elongation both before and after heat aging and isopropyl alcohol immersion. Additionally, gloves must meet requirements for dexterity, puncture resistance, liquid tight integrity and minimum sizing. Like the garments, facewear must meet requirements for liquid tight integrity in those areas of the facewear that are designed to provide biological protection.

Manufacturers of clothing that meet this standard must provide sufficient documentation to the purchaser or end user of the protective equipment which details the equipment’s technical data and user information.

User instructions and information for all emergency medical garments, gloves, and face protection devices must include the following:

- Donning procedures;
- Doffing procedures;
- Safety considerations;
• Recommended storage practices;
• Decontamination recommendations and considerations;
• Retirement considerations; and
• Disposal considerations. (3-1.2.1, 3-2.2.1)

• Cleaning instructions;
• Marking and storage instructions;
• Frequency and details of inspections;
• Maintenance criteria;
• How to use test equipment, where applicable;
• Method of repair, if recommended by manufacturer; and
• Warranty information. (3-3.2.1)

• Limitations of use

• Sizing and adjustment procedures

ASTM also has a standard for medical gloves, ASTM Standard Specification for Rubber Examination Gloves, Designation D 3578-77. This standard includes requirements for sampling to insure quality control, watertightness testing for detecting holes in the gloves, physical dimension testing to insure proper fit of gloves, and physical testing (tensile strength and ultimate elongation) to insure that the gloves do not tear easily. Practical advice about gloves may also be available from local hospital and emergency room staff. This standard was incorporated into the requirements of the NFPA 1999 Standard.

Selection Criteria

Each fire department should provide guidelines for the selection and use of appropriate protective clothing and equipment during emergency medical work. NFPA 1500 requires that protective clothing, including garments, face protection, and medical gloves meeting NFPA 1999, Standard on Protective Clothing for Emergency Medical Operations, be provided to and used by personnel that may be exposed to blood or other body fluids. Fire fighters should use gloves meeting the performance requirements of NFPA 1971, Standard on Protective Ensemble for Structural Fire Fighting, including the requirements for water penetration, during situations where sharp or rough surfaces are likely to be encountered (e.g. vehicle extrications).

The CDC and OSHA discuss the selection and use of appropriate clothing and equipment during medical emergencies. Both agencies recommend that disposable gloves be worn by all personnel prior to initiating any emergency patient care tasks involving exposure to blood or body fluids. Extra pairs of gloves should always be available. For multiple victims, gloves should be changed between patient contacts.

While wearing gloves, members should avoid handling personal items, such as combs and pens, that could become contaminated. Gloves contaminated with blood or other body fluids
The use of gloves does not eliminate the need to wash hands after emergency medical incidents. **Handwashing is one of the most important elements of infection control!!**

Masks, eyewear, and gowns should be present on all emergency vehicles that respond or potentially respond to medical emergencies or victim rescues. Masks, eyewear, and gowns should be donned by all personnel prior to any situation where splashes of blood or other body fluids to which *universal precautions* apply are likely to occur. Finally, contaminated gloves should be placed and transported in bags that prevent leakage and disposed of properly; or, in the case of reusable gloves, cleaned, disinfected, and stored properly.

No transmission of hepatitis B or HIV infection during mouth-to-mouth resuscitation has been documented. However, because of the risk of salivary transmission of other communicable diseases (e.g. Herpes simplex and Neisseria meningitidis) and the theoretical risk of HIV and hepatitis B transmission during artificial ventilation of victims, CDC recommends the use of *mechanical respiratory assist devices*, such as bag-valve masks and oxygen demand valve resuscitators, or pocket mouth-to-mouth resuscitation masks (i.e., *double lumen systems*) designed to isolate emergency response personnel from victims’ blood and blood-contaminated saliva, respiratory secretions, and vomitus.

One final note, the OSHA Bloodborne Pathogens Standard has a table with examples of medical tasks and activities and the recommended personal protective equipment that would be appropriate for these tasks.

Each fire department must have procedures for the decontamination of specific items of clothing and equipment. OSHA has published recommendations for these procedures in their Bloodborne Pathogens Standard. Cleaning, disinfecting, and disposal criteria are included in this OSHA standard as well as in NFPA 1581, *Standard on Fire Department Infection Control Program*, which is required to be utilized by NFPA 1500.

**Clothing**

The CDC recommends and U.S. OSHA requires that laundry facilities and/or services be routinely made available by the employer. Protective clothing and station work uniforms should be washed and dried according to manufacturers recommendations. Also, boots and leather goods can be scrubbed with soap and hot water to remove contamination. The OSHA standard, 1910.1030 also has specific laundering requirements.

**Equipment**

The OSHA Bloodborne Pathogen Standard describe methods for cleaning, disinfecting, and sterilizing equipment and surfaces in the pre-hospital setting. **Before disinfecting always clean thoroughly with soap and water.**

**Choosing Disinfectants**

Disinfectants used for decontaminating equipment should be *EPA registered hospital disinfectant chemical germicides that have been documented as effective against myobacterium tuberculosis.*
Care also must be taken in the use of disinfectants. Members should be aware of the flammability and reactivity of disinfectants and should follow manufacturer’s instructions for use (e.g., contact time and temperature). Disinfectants should only be used with adequate ventilation and while wearing appropriate infection control garments and equipment for cleaning and disinfecting, including eye protection, gloves, and aprons. It also is important when disinfecting equipment, to check with the manufacturer of the germicide to determine compatibility of the medical equipment and protective clothing with the disinfectant.

Information on specific label claims of commercial germicides can be obtained by contacting the Disinfectants Branch, Office of Pesticides, EPA, 401 M St. S.W., Washington, D.C. 20460.

Setting Aside an Area for Decontamination

The fire department should set aside an area in each fire station for the storage, cleaning, and disinfecting of emergency medical equipment. The room should be physically separated by four walls from other fire station areas, properly lighted, vented to the outside environment, and fitted with floor drains connected to a sanitary sewer system.

Procedures for Disposal of Medical Waste

Disposal of medical waste is a high profile topic. Every fire department should develop and implement procedures for the disposal of medical waste. Compliance with State, Provincial and Local regulations should be carefully considered when developing an infectious waste management plan. A waste management plan should include the following:

- designation of the waste that should be managed as infectious,
- segregation of infectious waste from the noninfectious waste,
- packaging,
- labeling,
- storage,
- treatment,
- disposal, and
- training.

Needles and sharps must be placed in approved puncture resistant disposable containers. These containers should be in all patient transport vehicles and readily available in areas such as drug boxes, trauma kits, and IV kits.

Any disposable medical supplies and wastes generated during emergency medical care must be placed in sealed, leakproof bags and disposed of as medical waste.

Consultation with local hospital infection control practitioners also can be helpful in establishing guidelines for handling medical waste.
The legal ramifications and impact of laws and court decisions regarding infectious disease are not at all clear as to their direct effect on fire fighters and emergency medical service personnel. However, there are applicable laws and a few cases that have been decided, and others pending, that help to identify the rights of emergency service employees and to establish some precedents.

**The Ryan White Comprehensive AIDS Resources Emergency Act**

The Ryan White Comprehensive AIDS Resources Emergency Act became public law August 18, 1990. The Act was created to help states, communities, and families cope with the growing impact of the AIDS epidemic. Since 1991, $6.4 billion in federal funds has been appropriated under the Act. This money is for grants to states and political subdivisions for the purpose of implementing the Center for Disease Control (CDC) infection control recommendations found in their publications, including *Guidelines for Prevention of Transmission of Human Immunodeficiency Virus (HIV) and hepatitis B Virus (HBV) to Health Care and Public Safety Workers, February 1989*.

Subtitle B of the act is designed to allow for requests of notification of exposure by Emergency Response Employees who believe they may have had an exposure and a procedure for that notification to manifest. The Law in a reduced form says that if emergency response personnel feel they have been exposed to an infectious disease they may put in a request to a designated officer. There will be one designated officer or official of each employer of emergency response employees in each state. The designated officer or official will be designated by the public health officer in that state.

The details of each potential exposure shall be collected and evaluated by the designated officer. If he or she feels there was a potential for exposure he or she will submit a request to the medical care facility as soon as possible but within a period not exceeding 48 hours after the receipt of the employee request. The medical care facility will then evaluate the injured victim and make a decision on the basis of the medical information possessed by the facility at that time whether or not there may have been an exposure. There are three types of notification. The types are listed below:

- There was an exposure
- There was no exposure
- There is insufficient information to determine if an exposure occurred.

This notification by the medical facility shall be made to the designated officer in writing as soon as possible, but within a period not exceeding 48 hours after the receipt of the request by the designated officer. The designated officer will then inform the employee or employees involved of the determination. This act does not authorize or require a medical facility to test any such victim for any infectious disease, nor can this act be construed to authorize any emergency response employee to fail to respond, or to deny services, to any victim of an emergency.
States That Have Worker Notification Laws

Forty-four states have laws that allow for worker notification, but do not specifically require any testing of the victim. The determination is made on the basis of the facts that the medical facility has available to them at the time.

Alabama
Arizona
Arkansas
California
Colorado
Connecticut
Delaware
Florida
Georgia
Hawaii
Idaho
Illinois
Indiana
Iowa
Kansas
Kentucky
Louisiana
Maine
Maryland
Michigan
Minnesota
Mississippi
Missouri
Montana
Nebraska
New Hampshire
New Jersey
North Carolina
North Dakota
Ohio
Oklahoma
Oregon
Pennsylvania
Rhode Island
South Carolina
Tennessee
Texas
Utah
Virginia
Washington
West Virginia
Wisconsin
Wyoming

States That Have Laws Allowing For Testing Of Victims

The following states have laws that allow for testing of victims if emergency response personnel can document that an exposure occurred.

Arkansas
Colorado
Connecticut
Delaware
Florida
Hawaii
Idaho
Iowa
Illinois
Louisiana
Maine
Maryland
Michigan
Minnesota
Mississippi
Montana
Nebraska
New Mexico
North Dakota
Ohio
Oregon
Pennsylvania
Rhode Island
South Carolina
Tennessee
Texas
Utah
Virginia
Washington
West Virginia
Wisconsin
Wyoming

1 Requires informed consent from the victim.
2 Testing may be performed on any blood or bodily fluid previously drawn.
3 A court order to require testing of the patient may be obtained.
4 Consent not required on deceased persons.

Statute Of Limitations For Filing Claim of Occupational Exposure

Most states have a statute of limitations for filing a claim of occupational exposure to infectious disease. There have been a few cases that address this issue. Although none of them address the fire or emergency services, they do offer guidelines and also some information. Some infectious diseases, particularly HIV/AIDS, may have long periods of incubation before any effects become apparent. Typically, the view is that the statute of limitations begins upon discovery of the effects of the “injury”, not the point of transmission. Using HIV as an example, the latent effects could take years to manifest. If an employee has been exposed, he may not find out until he either (1) is affected by the disease, or (2) is tested and a positive result is determined. In many states the statute of limitations to file a claim is from a year to two years. It is common place for infected persons not to be aware of their state of health until this term has lapsed. Many states have specific statutes that address the latent effects of infectious diseases.
Fourth Amendment Rights Concerning Mandatory Testing

Anonymous Fireman v. City of Willoughby

There have been a few cases addressing the constitutionality of mandatory HIV testing including one that addresses the fire and emergency services. The focus of this case centers around the collection of the blood sample and whether the requirement of mandatory blood testing is a violation of the Fourth Amendment, Illegal Search and Seizure. Fire fighters from Willoughby, Ohio were transported to a medical laboratory and ordered to undergo a HIV blood test. One fire fighter objected, although he complied with the directive, since the City did not obtain a warrant authorizing the testing and did not have any facts constituting probable cause or reasonable suspicion. He also believed that the city did not have any justification for routine testing, did not have any education and counseling program and did not have any procedures to insure confidentiality.

The Fourth Amendment does not prohibit all searches and seizures, only those that are unreasonable. The determination of the reasonableness of the search requires balancing the need to search against the invasion that the search entails. On one side of the balance is placed the individual’s legitimate expectations of privacy, on the other, the government's need for effective methods to deal with legitimate governmental interests.

The Supreme Court in a drug testing case has ruled that the “intrusion occasioned by a blood test is not significant, since such tests are a common place in these days of periodic physical examinations ... and blood tests do not constitute an unduly extensive imposition on an individual’s privacy and bodily integrity.” The decision goes on to state that “the expectations of privacy of covered employees are diminished by reason of their participation in an industry that is regulated pervasively to ensure safety, a goal dependent, in substantial part on the health and fitness of covered employees.” (Skinner v. Railway Labor Executives’ Ass’n)

The Willoughby decision found that the fire industry is one of the most highly regulated of any industry concerning the performance of their employees. Criminal standards applying the unreasonable search and seizure tests to the city of Willoughby are inappropriate, since Fire Fighters have a diminished expectation of privacy due to the their heavily regulated public employment. (Chicago Fire Fighters Union, Local 2 v. Chicago) Mandatory testing of employees can be valid only if the group of employees involved is at a high risk of contracting or transmitting AIDS/HIV to the public, as is the case with the fire and emergency service.

Additionally, the court recognized that a HIV test result would not prevent AIDS from developing, but that persons who have tested positive for the HIV virus or AIDS, can take extra precautions to avoid the spread of HIV/AIDS. Additionally, the court found that those persons who test positive for the HIV virus can perform their work at whatever level and there is no danger of transmitting the HIV virus, there should be no problem with employment. These persons should not be discriminated against or ostracized from society or in their employment. The intended goal is preventing persons from contracting and/or transmitting the HIV virus or AIDS. Reaching this goal of “non transmission” is a compelling governmental interest.

In the Willoughby decision the judge did determine that the Fire Department members could be tested because there was a significant risk of exposure and transmission to themselves and to the public due to the nature of the occupation. Of further interest in this case, the collective bargaining agreement provided for HIV testing and the city argued that whatever rights the employee had were waived by the agreement. The agreement stated that test results must remain confidential and that HIV-infected individuals with no AIDS-type symptoms remain eligible for all job benefits. Additionally, employee can not be separated by a find of a HIV infection. The court reject the argument that the union had the right to waive constitutional rights enjoyed by the employee. It concluded nonetheless that any intrusion on privacy is justified in the public interest.
Discrimination

There are federal laws that provide statutory protection against handicapped employees from being discriminated against in the work place. The first of these laws is the Rehabilitation Act of 1973 (RA73). This act protects all employees who work for employers who receive federal funding. Section 504 states that no “otherwise qualified” individual with handicaps shall solely by reason of his handicap, be excluded from the participation in, be denied the benefits of or be subjected to discrimination under any program or activity receiving federal financial assistance. As recently as 1988, the U.S. Department of Justice has held the idea that the fear of being infected by a person with an infected disease was not covered by the statute. However, today there is little doubt that this statute offers this type of protection to those infected with a contagious disease. This in part is due to a Supreme Court Decision in School Board of Nassau County v Arline 107 S. Ct. 1123 (1987). This decision made clear that a person with a contagious disease (in this case Tuberculosis) was a handicapped person within the meaning of RA73 Section 504. The court said that a person was “otherwise qualified” for employment is he or she did not pose a significant risk of communicating the disease to others in the workplace or if a reasonable accommodation could remove the risk. A reasonable accommodation could include the use of protective equipment or a job duty reassignment.

All fifty states and the District of Columbia have adopted anti discrimination legislation similar to the RA73. All but five include public and private employees. To help outline the significance of this legislation, several states and municipalities have enacted HIV/AIDS specific anti discrimination legislation.

The second of these acts is the Americans with Disabilities Act that was enacted on July 26, 1990 and went into effect for state and local governments in early 1992. This act employs the same ideas as the fore mentioned but includes all employers, not just the ones who receive federal moneys.

Persons infected with contagious disease can be free from symptoms for many years depending on the type of contagion. Asymptomatic employees infected with, HIV for example, are just as capable of working as any other employees. Because HIV is not transmitted through casual contact, the potential for exposure and/or transmission is not a sufficient justification for discrimination, unless there is a high probability of exposure/exchange of body fluids. The most difficult decisions have dealt with determining if infected individuals in the health care industry are “otherwise qualified” to continue working when they may expose patients to their blood or body fluid. To help address this, some employers have sought to test employees for HIV contamination. See previous section on Mandatory Testing.

Severino v. North Fort Myers Fire Control District

To date, there have only been two cases of discrimination relevant to the Fire and Emergency Medical Services. The first was Severino v. North Fort Myers Fire Control District. While the outcome was not in favor of the plaintiff, the case helps to illustrate some crucial points that apply to this type of discrimination.

The complaint was initiated after the plaintiff was advised of being HIV Positive. Based on the medical advice that he should not perform rescue duties required by his job as a fire fighter, Severino immediately tendered his resignation. Instead of accepting the resignation, the department assigned him to “light duty”, an alternative that provided him with insurance benefits, and continued salary. Severino stayed on in the department and worked the light duty assignment which consisted of fire hydrant maintenance, dispatch duty, errands and garbage details.

During this time period, Severino began collecting medical and legal literature about AIDS and HIV which led to his interest in a possible lawsuit. He also was concerned that the AIDS
infection could have occurred as a result of an occupational exposure. On March 23, 1988, Severino requested return to regular full-line duty. He did not present conclusive medical documentation of his ability to perform the rescue work as was requested, nor did he accept the offer to come back to work in any capacity. Severino was terminated on May 24, 1988, although health insurance coverage continued for an additional 18 months.

The view accepted by the court was that Severino instigated and took the initiative in all of the events that followed the discovery of his HIV positive status, including tendering his resignation. It was found that there was no intentional discrimination since he was fired for reasons other than his handicap. The court also found that there was no causal connection between the one departure from the regulations, in assigning Severino to “light duty” based on his handicap, and any harm to him was not in violation of Section 504, nor any other basis for relief.

Some of the key conclusions of this case with regard to The Rehabilitation Act of 1973 are as follows:

- The HIV positive fire fighter was not discriminated against on basis of handicap when he was reassigned to light duty as an accommodation to him; even if fire district’s belief regarding necessity of light duty was erroneous because the district relied upon a reasonable medical opinion in assigning fire fighter to light duty.

- The HIV positive fire fighter was “handicapped” within the meaning of the RA73.

- The HIV positive fire fighter who was assigned to light duty as an accommodation to him and who was discharged after he refused to perform light duty assignments was not discriminated against on the basis of a handicap. (Note: the ADA, however, now prohibits segregation of disabled employees into certain positions.)

- RA73 does not subject employers to liability for maintaining appropriate discipline in the work place or for making reasonable decisions to terminate unsatisfactory employees. Evenhanded treatment of employees in a program or activity covered by RA73 does not require the institution or employer to lower or effect substantial modifications of their employment standards to accommodate the handicapped person.

- The HIV positive fire fighter, who was assigned to light duty following his resignation and was then subsequently discharged when he refused to perform light duty assignments, failed to establish that he was denied equal protection or due process. The fire fighter was treated differently only to the extent of providing him with an alternative to his initial voluntary resignation due to his HIV status. The fire fighter was discharged because of his refusal to perform assigned duties, not because of his medical condition.

Upon appealed, the court affirmed the trial court’s decision with one of the three appellate judges held a dissenting opinion. The dissenting judge felt that “he would not have been dismissed but for his medical condition, and for this reason he is entitled to relief.”
The case of John Doe v. the District of Columbia was decided July 1, 1992. In a letter dated January 23, 1989 the District offered Doe a position as a fire fighter. This letter was received after Doe had successfully passed the written and physical examinations and all the other prerequisites of employment as a fire fighter. The letter of appointment notified Doe that his annual salary would be set at $23,555 and instructed Doe to report to the fire department on February 13, 1989 to begin his employment. The letter further advised Doe that his “first year will be served on a probationary status, during the course of which a suitability investigation would continue. If there is any derogatory or adverse information disclosed, your appointment to the Department will be terminated.” Doe did not consider his HIV-positive status to be “derogatory or adverse information” and the District had not tested him for HIV or inquired about his HIV status before offering him the fire fighter position. However, Doe was concerned that the District learn his HIV status later and consider this to be “derogatory or adverse information”. Doe believed that a failure to disclose this information would warrant the termination of his employment. Thus, Doe contacted an official within the fire department and disclosed his HIV-positive status.

In response to his disclosure, Doe was informed not to report as instructed by the letter of appointment. Instead, he was asked to undergo two blood tests for HIV, both of which were positive. Although Doe contacted the fire department for several weeks, he was never informed whether he should report for work or if the offer of employment had been withdrawn. According to a fire department officer, there was no question about Doe’s capability of performing the functions of a fire fighter. Instead, the decision not to permit him to report was made because of Doe’s HIV status. The captain testified that had Doe not voluntarily reported his HIV status, the department would not have found out and Doe would be a fire fighter. The Chief testified that he considered the public’s perception of HIV in deciding not to permit Doe to work, commenting that he “would be crazy” not to take the public’s fear of HIV and AIDS into account.

Doe testified the department’s refusal to permit him to work due to his HIV status made him feel “rejected,” like he was “garbage”, and that the District’s refusal to notify him of the status of his application was demoralizing. Doe cited his frustration at being denied the opportunity to serve as a fire fighter, a position he sought as a means of serving the community.

One of the key witnesses for the plaintiff testified, “[a]lthough it cannot be predicted with precision how long a particular HIV-positive person will remain asymptomatic, that approximately half of those for whom the date can be identified will exhibit symptoms within 10 years. Asymptomatic HIV positivity does not affect a person’s physical capabilities. For example, it does not impair a person’s strength, agility, or ability to breath.” The witness stated that an asymptomatic HIV infected person should be able to perform the functions of a fire fighter as stipulated by the District’. Based on this uncontroverted testimony the Court found that the ability to perform the functions of a fire fighter is unaffected by asymptomatic HIV-positivity.

Another expert witness, offered by the plaintiff, characterized the risk of blood to blood contact during the performance of fire fighting duties as “remote” and of transmission of HIV as “extremely small”. This witness also noted that although it is “extremely rare” for a fire fighter to have mouth-to-mouth contact with a rescue victim, such contact presents “no measurable risk” of transmission of HIV. Additionally, her research revealed several fire departments throughout the United States that employed HIV-positive fire fighters in active duty status and none of these departments employed or required any special precautions to be undertaken by these HIV-positive personnel. The personal protective equipment routinely issued to all fire fighters and the routine universal precautions required by all fire fighters are sufficient to protect against harm to the fire fighter or others.
Section 504 of RA73 provides that “No otherwise qualified individual with handicaps in the United States shall solely by reason of her or his handicap, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving any federal financial assistance.” The Supreme Court has held that “an otherwise qualified person is one who is able to meet all of a program’s requirements in spite of her or his handicap.” The application of the standard in this case was based on the following criteria.

The court held that Doe is an “individual with handicaps” because he has a physical impairment that substantially limits major life activities such as procreation, sexual contact, and normal social relationships.

With respect to the nature of the risk, the unrebutted testimony established that there are only three methods of HIV transmission: intimate sexual contact, puncture with contaminated intravenous needles, and blood-to-blood contact. Neither of the first two methods of transmission would occur while performing the duties of a fire fighter. With respect to the third, both experts testified that the risk of transmission through this means (i.e., while functioning as a fire fighter) is extremely remote.

The testimony demonstrated that Doe was and is fully fit to serve as a fire fighter. Doe was described as being in good physical condition, asymptomatic and able to perform any job he desires. In addition, Doe passed the fire department's physical examination.

The fire department’s own records unequivocally reflect the offer of employment to Doe was withdrawn because of a medical determination that his HIV status rendered him unfit to serve as a fire fighter.

The court held that Doe is entitled to reinstatement in the fire fighter position offered to him, retroactive to February 13, 1989. The District was also enjoined from discriminating on the basis of HIV status and was required to declare that the city’s policy and practice of denying employment on the basis of HIV status violated RA73.

While there has been limited court action on worker infectious diseases issue, it is obvious that this issue will receive considerable attention in the future. It is also important to note that the above cases are only set precedent in their respective jurisdiction. Additionally, legislative action is pending on infectious disease issues in the United States and Canada.
Infectious disease issues are developing rapidly in a complex environment of government regulations, court cases and politics. The IAFF is continually receiving new information and developing new resources. Further assistance can be obtained from the IAFF Department of Occupational Health and Safety.

General

The best source of up-to-date expert advice on infectious diseases is usually the Centers for Disease Control (CDC) in Atlanta, Georgia. The CDC can be reached through their general number, which is 404-639-3311, or on the internet at http://www.cdc.gov.

For information about regulations, call the National OSHA Information Office, 202-523-8148. Copies of the *Bloodborne Pathogens Standard Title 29 CFR, Part 1910.1030* are available from the Government Printing Office, Superintendent of Documents, Washington, DC 20402-9325 or phone 202-783-3238. Request GPO stock number 069-001-0040-8 ($2.00). OSHA has also developed the following materials that are available free from the internet at http://www.osha.gov under “Bloodborne Pathogens.” They are also available upon request from the OSHA field offices or the U.S. Department of Labor, OSHA/OICA Publications, P.O. Box 37535, Washington, DC 20013-7535. Please send a self-addressed mailing label with your request.


*Bloodborne Pathogens and Long-Term Care Workers*, USDOL, OSHA 3131, 1992.

The United States Fire Administration has developed a number of training materials on infection control for fire and emergency services. For further information contact the USFA, National Fire Programs Office at 301-447-1080 or http://www.usfa.fema.gov.

The IAFF maintains considerable information on communicable diseases. Examples of resources available from the IAFF Department of Occupational Health and Safety include the *IAFF Occupational Exposure to Contagious Disease Kit; IAFF Occupational Contagious Disease Laws Kit*; and Dispatch Fact Sheets on topics such as the OSHA Bloodborne Pathogens Standard, CDC Recommendations for Follow-up After Occupational Exposure to Hepatitis C, the Ryan White CARE Act, and Occupational Exposure to Tuberculosis.
The National Fire Protection Association has a standard that addresses fire department infection control program. Your department should be implementing this standard:


The following references also provide general information on infection control and risk of infection:


**Infectious Diseases**

The following references provide information regarding specific infectious diseases:

*Hepatitis*


*Human Immunodeficiency Virus (HIV) and AIDS*


**Tuberculosis**


**Lyme Disease**


**Vaccinations**

The following references and contacts provide information regarding vaccinations for emergency response personnel:
Guidelines and general information about vaccinations are available from:

The National Immunization Program  
Centers for Disease Control and Prevention  
1600 Clifton Road  
Atlanta, GA 30333  
1-800-232-2522  
www.cdc.gov/nip/  

American College of Physicians  
190 N. Independence Mall West  
Philadelphia, PA 19106-1572  
1-800-523-1546 or 215-351-2600  
www.acponline.org  

American Academy of Pediatrics  
141 Northwest Point Blvd.  
Elk Grove Village, IL 60007-1098  
847-434-4000  
www.aap.org  

Scientific and research information about specific biological and immunological products, including vaccines, serums, toxins, and others is available from the following:

Food and Drug Administration  
5600 Fishers Lane (HFB-142)  
Rockville, MD 20857  
1-888-INFO-FDA (1-888-463-6332)  
www.fda.gov  

National Institute of Allergy and Infectious Diseases  
Building 31, Room 7A-50  
31 Center Drive MSC 2520  
Bethesda, MD 20892-2520  
301-496-5717  
www.niaid.nih.gov  

The following documents deal with both general and specific aspects of vaccination against hepatitis A and B:


Legal Requirements


Protective Clothing and Equipment

The National Fire Protection Association has a standard that addresses protective clothing for protection from biological exposures. Your department should be purchasing clothing that meets this standard:


The American Society for Testing and Materials has a standard for rubber examination gloves. You may wish to purchase gloves that meet this standard:


Disinfectants

For a list of EPA Registered Disinfectants, contact the National Antimicrobial Information Network, a cooperative effort of Oregon State University and the EPA, at 1-800-447-6349, or try them online at [http://nain.orst.edu/lists.htm](http://nain.orst.edu/lists.htm). Site includes lists of EPA registered antimicrobial products, as well as fact sheets, safety guidelines, regulations, toxicology, and other general information for anti-microbial chemicals.
Medical Waste

The following references may be helpful when you are developing procedures for the handling and disposing of medical waste:


Post-Exposure Management

The following references provide guidelines for the post-exposure management of emergency medical personnel:


Post-exposure prophylaxis of occupational exposure to HIV infection. *J Assoc Nurses AIDS Care* 1999 May-Jun;10(3):97


Notification Legislation

For sample notification legislation contact the IAFF:

IAFF Department of Occupational Health and Safety, *Occupational Contagious Disease Laws*. Note: If your state adopts such legislation, please forward a copy to our office.

Facility Design

The following references discuss fire station design and how it relates to infection control:


**Terms and Definitions**

**Antibody:** A type of protein (an immunoglobulin) produced by the body’s immune system that is specific for a particular antigen, conferring immunity to the body against that antigen.

**Antigen:** Any substance that stimulates an immune response in an individual when the individual is exposed to it. The immune response is usually in the form of antibodies. For example, vaccinations use antigens derived from bacteria or viruses to stimulate an immune response in the body. Antigens may be the whole or only part of the microbe in question.

**Bacteria:** A group of microscopic organisms that are capable of reproducing on their own, causing human disease by direct invasion of body tissues. Bacteria often produce toxins that poison the cells they have invaded. Numerous bacteria also live in harmony with the body and are necessary for human existence, such as bacteria that aid in digestion in the gut. Important bacterial diseases include “strep” tonsillitis, pneumonia, and meningitis.

**Bloodborne pathogen:** A pathologic microorganism that is present in human blood, blood components, and blood products that can cause disease in humans.

**Hepatitis B carrier:** A person in whom the hepatitis B virus has established a persistent low grade infection in the patient’s liver that the patient’s immune system is unable to clear. This occurs in 5 to 10% of all people infected with hepatitis B. Hepatitis B carriers are at increased risk of developing cirrhosis of the liver, liver cancer, and liver failure, all of which may eventually result in the patient’s death.

**Hepatitis B core antigen (HBcAg):** This antigen is present on the inside of the hepatitis B virus, but does not stimulate the immune system to produce long lasting immunity.

**Hepatitis B surface antibody (HBsAb):** An antibody produced by the body’s immune system that is specifically active against the hepatitis B surface antigen. This antibody confers long lasting immunity against hepatitis B.

**Hepatitis B surface antigen (HBsAg):** The antigen that is present on the outside of the hepatitis B virus. This antigen stimulates the antibody response against the hepatitis B virus that confers long lasting immunity.

**Hepatitis B surface antigen (HBsAg):** The antigen that is present on the outside surface
of the hepatitis B virus. This antigen stimulates the antibody response against the hepatitis B virus that confers long lasting immunity.

**Immunity:** Resistance to a particular disease due to an activation of the body’s immune system by exposure to either the infectious agent or to a vaccination prepared from the infectious agent.

**Induration:** An area of hardened tissue

**Incidence:** The number of new cases of disease in a defined population occurring over a specific period of time, usually one year.

**Myalgia:** Tenderness or pain in the muscles; muscular rheumatism

**Prevalence:** The number of existing cases of a particular disease present at a given time in a defined population. The prevalence is usually expressed as a proportion or a percentage of the population under study.

**Prophylaxis:** A means of providing temporary protection against disease by means of either a medication or substance that stimulates the body’s own immune system against the disease, or a transfer of protective factors pooled from donors or animals.

**Serology:** The branch of science concerned with the study of the immune components of the serum (antigens and antibodies).

**Vaccine:** A preparation of killed or inactivated bacteria or viruses that is given to a person in order to artificially stimulate their immune system against a particular disease. This protects the vaccinated person from contracting the disease in the future.

**Virus:** A term for a group of microbes that are incapable of reproducing on their own, and must invade a host cell in order to use its genetic machinery for reproduction.Viruses are smaller than bacteria, and are responsible for the most common human diseases, the common cold and the “flu” (influenza). Viruses are also responsible for more serious diseases such as AIDS, hepatitis B, and hepatitis C.