NFPA®

1581

Standard on Fire Department Infection Control Program

2022

NFPA®

NFPA® 1581

Standard on

Fire Department Infection Control Program

2022 Edition

This edition of NFPA 1581, *Standard on Fire Department Infection Control Program*, was prepared by the Technical Committee on Fire Service Occupational Safety. It was issued by the Standards Council on March 18, 2021, with an effective date of April 8, 2021, and supersedes all previous editions.

This edition of NFPA 1581 was approved as an American National Standard on April 8, 2021.

Origin and Development of NFPA 1581

In many fire departments, the majority of responses are emergency medical service (EMS)-related. The need for a proactive infection control policy and program is paramount in working in this environment, as members come in contact with potentially infectious victims or other persons in both emergency and nonemergency settings. It is also crucial that those fire departments that do not provide emergency medical services have a proactive infection control program. Given the variety of situations that fire departments are called to, including domestic violence, hazardous materials releases, and even routine structural fires, the potential for infection of a fire department member exists.

This document was developed to provide requirements for infection control practices. The requirements were developed to be compatible with guidelines and regulations from the U.S. Centers for Disease Control (CDC) and the U.S. Department of Health and Human Services that apply to public safety and emergency response personnel. The first edition of the document was issued in 1992.

In the 1995 edition, revisions addressed decontamination of equipment and apparatus, clean areas for equipment to be stored, and living quarters for personnel, as well as the relationship of these subject areas to the overall health and safety of members.

In the 2000 edition, CDC requirements, the relationship with the medical control facility, recordkeeping requirements, and information on disease information for emergency responders were updated.

The 2005 edition was a complete revision to reorganize the document in compliance with the *Manual of Style for NFPA Technical Committee Documents*. Information on immunizations and infectious diseases was updated and material on members that decline immunization was moved from the annex to become requirements. The chapter on fire department apparatus was rewritten to use the term "vehicles used to transport patients" rather than the term "ambulance" and appropriate requirements previously referenced to GSA Federal Specification KKK-A-1822E were included in the standard. The table of disease information for emergency response personnel was updated to include some of the bioterrorism agents.

In the 2010 edition of the document, definitions were revised to clarify terminology and the revised terminology reflected as appropriate throughout the document. References and requirements were updated to match the latest CDC guidelines, requirements were reorganized into a more logical order, and emphasis was added on providing for and use of hand washing facilities to prevent contamination and spread of disease. The requirement for placement of PPE and station work uniform cleaning equipment, as well as tool and equipment cleaning, was clarified. The requirements for frequency of cleaning and decontamination of PPE were changed to reference NFPA 1851. Additional requirements were added on cleaning non-contaminated laundry. The revisions clarified the treatment of meningococcal disease and recognized ethicillin-resistant Staphylococcus aureus (MRSA) as an emerging problem and provided guidance on dealing with it.

For the 2015 edition, the committee updated several of the requirements, as well as definitions relating to pathogens, to bring the document in line with the Ryan White HIV/AIDS Treatment Extension Act of 2009. The committee also made changes based on the efficacy of liquid soap versus bar soap; specifically, liquid soap is preferred because it is less likely to harbor infectious diseases. Other changes were based on an increase in the spread of infectious diseases as well as in the prevalence of some infectious diseases. The committee also included changes to reflect NFPA 1917, *Standard for Automotive Ambulances*, as it relates to controlling the spread of infectious diseases to providers and occupants in ambulances. Additional changes were made to ensure that members use respirators of at least N-95 for protection against aerosolized pathogens. Also included was having the infection control officer be a consultant with the fire department physician regarding the possibility of imposing restrictions on fire department members who might present a risk of spreading infectious diseases to others.

The 2022 edition incorporates several changes that primarily address infection control measures, such as barrier face coverings, ventilation, and cleaning and disinfecting equipment, vehicles, and surfaces.

Technical Committee on Fire Service Occupational Safety

Randy J. Krause, *Chair*
Port of Seattle Fire Department, WA [E]

Christina M. Baxter, Emergency Response Tips, LLC, FL [SE]

David T. Bernzweig, Columbus (OH) Division of Fire, OH [L]
Rep. Columbus Firefighters Union

Sandy Bogucki, Yale University Emergency Medicine, CT [SE]

Dennis R. Childress, Orange County Fire Authority, CA [U]
Rep. California State Firefighters Association

Donald Lee Cox, Volunteer Fireman's Insurance Service, Inc. (VFIS), FL [I]

Fabrice Czarnecki, DHS, VA [SE]
Rep. American College of Occupational and Environmental Medicine (ACOEM)

Bradley Roy Davidson, Firefighter Cancer Consultants, LLC, Canada [C]
Rep. Last Call Foundation

David W. Dodson, Response Solutions LLC, CO [SE]
Rep. Fire Department Safety Officers Association

Scott William Dollman, United State Army, SC [U]

Christopher A. Garrett, City of Owasso, OK [M]
Rep. International Fire Service Training Association

Stanley Haimes, UCF College of Medicine, FL [SE]

Kepra Jack, Heartfit for Duty, AZ [U]

Scott D. Kerwood, Hutto Fire Rescue, TX [E]
Rep. International Association of Fire Chiefs

James Roger Lackore, REV Fire Group, WI [M]
Rep. Fire Apparatus Manufacturers Association

Murrey E. Loflin, National Institute for Occupational Safety & Health, WV [RT]

Tamara DiAnda Lopes, American Iron Gym, NV [U]

Joseph McHugh, Fire Department City of New York, NY [U]
Rep. Fire Department of New York

Steven M. Moffatt, Public Safety Medical, IN [SE]

Paul J. Napoli, Association of Fire Districts of the State of New York, NY [U]
Rep. Association of Fire Districts/State of New York

Robert D. Neamy, Gardnerville, NV [M]
Rep. National Incident Management System Consortium

John R. Niemiec, International Association of Fire Fighters (IAFF), DC [L]
Rep. International Association of Fire Fighters

Charles J. Popp, III, Boston Fire Department, MA [U]

David J. Prezant, Fire Department City of New York, NY [E]
Rep. Fire Department of New York

Mario D. Rueda, San Marino Fire Department, CA [E]

Daniel G. Samo, Northwestern Medical Group, IL [SE]

Andrew G. Schwartz, LION Group, Inc., OH [M]

Denise L. Smith, Skidmore College, NY [SE]

Donald F. Stewart, Medocracy Inc./Fairfax County Fire & Rescue, VA [E]

Philip C. Stittleburg, La Farge Fire Department, WI [U]
Rep. National Volunteer Fire Council

Susan Tamme, Tampa Fire Rescue Department, FL [L]
Rep. International Association of Women in Fire & Emergency Services

Fred C. Terryn, US Department of the Air Force, FL [U]

John Tippett, National Fallen Firefighters Foundation, MD [C]

Ronnie Villanueva, Los Angeles Fire Department, CA [U]

Alternates

Gregg Avery, Los Angeles Fire Department, CA [U]
(Alt. to Ronnie Villanueva)

Kurt Becker, Clayton, Missouri Fire Department, MO [L]
(Alt. to John R. Niemiec)

Brian Carlson, University Of Cincinnati, OH [SE]
(VotingAlt.)

Wesley D. Chestnut, Spartan Motors, Inc., MI [M]
(Alt. to James Roger Lackore)

Bradd K. Clark, Ocala Fire Rescue, FL [M]
(Alt. to Christopher A. Garrett)

Kenneth Desmond, Bath, ME [U]
(Alt. to Philip C. Stittleburg)

Edward I. Galaid, Roper St. Francis Occupational Medicine, SC [SE]
(Alt. to Stanley Haimes)

Edward M. Hawthorne, DFW Dynamics, TX [M]
(Alt. to Robert D. Neamy)

John A. Kottmyer, Volunteer Fireman's Insurance Service, Inc. (VFIS), PA [I]
(Alt. to Donald Lee Cox)

Paul Parrish, Austin Fire Wellness, TX [SE]
(Alt. to Sandy Bogucki)

Joanne R. Rund, Baltimore County Fire Department, MD [E]
(Alt. to Scott D. Kerwood)

Kevin Douglas Schulz, Lion Total Care, IL [M]
(Alt. to Andrew G. Schwartz)

Jay L. Tarley, National Institute for Occupational Safety & Health, WV [RT]
(Alt. to Murrey E. Loflin)

Brian Dean Thompson, United States Air Force, FL [U]
(Alt. to Fred C. Terryn)

Eric Valliere, Scottsdale Fire Department, AZ [SE]
(Alt. to David W. Dodson)

Nonvoting

William R. Hamilton, US Department of Labor, DC [E]

Andrew Levinson, US Department of Labor, DC [E]
Rep. Occupational Safety & Health Administration

Barry D. Chase, NFPA Staff Liaison

This list represents the membership at the time the Committee was balloted on the final text of this edition. Since that time, changes in the membership may have occurred. A key to classifications is found at the back of the document.

NOTE: Membership on a committee shall not in and of itself constitute an endorsement of the Association or any document developed by the committee on which the member serves.

Committee Scope: This Committee shall have primary responsibility for documents on occupational safety and incident command in the working environment of the fire service, not including hazardous materials or cross functional events. The committee shall also have responsibility for documents related to medical requirements for firefighters, and the professional qualifications for fire department safety officer. It shall coordinate its work with NFPA technical committees dealing with emergency responder safety and wellness.

Contents

Chapter 1 Administration 1581– 6
1.1 Scope. 1581– 6
1.2 Purpose. 1581– 6
1.3 Application. 1581– 6
1.4 Equivalency. 1581– 6

Chapter 2 Referenced Publications 1581– 6
2.1 General. 1581– 6
2.2 NFPA Publications. 1581– 6
2.3 Other Publications. 1581– 6
2.4 References for Extracts in Mandatory Sections. 1581– 7

Chapter 3 Definitions 1581– 7
3.1 General. 1581– 7
3.2 NFPA Official Definitions. 1581– 7
3.3 General Definitions. 1581– 7

Chapter 4 Program Components 1581– 9
4.1 Policy. 1581– 9
4.2 Risk Management. 1581– 9
4.3 Training and Education. 1581– 9
4.4 Infection Control Officer. 1581– 9
4.5 Health Maintenance. 1581– 10
4.6 Infectious Exposures. 1581– 10

Chapter 5 Fire Department Facilities 1581– 11
5.1 General. 1581– 11
5.2 Kitchen Areas. 1581– 11
5.3 Sleeping Areas. 1581– 11
5.4 Bathrooms. 1581– 11
5.5 Equipment Storage Areas. 1581– 11
5.6 Cleaning Areas. 1581– 12
5.7 Disinfecting Facilities. 1581– 12
5.8 Disposal Areas. 1581– 12

Chapter 6 Fire Department Apparatus 1581– 13
6.1 General. 1581– 13
6.2 Vehicles Used to Transport Patients. 1581– 13

Chapter 7 Protection for Emergency Medical Service Operations 1581– 13
7.1 Personnel. 1581– 13
7.2 Personal Protective Equipment. 1581– 13
7.3 Handling of Sharp Objects. 1581– 14

Chapter 8 Cleaning, Disinfecting, and Disposal 1581– 14
8.1 Skin Washing. 1581– 14
8.2 Disinfectants. 1581– 14
8.3 Emergency Medical Equipment and Environmental Surfaces. 1581– 14
8.4 Clothing and Personal Protective Equipment. 1581– 15
8.5 Disposal of Materials. 1581– 16
8.6 Linen. 1581– 16
8.7 Housekeeping. 1581– 16
8.8 Labeling. 1581– 17

Annex A Explanatory Material 1581– 17

Annex B Sample Policy Statements 1581– 24

Annex C Disinfection and Sterilization Methods . 1581– 25

Annex D Informational References 1581– 26

Index 1581– 28

NFPA 1581

Standard on

Fire Department Infection Control Program

2022 Edition

IMPORTANT NOTE: This NFPA document is made available for use subject to important notices and legal disclaimers. These notices and disclaimers appear in all publications containing this document and may be found under the heading "Important Notices and Disclaimers Concerning NFPA Standards." They can also be viewed at www.nfpa.org/disclaimers or obtained on request from NFPA.

UPDATES, ALERTS, AND FUTURE EDITIONS: New editions of NFPA codes, standards, recommended practices, and guides (i.e., NFPA Standards) are released on scheduled revision cycles. This edition may be superseded by a later one, or it may be amended outside of its scheduled revision cycle through the issuance of Tentative Interim Amendments (TIAs). An official NFPA Standard at any point in time consists of the current edition of the document, together with all TIAs and Errata in effect. To verify that this document is the current edition or to determine if it has been amended by TIAs or Errata, please consult the National Fire Codes® Subscription Service or the "List of NFPA Codes & Standards" at www.nfpa.org/docinfo. In addition to TIAs and Errata, the document information pages also include the option to sign up for alerts for individual documents and to be involved in the development of the next edition.

NOTICE: An asterisk (*) following the number or letter designating a paragraph indicates that explanatory material on the paragraph can be found in Annex A.

A reference in brackets [ ] following a section or paragraph indicates material that has been extracted from another NFPA document. Extracted text may be edited for consistency and style and may include the revision of internal paragraph references and other references as appropriate. Requests for interpretations or revisions of extracted text shall be sent to the technical committee responsible for the source document.

Information on referenced and extracted publications can be found in Chapter 2 and Annex D.

Chapter 1 Administration

1.1 Scope. This standard contains minimum requirements for a fire department infection control program.

1.2 Purpose. The purpose of this standard is to provide minimum criteria for infection control in the fire station, in the fire apparatus, during procedures at an incident scene, and at any other area where fire department members are involved in routine or emergency operations.

1.3 Application.

1.3.1 The requirements of this standard apply to organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, and other emergency services, including public, military, private, and industrial fire departments.

1.3.2 This standard does not apply to industrial fire brigades, which might also be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.

1.4 Equivalency.

1.4.1* The requirements of this standard are intended to meet or exceed the most current applicable federal regulations of the Occupational Safety and Health Administration (OSHA) and guidelines of the U.S. Centers for Disease Control and Prevention (CDC).

1.4.2 The requirements in this standard are designed to provide minimum levels of protection from infection for members and patients, and for the public at fire department facilities.

1.4.3 Nothing herein is intended to restrict any jurisdiction from exceeding these minimum requirements.

Chapter 2 Referenced Publications

2.1 General. The documents or portions thereof listed in this chapter are referenced within this standard and shall be considered part of the requirements of this document.

2.2 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2021 edition.

NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*, 2022 edition.

NFPA 1851, *Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2020 edition.

NFPA 1852, *Standard on Selection, Care, and Maintenance of Open-Circuit Self-Contained Breathing Apparatus (SCBA)*, 2019 edition.

NFPA 1917, *Standard for Automotive Ambulances*, 2019 edition.

NFPA 1971, *Standard on Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting*, 2018 edition.

NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations*, 2018 edition.

2.3 Other Publications.

2.3.1 US Government Publications. US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

Federal Specification KKK-A-1822F, *Star-of-Life Ambulance*, U.S. General Services Administration, July 1, 2018.

Selecting, Evaluating, and Using Sharps Disposal Containers. Publication No. 97-111, NIOSH, US Department of Health and Human Services. www.cdc.gov/niosh/docs/97-111/pdfs/97-111.pdf.

Title 29, Code of Federal Regulations, Part 1910.1020, "Access to Employee Exposure and Medical Records."

Title 29, Code of Federal Regulations, Part 1910.1030, "Bloodborne Pathogens."

Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory Protection."

2.3.2 Other Publications.

Merriam-Webster's Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2003.

2.4 References for Extracts in Mandatory Sections.

NFPA 600, *Standard on Facility Fire Brigades*, 2020 edition.

NFPA 1451, *Standard for a Fire and Emergency Service Vehicle Operations Training Program*, 2018 edition.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2021 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus*, 2016 edition.

NFPA 1917, *Standard for Automotive Ambulances*, 2019 edition.

NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations*, 2018 edition.

Chapter 3 Definitions

3.1 General. The definitions contained in this chapter shall apply to the terms used in this standard. Where terms are not defined in this chapter or within another chapter, they shall be defined using their ordinarily accepted meanings within the context in which they are used. *Merriam-Webster's Collegiate Dictionary*, 11th edition, shall be the source for the ordinarily accepted meaning.

3.2 NFPA Official Definitions.

3.2.1* Approved. Acceptable to the authority having jurisdiction.

3.2.2* Authority Having Jurisdiction (AHJ). An organization, office, or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, an installation, or a procedure.

3.2.3 Shall. Indicates a mandatory requirement.

3.2.4 Should. Indicates a recommendation or that which is advised but not required.

3.2.5 Standard. An NFPA Standard, the main text of which contains only mandatory provisions using the word "shall" to indicate requirements and that is in a form generally suitable for mandatory reference by another standard or code or for adoption into law. Nonmandatory provisions are not to be considered a part of the requirements of a standard and shall be located in an appendix, annex, footnote, informational note, or other means as permitted in the NFPA Manuals of Style. When used in a generic sense, such as in the phrase "standards development process" or "standards development activities," the term "standards" includes all NFPA Standards, including Codes, Standards, Recommended Practices, and Guides.

3.3* General Definitions.

3.3.1 Ambulance. A vehicle used for out-of-hospital medical care and patient transport that provides a driver's compartment; a patient compartment to accommodate an emergency medical services provider (EMSP) and at least one patient located on the primary cot so positioned that the primary patient can be given emergency care during transit; equipment and supplies for emergency care at the scene as well as during transport; safety, comfort, and avoidance of aggravation of the patient's injury or illness; two-way radio communication; and audible and visual traffic warning devices. [**1917,** 2019]

3.3.2 Blood. Human blood, human blood components, and products made from human blood.

3.3.3 Body Fluids. Fluids that the body produces including, but not limited to, blood, semen, mucus, feces, urine, vaginal secretions, breast milk, amniotic fluids, cerebrospinal fluid, synovial fluid, pericardial fluid, sputum, saliva, and any other fluids that might contain pathogens.

3.3.4 Cleaning. The physical removal of dirt and debris, which generally is accomplished with soap and water and physical scrubbing.

3.3.5 Cleaning Gloves. Multipurpose gloves, not for emergency patient care, that provide a barrier against body fluids, cleaning fluids, and disinfectants and limited physical protection to the wearer.

3.3.6 Contaminated. The presence or the reasonably anticipated presence of blood, body fluids, or other potentially infectious materials on an item or surface.

3.3.7 Contaminated Sharps. Any contaminated object that can penetrate the skin including, but not limited to, needles, lancets, scalpels, broken glass, jagged metal, or other debris.

3.3.8 Decontamination. The use of physical or chemical means to remove, inactivate, or destroy bloodborne, airborne, or foodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

3.3.9* Disinfection. The process used to inactivate virtually all recognized pathogenic microorganisms but not necessarily all microbial forms, such as bacterial endospore.

3.3.10 Emergency Medical Services. The treatment of patients, using first aid, cardiopulmonary resuscitation, basic life support, advanced life support, and other medical protocols prior to arrival at a hospital or other health care facility.

3.3.11* Engineering Controls. Physical features or mechanical processes within fixed facilities or vehicles that are implemented to improve efficiency, safety, or comfort associated with their operation or use.

3.3.12 Environmental Surface. Interior patient care areas, both stationary and in vehicles, and other surfaces not designed for intrusive contact with the patient or contact with mucosal tissue.

3.3.13 Exposure.

3.3.13.1 ***Infectious Exposure.*** A specific eye, mouth, other mucous membrane, non-intact skin, or parenteral contact with blood, body fluids, or other potentially infectious material; inhalation of airborne pathogens; or ingestion of foodborne pathogens or toxins.

3.3.13.2 ***Occupational Exposure.*** An infectious exposure that resulted from performance of a member's duties.

3.3.14 Eyewear. See 3.3.53, Splash-Resistant Eyewear.

3.3.15 Face Protection Devices. An item of emergency medical protective clothing that is designed and configured to provide barrier protection to the wearer's eyes or face, or both.

3.3.16 Facility Fire Brigade. An organized group of employees at a facility who are knowledgeable, trained, and skilled in at least basic fire-fighting operations, and whose full-time occupation might be the provision of fire suppression and related activities for their employer. [**600,** 2020]

3.3.17 Fire Apparatus. A vehicle designed to be used under emergency conditions to transport personnel and equipment or to support the suppression of fires or mitigation of other hazardous situations. [**1901,** 2016]

3.3.18* Fire Department. An organization providing rescue, fire suppression, emergency medical services, special operations, and related services.

3.3.19* Fire Department Facility. Any building or area owned, operated, occupied, or used by a fire department on a routine basis. [**1500,** 2021]

3.3.20 Fire Department Member. See 3.3.37, Member.

3.3.21 Fluid-Resistant Clothing. Clothing worn for the purpose of isolating parts of the wearer's body from contact with body fluids.

3.3.22 Garment. The coat, trouser, or coverall elements of the protective ensemble designed to provide minimum protection to the upper and lower torso, arms, and legs, excluding the head, hands, and feet.

3.3.23 Handwashing Facility. A facility providing an adequate supply of running potable water, liquid soap, and single-use towels or hot-air drying machines.

3.3.24* Health and Safety Officer. The member of the fire department assigned and authorized by the fire chief as the manager of the safety, health, and wellness program. [**1500,** 2021]

3.3.25 Health Data Base. A compilation of records and data that relates to the health experience of a group of individuals and is maintained in a manner such that it is retrievable for study and analysis over a period of time. [**1500,** 2021]

3.3.26 Hepatitis.

3.3.26.1 ***HBV.*** Hepatitis B virus.

3.3.26.2 ***HCV.*** Hepatitis C Virus.

3.3.27 HIV. Human immunodeficiency virus.

3.3.28 Immunization. The process or procedure by which a person is rendered immune.

3.3.29 Infection. The state or condition in which the body or a part of it is invaded by a pathogenic agent (microorganism or virus) that, under favorable conditions, multiplies and produces effects that are injurious.

3.3.30 Infection Control Officer. The person or persons within the fire department who are responsible for managing the department infection control program and for coordinating efforts surrounding the investigation of an exposure.

3.3.31* Infection Control Program. The fire department's formal policy and implementation of procedures relating to the control of infectious and communicable disease hazards where employees, patients, or the general public could be exposed to blood, body fluids, or other potentially infectious materials in the fire department work environment. [**1500,** 2021]

3.3.32* Kitchen. An area designated for storage, preparation, cooking, and serving of food for members.

3.3.33 Leakproof Bags. Bags that are sufficiently sturdy to prevent tearing or breaking and can be sealed securely to prevent leakage and that are red in color or display the universal biohazard symbol.

3.3.34 Mask. A device designed to limit exposure of the nasal, oral, respiratory, or mucosal membranes to airborne pathogens.

3.3.35* Medical Gloves. Single-use patient examination gloves that are designed to provide barrier protection against body fluids to the wearer's hand and wrist.

3.3.36 Medical Waste. Items to be disposed of that have been contaminated with human waste, blood, or body fluids, or human waste, human tissue, blood, or body fluids for which special handling precautions are necessary.

3.3.37* Member. A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization. [**1500,** 2021]

3.3.38 Mucous Membrane. A moist layer of tissue that lines the mouth, eyes, nostrils, vagina, anus, or urethra.

3.3.39 Needle. A slender, usually sharp, pointed instrument used for puncturing tissues, suturing, drawing blood, or passing a ligature around a vessel.

3.3.40 Parenteral. Piercing of the mucous membranes or the skin barrier due to such events as needle sticks, human bites, cuts, and abrasions.

3.3.41* Pathogens. Microorganisms such as bacteria, a virus, or a fungus that is capable of causing disease.

3.3.41.1 ***Aerosolized Airborne Transmission.*** Person-to-person transmission of an infectious agent by an aerosol of small particles able to remain airborne for long periods of time.

3.3.41.2* ***Aerosolized Droplet Transmission.*** Person-to-person transmission of an infectious agent by large particles able to remain airborne for only short periods of time.

3.3.41.3* ***Bioterrorism or Biologic Warfare Agents.*** Biological agents and toxins that have the potential to pose a severe threat to human health and that can be used for or adapted for bioterrorist attacks.

3.3.41.4* ***Contact and Body Fluid Exposures.*** Person-to-person transmission of an infectious agent through direct or indirect contact with an infected person's blood or other bodily fluids.

3.3.42 Patient. An individual, living or dead, whose body fluids, tissues, or organs could be a source of exposure to the member.

3.3.43* Personal Protective Equipment (PPE). Specialized clothing or equipment worn by a member for protection against a hazard.

3.3.44 Pocket Mask. A double-lumen device that is portable, pocket-size, and designed to protect the emergency care provider from direct contact with the mouth/lips or body fluids of a patient while performing artificial respiration.

3.3.45 Post-Exposure Prophylaxis. Administration of a medication to prevent development of an infectious disease following known or suspected exposure to that disease.

3.3.46 Potentially Infectious Materials. Any body fluid that is visibly contaminated with blood; all body fluids in situations

where it is difficult or impossible to differentiate between body fluids; sputum, saliva, and other respiratory secretions; and any unfixed tissue or organ from a living or dead human.

3.3.47* Protective Ensemble. Multiple elements of compliant protective clothing that when worn together can reduce, but not eliminate, the health and safety risks of emergency incident operations.

3.3.48 Regulated Waste. Liquid or semi-liquid blood, body fluids, or other potentially infectious materials; contaminated items that would release blood, body fluids, or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood, body fluids, or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood, body fluids, or other potentially infectious materials.

3.3.49 Resuscitation Equipment. Respiratory assist devices such as bag-valve masks, oxygen demand valve resuscitators, pocket masks, and other ventilation devices that are designed to provide artificial respiration or assist with ventilation of a patient.

3.3.50 Risk. A measure of the probability and severity of adverse effects that result from exposure to a hazard. [**1451,** 2018]

3.3.51 Sharps Containers. Containers that are closable, puncture-resistant, disposable, and leakproof on the sides and bottom; red in color or display the universal biohazard symbol; and designed to store sharp objects after use per OSHA Bloodborne Pathogens Standard. **[29 CFR Part 1910.1030]**

3.3.52 Source Individual. Any individual, living or dead, whose blood, body fluids, or other potentially infectious materials has been a source of occupational exposure to a member.

3.3.53 Splash-Resistant Eyewear. Safety glasses, prescription eyewear with protective side shields, goggles, or chin-length face shields that, when worn properly, provide limited protection against splashes, spray, spatters, or droplets of body fluids. [**1999,** 2018] *(See also 3.3.15.)*

3.3.54* Sterilization. The use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores.

3.3.55 Structural Firefighting Gloves. The element of the structural firefighting protective ensemble that provides protection to the hand and wrist.

3.3.56* Universal Precautions. An approach to infection control in which human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Chapter 4 Program Components

4.1 Policy.

4.1.1 The fire department shall have a written infection control policy with the goal of identifying and limiting the exposure of members to infection during the performance of their assigned duties and within the fire department working and living environment *(see Annex B).*

4.1.2 As part of the overall fire department safety and health program, the fire department shall implement an infection control program that meets the requirements of this standard.

4.1.3 The fire department shall provide for the cleaning and disinfection or disposal of the following:

(1) Protective ensembles
(2) Firefighting tools and other equipment
(3) Station/work uniforms
(4)* Other protective equipment
(5) Emergency medical equipment
(6)* Fire apparatus, ambulances, and other fire department vehicles (patient compartments and areas used by firefighters/EMS providers)
(7) Fire department facilities

4.2* Risk Management.

4.2.1* The fire department shall incorporate infection control in the written risk management plan that meets the requirements specified in NFPA 1500.

4.2.2 The written risk management plan shall include the identification, evaluation, control, and monitoring of risks to the following:

(1) Fire department facilities
(2) Fire and emergency services vehicles
(3) Emergency medical service operations
(4) Members when cleaning and disinfecting protective clothing and equipment
(5) Members from other situations that could result in occupational exposure to a communicable disease

4.3 Training and Education.

4.3.1* The fire department shall conduct initial and annual training and education programs for all members in accordance with state, provincial, or federal regulations.

4.3.2 The training program shall include the following:

(1) Use of PPE
(2) Standard operating procedures for safe work practices in infection control
(3) Methods of disposal of contaminated articles and medical waste
(4) Cleaning and decontamination
(5) Exposure management
(6) Medical follow-up

4.3.3* The education program shall provide information on the epidemiology, modes of transmission, and prevention of infectious diseases.

4.3.4 Members shall be educated in the potential reproductive health risks, to the individual as well as to the fetus, related to infectious diseases.

4.4 Infection Control Officer.

4.4.1 The fire department shall have a designated infection control officer.

4.4.1.1 Additional assistant infection control officers shall be appointed where warranted by the activities, size, or character of the fire department.

4.4.1.2 If the infection control officer is not available, additional assistant infection control officers shall be appointed to ensure coverage.

4.4.1.3 In the absence of the infection control officer and assistant infection control officers, alternate members shall be assigned to perform the duties and responsibilities that need immediate attention, regardless of their positions.

4.4.2 The position of infection control officer shall be full-time or part-time, depending on the size and character of the fire department.

4.4.3* The infection control officer shall be responsible for maintaining a liaison with the fire department physician, the health and safety officer, the infection control representative at health care facilities, and health care regulatory agencies.

4.4.4 When notified of an infectious exposure, the infection control officer shall ensure the following:

(1) Notification, verification, treatment, and medical follow-up of members
(2) Documentation of the infectious exposure as specified in 4.6.5

4.4.5 The infection control officer shall examine compliance procedures and engineering controls to ensure their effectiveness in accordance with the operational requirements of this standard.

4.4.6 The infection control officer shall be a designated member of the fire department's occupational safety and health committee.

4.4.7 The infection control officer shall be knowledgeable and cognizant of the issues associated with bioterrorism pathogens (e.g., anthrax, smallpox) and emerging infectious diseases (e.g., SARS, MRSA, Clostridium difficile) that members could encounter during the performance of their job duties, including, but not limited to, the following *(see Table A.4.3.3)*:

(1) Identification and screening
(2) Immunizations
(3) Efficacy of various PPE
(4) Health effects education
(5) Source control management
(6) Post-exposure management
(7) Post-incident management
(8) Disinfection/decontamination of firefighting and other equipment

4.5 Health Maintenance.

4.5.1 A confidential health data base shall be established and maintained for each member as specified in NFPA 1500 and NFPA 1582, and in accordance with 29 CFR 1910.1020, "Access to Employee Exposure and Medical Records."

4.5.1.1 This data base shall include:

(1) Any occupational exposures
(2) Vaccination status

4.5.1.2 The data base shall be maintained as a confidential medical record and not released unless mandated by public health statute.

4.5.2 Immunizations and Infectious Disease Screening.

4.5.2.1* The following infectious disease immunizations or infectious disease screenings shall be provided as indicated:

(1) A tuberculosis screening program composed of the following:
(a)* Baseline tuberculin testing by either of the following:
i. A two-step tuberculin skin test according to the CDC procedures
ii. A blood test for mycobacterium tuberculosis using interferon-gamma release assays (IGRAs)
(b)* Subsequent tuberculin testing at a frequency determined by annual CDC risk assessment guidelines
(2) Hepatitis B virus vaccinations and titers, as specified in CDC guidelines
(3) Hepatitis C virus screens (baseline, following occupational exposure, and if requested by the fire department physician or member)
(4) HIV screens (baseline, following occupational exposure, and if requested by the fire department physician or member)
(5) Tetanus/diphtheria vaccine or tetanus/diphtheria/acellular pertussis (Tdap)
(6) Measles, mumps, rubella (MMR) vaccine
(7) Polio vaccine
(8) Hepatitis A vaccine offered to high-risk personnel [HazMat, urban search and rescue (USAR), and SCUBA] and other personnel with frequent or expected exposures to contaminated water
(9) Varicella vaccine offered to all nonimmune personnel
(10) Influenza vaccine offered to all personnel annually
(11) Vaccines for emerging threats (e.g., SARS-CoV-2) offered to all personnel, as needed

4.5.2.1.1 The infection control officer shall ensure the immunizations listed in 4.5.2.1 are consistent with current CDC guidelines.

4.5.2.2 If a member has a positive PPD by history, CDC guidelines for management and subsequent chest radiographic surveillance shall be followed.

4.5.2.3 All members shall be immunized against infectious diseases as required by the authority having jurisdiction and by 29 CFR 1910.1030, Bloodborne Pathogens.

4.5.2.4 The fire department physician shall ensure that all members are offered currently recommended immunizations at no cost to the members.

4.5.2.5* Members who choose to decline immunizations offered by the department shall be required to sign a written declination.

4.5.2.5.1 The declination shall become part of the member's confidential health database.

4.5.2.5.2 Members shall be allowed to recant a declination at any time and receive the offered immunizations.

4.6 Infectious Exposures.

4.6.1 If a member has sustained an infectious exposure, the exposed area shall be immediately and thoroughly washed using water on mucosal surfaces and liquid soap and running water on skin surfaces.

4.6.2 If soap and running water are not available, waterless cleansers, antiseptic wipes, alcohol, or other skin cleaning agents that do not need running water shall be used until liquid soap and running water are obtained.

4.6.3 The fire department shall have an established procedure and shall train in that procedure to ensure that when a member has an infectious exposure the immediate supervisor is notified and the member is offered immediate medical evaluation.

4.6.4* The fire department shall ensure that a member who has experienced an infectious exposure (real or perceived) receives immediate medical guidance, evaluation, and, if appropriate:

(1) Post-exposure prophylaxis
(2) Confidential, post-exposure counseling and subsequent testing

4.6.5* All infectious exposures shall be recorded in writing as soon as possible after the exposure using a standardized form designed to allow for follow-up.

4.6.5.1 The record shall include the following:

(1) Description of the tasks being performed when the infectious exposure occurred
(2) Source of transmission including any relevant medical and social history of the source
(3) Portal of entry
(4) PPE utilized
(5) Disposition of medical management

4.6.5.2 The record of infectious exposures shall become part of the member's confidential health data base.

4.6.6 A complete record of the member's infectious exposures shall be available to the member upon request.

4.6.7 Infectious exposure data, without personal identifiers, also shall be added to the fire department health data base as specified in Chapter 11 of NFPA 1500.

4.6.8 Due to the hazardous nature of some communicable diseases, a member shall be required to report to the infection control officer when that member experiences a confirmed infectious exposure and is being medically treated or tested due to presenting signs or symptoms.

4.6.9 The fire department physician shall determine fitness-for-duty status after reviewing documentation of a member's infectious exposure.

Chapter 5 Fire Department Facilities

5.1* General.

5.1.1* All fire department facilities shall comply with all relevant health and infection control laws and regulations.

5.1.2 Hand Washing Capacity.

5.1.2.1 Hand washing capacity shall be available in areas of the fire station where contaminated materials are cleaned, stored, disinfected, or laundered.

5.1.2.2 If soap and running water are not available, waterless cleansers, antiseptic wipes, alcohol, or other skin cleaning agents, shall be available.

5.1.3 Hand cleaning shall occur before the member enters the fire station's living, sleeping, and/or eating areas if the member has potentially been contaminated with infectious agents.

5.2 Kitchen Areas.

5.2.1 All food preparation surfaces and all surfaces directly used for holding or hanging food preparation containers and utensils shall be of a nonporous material.

5.2.2 Shelving Above Sinks. Dish-washing areas shall be equipped with shelving or racks to drip-dry cleaned food preparation containers.

5.2.2.1 Shelving or racks shall be of nonporous material.

5.2.2.2 All drainage from the shelving or racks shall run into a sink or drainage pan that empties directly into a sanitary sewer system or septic system.

5.2.3 All kitchens shall have either double-basin sinks or two sinks.

5.2.3.1 A sprayer attachment shall be provided.

5.2.3.2 Sinks, adjacent countertops and dish drainage areas, and splash guards around the sink shall be of a nonporous material.

5.2.4* Kitchens in fire department facilities shall include the following appliances:

(1) Range
(2) Oven
(3) At least one refrigerator
(4) Dishwasher

5.2.5 Food Storage.

5.2.5.1 Perishable food that needs cold storage shall be kept at a temperature of 4°C (40°F) or lower.

5.2.5.2 Perishable food that needs freezer storage shall be kept at a temperature of –18°C (0°F) or lower.

5.2.5.3 All foods removed from their original manufactured packaging shall be kept in tightly sealed food containers or shall be wrapped with plastic food wrap.

5.2.6 Kitchens equipped with a dishwasher shall be capable of supplying water for washing at 60°C (140°F).

5.2.7 Food preparation and storage areas shall meet local health standards.

5.3 Sleeping Areas.

5.3.1 A minimum of 5.6 m^2 (60 ft^2) of floor space per bed shall be provided in sleeping areas.

5.3.2 Ventilation, heating, and cooling shall be provided in sleeping areas.

5.4 Bathrooms.

5.4.1* Doors, sinks, and other bathroom fixtures shall be designed to prevent or minimize the spread of contaminants.

5.4.2 A clearly visible sign reminding members to wash their hands shall be posted prominently in each bathroom.

5.4.3 Bathrooms shall meet local standards.

5.5 Equipment Storage Areas.

5.5.1* Emergency medical supplies and equipment stored in fire department facilities, other than those stored on vehicles, shall be stored in a dedicated, enclosed area to protect them

from temperature degradation, contamination, and other physical damage.

5.5.2 The storage area shall be secured and labeled.

5.5.3 Open and reusable emergency medical supplies and equipment shall not be stored in personal clothing lockers or in areas used for the following:

(1) Food preparation and cooking
(2) Living
(3) Sleeping
(4) Recreation
(5) Personal hygiene, unless physically separated in a locker or room

5.5.4 Potentially Contaminated Personal Protective Equipment.

5.5.4.1 Potentially contaminated personal protective equipment shall be stored in a dedicated, well-ventilated area or room.

5.5.4.2 Potentially contaminated PPE shall not be allowed in personal clothing lockers or in areas used for the following:

(1) Food preparation and cooking
(2) Living
(3) Sleeping
(4) Recreation
(5) Personal hygiene

5.5.5 Contaminated Storage.

5.5.5.1 Areas or containers for the temporary storage of contaminated medical supplies or equipment prior to disinfection or disposal shall be separated physically from members in facilities or on vehicles.

5.5.5.2 Such areas or containers shall not be used for any other purpose.

5.6 Cleaning Areas.

5.6.1 A designated cleaning area shall be provided in each fire station for the cleaning of PPE, portable equipment, and other clothing.

5.6.2* The cleaning area shall have ventilation, lighting, and drainage connected to a sanitary sewer system or septic system.

5.6.3 The designated cleaning area shall be physically separate from areas used for the following:

(1) Cleaning of food and cooking utensils
(2) Food preparation
(3) Personal hygiene
(4) Sleeping
(5) Living

5.6.4 The designated cleaning area shall be physically separate from the disinfecting facility and laundry facility.

5.7 Disinfecting Facilities.

5.7.1* Fire departments that provide emergency medical services shall provide or have access to disinfecting facilities for the cleaning and disinfecting of emergency medical equipment.

5.7.1.1 Medical equipment shall be disinfected at a fire station only where a disinfecting facility that meets the requirements of Section 5.7 is provided.

5.7.1.2 Disinfection shall not be conducted in fire station kitchen, living, sleeping, or personal hygiene areas.

5.7.2 Disinfecting facilities in fire stations shall meet the following requirements:

(1) They shall be lighted.
(2) They shall be vented to the outside environment.
(3) They shall be fitted with floor drains connected to a sanitary sewer system or septic system.
(4) They shall be designed to prevent contamination of other fire station areas.

5.7.3 Disinfecting facilities shall be equipped with racks or shelving to drip-dry cleaned equipment.

5.7.3.1 Racks or shelving shall be of nonporous material.

5.7.3.2 All drainage from the racks or shelving shall run into a sink or drainage pan that empties directly into a sanitary sewer system or septic system.

5.7.4* Where the cleaning of protective ensembles and contaminated station/work uniforms is conducted in fire stations, the fire department shall provide at least one washing machine and clothes dryer for the dedicated purpose of cleaning protective ensembles, contaminated station/work uniforms, and other contaminated clothing.

5.7.4.1 The washer and dryer shall be located in the designated cleaning area.

5.7.4.2 Noncontaminated clothing and laundry shall not be washed in the machine(s) used for cleaning protective ensembles and contaminated station/work uniforms or contaminated clothing.

5.7.5 If the fire department allows the washing of noncontaminated laundry, including bedding, in the fire station, a separate washer/dryer shall be available for that purpose and located in an area that is remote from the designated cleaning area required by 5.7.1.

5.8 Disposal Areas.

5.8.1 Medical waste or other regulated waste shall be disposed of in a designated disposal area.

5.8.2 Medical waste or other regulated waste shall not be disposed of in fire station kitchen, living, sleeping, or personal hygiene areas.

5.8.3 The designated disposal area shall be physically separate from areas used for the following:

(1) Food preparation
(2) Cleaning of food and cooking utensils
(3) Personal hygiene
(4) Sleeping
(5) Living

5.8.4 The designated disposal area shall be physically separate from the designated cleaning area and the disinfecting facility.

5.8.5 The designated disposal area shall be secured and labeled.

5.8.6 The designated disposal area and the handling, storage, transportation, and disposal of medical waste or other regulated waste shall comply with all applicable state, provincial, and local laws and regulations.

Chapter 6 Fire Department Apparatus

6.1 General.

6.1.1* All fire department vehicles involved in providing any level of emergency medical services (EMS) shall comply with health and infection control laws and regulations.

6.1.2 All fire department vehicles shall be cleaned and disinfected on a routine basis, as established by the AHJ, and following exposure to a potentially infectious incident.

6.1.3 At a minimum, waterless cleansers, antiseptic wipes, alcohol, or other skin cleaning agents shall be available on the vehicle.

6.2 Vehicles Used to Transport Patients. The provisions of Section 6.2 shall apply to all fire department vehicles including, but not limited to, rescue vehicles, ambulances, and nonemergency vehicles that are used to transport patients to or from hospitals or other health care facilities.

6.2.1 All engineering controls directed toward infection control in vehicles used to transport patients shall meet the requirements specified in NFPA 1917.

6.2.2 The engineering controls shall include, but shall not be limited to, those referenced in NFPA 1917.

6.2.3 Engineering controls shall be used to augment but not to replace safe infection control training and practices and appropriate personal protective clothing and equipment, as outlined in this standard and in relevant state, provincial, or federal regulations.

6.2.4* Ventilation.

6.2.4.1 For comfort, not infection control purposes, the GSA Federal Specifications KKK-A-1822F requires ventilation systems shall provide complete ambient air exchanges in both driver and patient compartments at least every 2 minutes when the vehicle is stationary.

6.2.4.2 When the vehicle is stationary, ventilation systems shall provide complete ambient air exchanges in both driver and patient compartments.

6.2.5* Ambient Air Filtration. To prevent airborne pathogen exposure, fire department vehicles used to transport patients shall have properly fitted, high-efficiency particle (HEPA) filters integrated into the patient compartment heating and air conditioning system.

6.2.6* Vehicle Interior Surfaces. The interiors of fire department vehicles used to transport patients shall meet or exceed the requirements of NFPA 1917 and be free of all sharp projections, and the material in the interior shall be physically and chemically inert to detergents and other solvents or solutions used for cleaning and disinfecting.

Chapter 7 Protection for Emergency Medical Service Operations

7.1 Personnel.

7.1.1 Prior to any contacts with patients, members shall cover all areas of abraded, lacerated, chapped, irritated, or otherwise damaged skin with adhesive dressings.

7.1.2* Any member who has skin or mucosal contact with body fluids shall thoroughly wash the exposed area immediately using water or saline on mucosal surfaces and liquid soap and running water on skin surfaces.

7.1.3 If soap and running water are not available, waterless cleansers, antiseptic wipes, alcohol, or other skin cleaning agents that do not need running water shall be used until liquid soap and running water are obtained.

7.1.4 After removal of any PPE, including gloves, all members shall wash their hands immediately or as soon as feasible.

7.1.5* The infection control officer shall consult with the fire department physician regarding the need for restrictions for members with infectious diseases who present a risk of transmitting their infections to other members of the fire service or the general public.

7.2 Personal Protective Equipment.

7.2.1 Members providing any emergency medical services shall don medical gloves prior to initiating such care to protect against the variety of diseases, modes of transmission, and unpredictable nature of the work environment.

7.2.1.1 Medical gloves shall be a standard component of emergency response equipment.

7.2.1.2 Latex-free or powder-free medical gloves shall be provided for members with a latex allergy or for members providing care for a patient with a latex allergy.

7.2.2 Medical gloves shall be removed as soon as possible after the termination of patient care, taking care to avoid skin contact with the glove's exterior surface, and shall be disposed of in accordance with 8.5.5.

7.2.3 Hands shall be washed as specified in Section 8.1 following removal of medical gloves.

7.2.4 All PPE used while providing emergency medical service shall meet the requirements of NFPA 1999 and shall be donned prior to beginning any emergency medical service.

7.2.5 PPE used while providing emergency medical services, including air purifying respirators (e.g., N-95 or better), masks, splash-resistant eyewear, medical gloves, and fluid-resistant clothing, shall be present on all fire department vehicles that support emergency medical service operations.

7.2.5.1 NIOSH-approved respirators, FDA-cleared medical masks, barrier face coverings (source control devices), splash-resistant eyewear, and fluid-resistant clothing shall be used by members providing treatment during situations involving spurting blood, trauma, or childbirth, or other situations where direct contamination is anticipated or possible.

7.2.5.2* Appropriate respiratory protection shall be used during situations involving potential exposure to airborne pathogens.

7.2.5.3* During potentially contagious disease incidents, barrier face coverings (source control devices) or face shields shall be used on the patient if safety permits.

7.2.5.4 During potentially contagious disease incidents, barrier face coverings (source control devices) shall be used by the member during nonpatient interactions. *(See A.7.2.5.3.)*

7.2.6 Resuscitation Equipment.

7.2.6.1 Resuscitation equipment, including pocket masks, shall be available on all fire department vehicles that support emergency medical service operations.

7.2.6.2 The equipment shall be used by members performing airway management.

7.2.7 Structural firefighting gloves shall meet the requirements of NFPA 1971.

7.2.8 Structural firefighting gloves shall be worn by members in any situation where sharp or rough surfaces or a potentially high heat exposure is likely to be encountered, such as patient extrication.

7.2.9* Medical gloves shall not be worn under structural firefighting gloves.

7.2.10 Cleaning gloves shall be reusable, heavy-duty, midforearm length, and designed to provide limited protection from abrasions, cuts, snags, and punctures.

7.2.11 Cleaning gloves shall provide a barrier against body fluids, cleaning fluids, and disinfectants.

7.2.12 Cleaning gloves, splash-resistant eyewear, and fluid-resistant clothing shall be worn by members during cleaning or disinfecting of clothing or equipment potentially contaminated during emergency medical service operations.

7.2.13 Members shall not eat, drink, smoke, apply cosmetics or lip balm, or handle contact lenses while wearing cleaning gloves.

7.3 Handling of Sharp Objects.

7.3.1 All members shall take precautions during procedures to prevent injuries caused by needles, scalpel blades, and other sharp instruments or devices.

7.3.2 All used sharp objects, such as needles, scalpels, catheter stylets, and other potentially contaminated sharp objects, shall be considered infectious and shall be handled with extraordinary care.

7.3.3 Except for those that are automatic or self-sheathing, needles shall not be manually recapped, bent, or broken.

7.3.4 Following use, all sharp objects shall be placed immediately in sharps containers.

7.3.5 Sharps containers shall be located in all patient transport vehicles and shall be readily available in such items as drug boxes, trauma kits, and IV kits.

7.3.6 All sharps disposal containers shall be compliant with the following:

(1) NIOSH Publication No. 97-111, *Selecting, Evaluating, and Using Sharps Disposal Containers*
(2) OSHA Bloodborne Pathogens Standard (29 CFR Part 1910.1030)

Chapter 8 Cleaning, Disinfecting, and Disposal

8.1 Skin Washing.

8.1.1 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 PPE
(3) After cleaning and disinfecting emergency medical equipment
(4) After cleaning PPE
(5) After any cleaning function
(6) After using the bathroom
(7) Before and after handling food or cooking and food utensils

8.1.2* Hands and contaminated skin surfaces shall be washed with nonabrasive liquid soap and water by lathering the skin and vigorously rubbing together all lathered surfaces for at least 20 seconds, followed by thorough rinsing under running water.

8.1.3 Where provision of handwashing facilities is not feasible, appropriate antiseptic hand cleansers in conjunction with clean cloth, paper towels, or antiseptic towelettes shall be used.

8.1.4 Where antiseptic hand cleaners or towelettes are used, hands shall be washed with nonabrasive soap and running water as soon as feasible.

8.2 Disinfectants.

8.2.1 All disinfectants shall be as follows:

(1) Approved by and registered as tuberculocidal with the US Environmental Protection Agency (EPA)
(2) Effective for the hazards likely to be encountered (e.g., C. difficile, coronavirus)
(3) Used in accordance with the manufacturer's instructions for the material or equipment being disinfected

8.2.2 Care shall be taken in the use of all disinfectants.

8.2.2.1 Members shall be aware of the flammability and reactivity of disinfectants and shall follow the manufacturer's instructions.

8.2.2.2 Disinfectants shall be used only with ventilation and while wearing appropriate infection control garments and equipment, including, but not limited to, cleaning gloves, face protection devices, and aprons.

8.2.3 Disinfecting shall take place in the designated disinfecting facility as specified in Section 5.7.

8.3 Emergency Medical Equipment and Environmental Surfaces.

8.3.1 Where emergency medical equipment cleaning is performed by members, it shall take place in a designated disinfecting facility as specified in Section 5.7, and appropriate PPE shall be available, including the following:

(1) Splash-resistant eyewear
(2) Cleaning gloves
(3) Fluid-resistant clothing
(4) Respiratory protection, as appropriate

8.3.2 Dirty or contaminated emergency medical equipment shall not be cleaned or disinfected in fire station kitchen, living, sleeping, or personal hygiene areas.

8.3.3 Personal protective equipment shall be used wherever there is a potential for exposure to body fluids or potentially infectious material during cleaning or disinfecting.

8.3.4 Prior to cleaning and disinfecting, dirty or contaminated emergency medical equipment shall be stored separately from cleaned and disinfected emergency medical equipment.

8.3.5 Disinfectants meeting the requirements specified in 8.2.1 shall be used in accordance with the manufacturer's instructions with special attention to prescribed contact time.

8.3.6 Dirty or contaminated runoff from emergency medical equipment, environmental surfaces, and cleaning and disinfecting solutions shall be drained into a sanitary sewer system or septic system.

8.3.7 Emergency medical equipment, metal, and electronic equipment shall be cleaned in a manner appropriate for the equipment and then disinfected.

8.3.7.1 Only disinfectants that are chemically compatible with the equipment or the environmental surface to be disinfected and that meet the requirements specified in 8.2.1 shall be used.

8.3.8 Reusable emergency medical equipment that comes in contact with mucous membranes shall require cleaning and a high-level disinfection or sterilization in accordance with the medical equipment manufacturer's instructions after each use *(see Annex C).*

8.4 Clothing and Personal Protective Equipment.

8.4.1 Fire Department Role.

8.4.1.1* The fire department shall clean, launder, and dispose of personal protective equipment at no cost to the member.

8.4.1.2 The fire department also shall repair or replace personal protective equipment as needed to maintain its effectiveness, at no cost to the member.

8.4.2 If a garment(s) is penetrated by blood or other potentially infectious materials, the garment(s) shall be removed immediately or as soon as feasible.

8.4.3 All personal protective equipment shall be removed prior to leaving the work area.

8.4.4 Clothing that is contaminated with body fluids shall be placed in leakproof bags, sealed, and transported for cleaning or disposal.

8.4.5 Contaminated Clothing.

8.4.5.1 Cleaning or disinfecting of protective ensembles and contaminated station/work uniforms shall be performed by a cleaning service or at a fire department facility equipped to handle contaminated clothing.

8.4.5.2 The cleaning of contaminated PPE, station/work uniforms, or other clothing shall not be done at home.

8.4.6 Structural firefighting protective ensembles and the individual ensemble elements that include garments, helmets, gloves, footwear, and interface components shall be maintained, cleaned, and decontaminated in accordance with NFPA 1851. *(See also Annex C.)*

8.4.7 When a garment is contaminated, it shall be cleaned as soon as possible.

8.4.8 When PPE is removed, it shall be placed in a designated area or container for storage until cleaned or disposed of.

8.4.9 Self-contained breathing apparatus (SCBA) cleaning, maintenance, and care shall be in accordance with NFPA 1852.

8.4.9.1 Organizations in the United States shall also comply with 29 CFR 1910.134, Respiratory Protection, Paragraph (h) "Maintenance and Care of Respirators," and Appendix B-2, "Respiratory Cleaning Procedures (Mandatory)."

8.4.9.2 Organizations outside the United States shall also comply with all applicable national, state/provincial, and local regulations.

8.4.10* APR and SCBA Facepieces Exposed to Airborne and Liquidborne Pathogens.

8.4.10.1 Individuals involved in the cleaning and disinfection of air-purifying respirator (APR) and SCBA facepieces shall be trained in cleaning and disinfecting procedures in accordance with 8.4.10 and shall be familiar with the facepieces being cleaned and disinfected, including their inspection and assembly procedures.

8.4.10.2* Individuals handling contaminated APR and SCBA facepieces shall wear a minimum of a protective garment, gloves, goggles, and a respirator appropriate for the type of disinfectant and hazards associated with the respective airborne and liquidborne pathogens.

8.4.10.3* Where available, the specific instructions provided by the manufacturer shall be used for the cleaning and disinfection of APR and SCBA facepieces that have been exposed to airborne or liquidborne pathogens.

8.4.10.4* In the absence of specific cleaning and disinfection instructions, the procedures in 8.4.10.4.1 through 8.4.10.4.10.2 shall be used.

8.4.10.4.1 If filters or cartridges are present, the filters and cartridges shall be removed from the facepiece. Reusable filters or cartridges shall be cleaned as specified in 8.4.10.4.10.

8.4.10.4.2 Facepieces shall be further disassembled by removing speaking diaphragms, demand and pressure-demand valve assemblies, hoses, or any components recommended by the manufacturer.

8.4.10.4.3 The facepiece shall be washed in warm [43°C (110°F) maximum] water with a mild detergent or with a cleaning agent recommended by the manufacturer.

8.4.10.4.3.1 Use of a stiff bristle, not wire, brush shall be permitted to facilitate the removal of dirt.

8.4.10.4.4 Facepiece components shall be thoroughly rinsed in clean, warm [43°C (110°F) maximum], preferably running water.

8.4.10.4.4.1 If the rinsing is accomplished in a bucket or other vessel, the bucket or vessel shall be drained.

8.4.10.4.5* When the cleaning agent used does not contain a disinfecting agent, respirator components shall be immersed for 2 minutes in one of the following:

(1) A hypochlorite solution (50 ppm chlorine) that is made by adding approximately 1 mL laundry bleach to 1 L water at 43°C (110°F).
(2) An aqueous solution of iodine (50 ppm iodine) that is made by adding approximately 0.8 mL tincture of iodine (6 g to 8 g ammonium and/or potassium iodide/100 mL 45 percent alcohol) to 1 L water at 43°C (110°F).

(3)* Other commercially available cleaning agents of equivalent disinfectant quality used as directed in terms of its concentration, application, and dwell time, if their use is recommended or approved by the respirator manufacturer; where possible, EPA-registered disinfectants shall be used that are specific to the pathogens involved.

8.4.10.4.6 Following disinfection, facepiece components shall be thoroughly rinsed in clean, warm [43°C (110°F) maximum], preferably running water.

8.4.10.4.6.1 If the rinsing is accomplished in a bucket or other vessel, the bucket or vessel shall be drained.

8.4.10.4.7* Facepiece components shall be hand-dried with a clean lint-free cloth or air-dried.

8.4.10.4.8 The facepiece shall be reassembled, replacing filters, cartridges, and canisters in accordance with manufacturer's instructions, where necessary.

8.4.10.4.9 The respirator shall be inspected in accordance with the manufacturer's instructions to ensure that all components work properly and any damaged or defective components shall either be repaired or replaced.

8.4.10.4.10* The outside of any filters or cartridges to be reused shall be wiped down with a disinfectant wipe and then allowed to air dry.

8.4.10.4.10.1 The filter media shall not be wetted or exposed to liquid disinfectant.

8.4.10.4.10.2 Any filter or cartridge that has been soiled, contaminated, or clogged shall be replaced.

8.5* Disposal of Materials.

8.5.1 Sharps containers shall be disposed of in accordance with applicable federal, state, provincial, and local regulations.

8.5.2 Contaminated sharps shall be discarded immediately or as soon as feasible in containers meeting the OSHA Bloodborne Pathogens Standard (29 CFR Part 1910.1030) for the following features:

(1) Closable
(2) Puncture-resistant
(3) Leakproof on sides and bottom
(4) Labeled or color-coded in accordance with Section 8.8

8.5.2.1 In addition, the container shall be designed to ensure the following:

(1) Only one sharp can be disposed of at a time.
(2) A hand cannot enter the container.
(3) The container remains closed when not in use.
(4) The container retains the contents during transport for disposal.

8.5.3 During use, containers for contaminated sharps shall meet the following requirements:

(1) They shall be accessible to personnel.
(2) They shall be located as close as is feasible to the immediate area where sharps are used or anticipated to be found.
(3) They shall be maintained upright throughout use.
(4) They shall be replaced routinely and not be allowed to overfill.

8.5.4 Moving Containers.

8.5.4.1 When moving containers of contaminated sharps from the area of use, the containers shall be closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

8.5.4.2 Sharps containers shall be placed in a secondary container if leakage is possible.

8.5.5 The following shall be placed in leakproof bags, sealed, and disposed of as medical waste:

(1) Contaminated disposable medical supplies and equipment
(2) Contaminated disposable PPE
(3) Contaminated wastes

8.5.6 Noncontaminated Waste Collection.

8.5.6.1 Noncontaminated disposable medical supplies and equipment, noncontaminated disposable PPE, and noncontaminated wastes shall be permitted to be collected in closable waste containers and shall be disposed of.

8.5.6.2 Such waste collection containers shall not be located in any fire station kitchen, living, or sleeping area.

8.5.7 Where it has been determined by the infection control officer that it is not possible for nondisposable items to be disinfected, they shall be placed in leakproof bags, sealed, and disposed of as medical waste.

8.6 Linen.

8.6.1 Contaminated laundry shall be handled as little as possible and with a minimum of agitation.

8.6.2 Contaminated laundry shall be bagged or put into containers at the location where used and shall not be sorted or rinsed at the location of use.

8.6.3 Contaminated laundry shall be placed and transported in bags or containers labeled or color-coded in accordance with Section 8.8.

8.6.4 Wherever contaminated laundry is wet and presents a reasonable likelihood of soaking through or leaking from the bag or container, the laundry shall be placed and transported in bags or containers that prevent soak-through or leakage, or both, of fluids to the exterior.

8.6.5 The employer shall ensure that employees who have contact with contaminated laundry wear PPE commensurate with the risk.

8.7 Housekeeping.

8.7.1 Fire Department Role.

8.7.1.1 The fire department shall ensure that the worksite is maintained in a clean and sanitary condition.

8.7.1.2 The fire department shall determine and implement a written schedule for cleaning and method of decontamination based on the following:

(1) Location within the facility
(2) Type of surface to be cleaned
(3) Type of soil present
(4) Tasks or procedures performed

8.7.2* After contact with blood or other potentially infectious materials, equipment and environmental and working surfaces shall be cleaned and decontaminated using any cleaner or disinfectant agent intended for environmental use.

8.7.3 Contaminated work surfaces shall be decontaminated with a disinfectant at the following times:

(1) After completion of an incident involving emergency medical service operations
(2) Immediately or as soon as feasible where surfaces are overtly contaminated
(3) Immediately after any spill of blood or other potentially infectious materials
(4) At the end of the workshift if the surface was possibly contaminated since the last cleaning

8.7.4 All bins, pails, cans, and similar receptacles intended for reuse that have a reasonable likelihood of becoming contaminated with blood or other potentially infectious materials shall be inspected and decontaminated on a regularly scheduled basis and cleaned and decontaminated immediately or as soon as feasible upon visible contamination.

8.8 Labeling.

8.8.1 Warning labels shall be affixed to containers of regulated waste and other containers used to store, transport, or ship blood or other potentially infectious materials, such as sharps.

8.8.2 Labels required by Section 8.8 shall include the symbol shown in Figure 8.8.2.

8.8.3 The labels shall be fluorescent orange or orange-red, or predominantly so, with lettering or symbols in a contrasting color.

8.8.4 The labels required shall be affixed as closely as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

8.8.5 The use of red bags or red containers shall be permitted to be substituted for the use of labels.

8.8.6 Labels required for contaminated equipment shall specify which portions of the equipment remain contaminated.

8.8.7 Regulated waste that has been decontaminated shall not be required to be labeled or color-coded.

FIGURE 8.8.2 Department of Transportation (DOT) Symbol for Biohazards.

Annex A Explanatory Material

Annex A is not a part of the requirements of this NFPA document but is included for informational purposes only. This annex contains explanatory material, numbered to correspond with the applicable text paragraphs.

A.1.4.1 "Applicable federal regulations of the Occupational Safety and Health Administration" refers specifically to 29 CFR 1910.1030, "Bloodborne Pathogens."

"Guidelines of the US Centers for Disease Control and Prevention" refers specifically to *Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health Care and Public Safety Workers.*

A.3.2.1 Approved. The National Fire Protection Association does not approve, inspect, or certify any installations, procedures, equipment, or materials; nor does it approve or evaluate testing laboratories. In determining the acceptability of installations, procedures, equipment, or materials, the authority having jurisdiction may base acceptance on compliance with NFPA or other appropriate standards. In the absence of such standards, said authority may require evidence of proper installation, procedure, or use. The authority having jurisdiction may also refer to the listings or labeling practices of an organization that is concerned with product evaluations and is thus in a position to determine compliance with appropriate standards for the current production of listed items.

A.3.2.2 Authority Having Jurisdiction (AHJ). The phrase "authority having jurisdiction," or its acronym AHJ, is used in NFPA documents in a broad manner, since jurisdictions and approval agencies vary, as do their responsibilities. Where public safety is primary, the authority having jurisdiction may be a federal, state, local, or other regional department or individual such as a fire chief; fire marshal; chief of a fire prevention bureau, labor department, or health department; building official; electrical inspector; or others having statutory authority. For insurance purposes, an insurance inspection department, rating bureau, or other insurance company representative may be the authority having jurisdiction. In many circumstances, the property owner or his or her designated agent assumes the role of the authority having jurisdiction; at government installations, the commanding officer or departmental official may be the authority having jurisdiction.

A.3.3 General Definitions. For a more complete glossary of terms associated with infection control, refer to the US Fire Administration Publication FA-112, *Guide to Managing an Emergency Service Infection Control Program.*

A.3.3.9 Disinfection. Disinfection is not the same as sterilization.

A.3.3.11 Engineering Controls. The engineering controls described in this standard are designed to reduce the risk of occupational exposure to infectious diseases for fire department members.

A.3.3.18 Fire Department. The term *fire department* includes any public, governmental, private, industrial, or military organization providing these services.

A.3.3.19 Fire Department Facility. This does not include locations where a fire department can be summoned to perform emergency operations or other duties, unless such premises are normally under the control of the fire department.

A.3.3.24 Health and Safety Officer. This individual can also be the incident safety officer or that role can be assigned to another individual as a separate function.

A.3.3.31 Infection Control Program. This program includes, but is not limited to, implementation of written policies and standard operating procedures regarding exposure follow-up measures, immunizations, member health screening programs, and educational programs.

A.3.3.32 Kitchen. Cleaning and washing of food service equipment and utensils also occur in this area.

A.3.3.35 Medical Gloves. The requirement for FDA registration of gloves provides further benefit to the emergency responder. Although the FDA currently does not require that medical gloves used when providing emergency medical services be registered as medical devices, these same gloves, when worn by emergency personnel inside hospitals and other health care facilities, must be registered as Class 1 medical devices.

Although FDA registration is not a certification of the product, it is a process by which the manufacturer is required to provide substantiation for any and all claims made regarding the performance of the product (such as its viral barrier performance, levels of quality assurance, and sterility) in either product packaging or marketing literature. The FDA either affirms or denies these claims.

Therefore, this requirement helps to ensure that fire service and emergency medical service personnel are provided with accurate information about the products they purchase.

A.3.3.37 Member. A fire department member can be a full-time or part-time employee or a paid or unpaid volunteer, can occupy any position or rank within the fire department, and can engage in emergency or non-emergency operations. [**1500,** 2021]

A.3.3.41 Pathogens. These pathogens have been grouped according to their routine mode of transmission per the Ryan White HIV/AIDS Treatment Extension Act of 2009.

A.3.3.41.2 Aerosolized Droplet Transmission. These droplets generally transmit diseases through the air over short distances (approximately 6 ft), do not cause prolonged airspace contamination, and are too large to be inhaled into the trachea and lung. Potentially life-threatening infectious diseases routinely transmitted through aerosolized droplets include the following:

(1) Diphtheria *(Corynebacterium diphtheriae)*
(2) Novel influenza A viruses as defined by the Council of State and Territorial Epidemiologists for Meningococcal disease *(Neisseria meningitidis)*
(3) Mumps (mumps virus)
(4) Pertussis *(Bordetella pertussis)*
(5) Plague, pneumonic *(Versinia pestis)*
(6) Rubella (German measles; rubella virus)
(7) SARS-CoV

A.3.3.41.3 Bioterrorism or Biologic Warfare Agents. Potentially life-threatening infectious diseases caused by agents potentially used for bioterrorism or biological warfare include those caused by any transmissible agent included in the U.S. Department of Health and Human Services (HHS) and the U.S. Department of Agriculture Select Agents and Toxins list. Many are not routinely transmitted human to human but can be transmitted via exposure to contaminated environments. The HHS Select Agents and Toxins list is updated regularly and can be found on the National Select Agent Registry website: www.selectagents.gov/resources/List_of_Select_Agents_and_Toxins_2012-12-4-English.pdf.

A.3.3.41.4 Contact and Body Fluid Exposures. Potentially life-threatening infectious diseases that are routinely transmitted by contact or body fluid exposures include the following:

(1) Anthrax, cutaneous *(Bacillus anthracis)*
(2) Hepatitis B (HBV)
(3) Hepatitis C (HCV)
(4) Human immunodeficiency virus (HIV)
(5) Rabies (rabies virus)
(6) Vaccinia (vaccinia virus)
(7) Viral hemorrhagic fevers (Lassa, Marburg, Ebola, Crimean-Congo, and other viruses yet to be identified)

For most viral hemorrhagic fevers (VHFs), routine transmission is limited to transmission from a zoonotic reservoir or direct contact with an infected person (e.g., Ebola virus, Marburg virus) or through arthropod-borne transmission (Rift Valley fever, Crimean-Congo hemorrhagic fever). For a small number of VHF viruses, transmission can occur through droplet transmission (e.g., Nipah virus); however, prolonged close contact is likely necessary. Aerosol transmission does not occur in natural (nonlaboratory) settings.

A.3.3.43 Personal Protective Equipment (PPE). Personal protective equipment for cleaning and disinfecting includes splash-resistant eyewear, cleaning gloves, and fluid-resistant clothing.

A.3.3.47 Protective Ensemble. The elements of the protective ensemble include, but are not limited to, garments, helmets, hoods, gloves, and footwear.

A.3.3.54 Sterilization. This procedure typically is not performed at fire department facilities or by members.

A.3.3.56 Universal Precautions. Under circumstances in which differentiation between body fluids is difficult or impossible, all body fluids are considered potentially infectious materials. An infection control strategy that considers all body substances potentially infectious is called *body substance isolation.*

A.4.1.3(4) Other protective equipment includes items such as SCBA and PASS.

A.4.1.3(6) See NFPA 1500, NFPA 1901, and NFPA 1917 for additional design and cleaning requirements.

A.4.2 The risk of occupational exposure to a communicable disease poses a real hazard on a daily basis for department members. It is possible for an occupational exposure to a communicable disease to occur during a variety of emergency operations involving delivery of service to the public. Prevention aspects should be properly addressed through a written infection control program.

Infection control should be integrated into the department's overall risk management process. By utilizing the risk management process, risks are identified according to the job tasks performed by department members. Risks should be evaluated based on the frequency and severity of occurrence within the community. Control measures should be implemented based upon the risk evaluation and services performed by the department. A monitoring process evaluates the effectiveness of this program and determines if changes should be made.

Risk management is an ongoing process that should be continually evaluated and revised based on the needs and requirements of the department. The health and safety officer, the infection control officer, and the department's occupational safety and health committee should ensure that evaluations and revisions occur at least annually.

A.4.2.1 The risk to personnel of exposure to infection poses a real hazard and should be properly addressed through a written infection control program that should include, but not be limited to, the following:

(1) Training and education
(2) PPE
(3) Health maintenance and vaccinations
(4) Appropriate supervision
(5) Incident operations
(6) Facility safety
(7) Medical follow-up of an occupational exposure

A.4.3.1 For infectious disease training guidelines, the following should be consulted:

(1) *Infection Control for Emergency Response Personnel: The Supervisor's Role (Student Manual),* U.S. Fire Administration, National Fire Academy
(2) *A Curriculum Guide for Public Safety and Emergency Response Workers, Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus,* U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control and Prevention
(3) *Training for Hazardous Material Response: Infectious Diseases,* International Association of Fire Fighters (IAFF)

A.4.3.3 Table A.4.3.3 summarizes information on the specific diseases/infections that are of greatest concern.

A.4.4.3 The infection control officer needs to maintain contact with any person or agency that has an impact on the fire department infection control program, whether internal, external, local, statewide, provincewide, or nationwide. The officer should also be familiar with Public Law 111-87, The Ryan White HIV/AIDS Treatment Extension Act of 2009, Final Rule, and enforce the requirement portions of that law. The Ryan White HIV/AIDS Treatment Extension Act of 2009, Part G, mandates notification of EMS personnel after they have been exposed to a patient with suspected or confirmed infectious diseases (The Ryan White Life Threatening Disease List and Reporting Guidelines).

Networking is a very important part of the infection control program. One resource is the Association for Professionals in Infection Control and Epidemiology (APIC), 1275 K Street, NW, Suite 1000, Washington, DC 20005-4006, www.apic.org. This hospital-based organization provides information on all components of the infection control program.

An additional source of information is the *Morbidity and Mortality Weekly Report,* published by the CDC. A free e-mail subscription is available on the CDC website at www.cdc.gov/mmwr.

A.4.5.2.1 Current CDC guidelines recommend Tdap to replace a Td booster for:

(1) Adults who have not received Tdap previously.
(2) Adults with incomplete or unknown Td vaccine.
(3) Adults with unknown or incomplete history of completing a three-dose primary vaccination series with Td-containing vaccines should begin or complete primary vaccination series with Tdap substituted for the first dose of the Td series.

Once one Tdap dose is given, a Td booster is recommended at least every 10 years.

A.4.5.2.1(1)(a) Firefighters, especially those performing EMS duties, should be provided baseline screening for tuberculosis upon hiring or joining a department. Two types of tuberculin tests are available: skin testing and blood testing. If the skin test is selected, OSHA requires and the CDC recommends a two-step test. A one-step test can be used if the candidate has a documented negative skin test within the past 12 months. The CDC provides guidance for how to conduct the skin tests. See "Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health-Care Settings."

The FDA has approved several blood tests to screen for mycobacterium tuberculosis. The blood tests seem to have some advantages when compared to the skin testing [e.g., reduced number of clinic visits, no cross-reactivity with atypical mycobacterium, no confounding in persons vaccinated with bacillus Calmette-Guerin (e.g,. the TB vaccine)]. However, at this time, both screening tests (blood or skin) are appropriate. See "Guidelines for Using the QuantiFERON-TB Gold Test for Detecting Mycobacterium Tuberculosis Infection, United States," and "QuantiFERON-TB Blood Testing in the Occupational Setting." Results of both skin and blood tests should be considered in the context of public health and medical factors.

A.4.5.2.1(1)(b) Subsequent tuberculin testing should be targeted, and at a frequency indicated by the risk classification of the fire department. CDC provides guidelines for conducting tuberculosis risk assessments for health care settings, and these guidelines are also relevant for fire departments. If needed, local public health officials can provide assistance with these annual tuberculosis risk assessments. Relevant data for fire departments include the rate of TB in the community, rate of TB in the population covered by the department, if persons with unrecognized TB disease were encountered during the previous 5 years, what environmental controls are in place, and results of the fire department's TB screening program.

Fire departments with a low risk for TB exposure (e.g., no cases of TB in the covered population) could consider TB screening only when an exposure to *M. tuberculosis* has occurred. Advantages include fewer false-positive test results among firefighters, since fewer tests will be performed. (See *Health Hazard Evaluation Report: Evaluation of Tuberculin Skin Test Conversions at a Mississippi Fire Department.*) This in turn will lessen the potential for firefighters to be placed on drug therapy for latent tuberculosis infection, reduce the rate of complications of that drug therapy, and result in lower occupational medical surveillance costs for the department. Disadvantages include a greater possibility of not identifying, in a timely manner, a firefighter's exposure to TB either occupationally or during off-duty activities. Fire departments at a medium or high risk for TB exposure would need to not only continue with a screening program, but also look at environmental controls to reduce exposure.

EMS personnel should be included in the follow-up contact investigations of patients with infectious TB disease. The Ryan White HIV/AIDS Treatment Extension Act of 2009 mandates notification of EMS personnel after they have been exposed to a patient with suspected or confirmed infectious TB disease.

Table A.4.3.3 Disease Information for Emergency Response Personnel

Disease/Infection	Mode of Transmission	Is Vaccine Available?	Signs and Symptoms
AIDS/HIV (human immunodeficiency virus)	Needle stick, blood splash into mucous membranes (e.g., eyes, mouth), blood contact with open wound	No	Fever, night sweats, weight loss, cough
Anthrax	Biowarfare and naturally acquired: spore-contaminated surfaces/material contacting one's skin (cutaneous anthrax), or breathing of spores (inhalation anthrax)	Yes	Cutaneous: progressive skin lesion(s) from papule to vesicle to black eschar
Bioterrorism agents (see anthrax, smallpox, pneumonic plague)			
Chicken pox (see varicella)			
Clostridium difficile	Contact with stool contaminated surfaces	No	Diarrhea, dehydration, fever, abdominal pain, bloating
German measles (see rubella)			
Hemorrhagic fevers	Inhalation, blood, body fluids	No	Fever, bleeding
Hepatitis A, Hepatitis E	Contaminated food/water	Yes	Fever, loss of appetite, jaundice, fatigue
Hepatitis B (HBV)	Needle stick, blood splash into mucous membranes (e.g., eye or mouth), blood contact with open wound; possible exposure during mouth-to-mouth resuscitation	Yes	Fever, fatigue, loss of appetite, nausea, headache, jaundice
Hepatitis C	Same as hepatitis B	No	Same as hepatitis B
Hepatitis D	Same as hepatitis B; dependent on HBV (past or present) to cause infection	No	A complication of HBV infection; can increase severity of HBV infection
Herpes simplex (cold sores)	Contact of mucous membrane with moist lesions; fingers at particular risk for becoming infected	No	Skin lesions located around mouth
Infectious diarrhea: *Campylobacter, Salmonella, Shigella, E. Coli*	Foodborne	No	Fever, diarrhea, vomiting, abdominal pains
Influenza	Respiratory aerosols	Yes	Fever, fatigue, loss of appetite, nausea, headache
Lice: head, body, pubic	Close head-to-head contact; both body and pubic lice require intimate contact (usually sexual) or sharing of intimate clothing	No	Severe itching and scratching, often with secondary infection; scalp and hairy portions of body can be affected; eggs of head lice (nits) attach to hairs as small, round, gray lumps
Measles (see rubella)			
Meningitis: meningococcal	In general, respiratory droplets, but respiratory aerosols need to be considered	Yes, but only in extraordinary circumstances	Fever, severe headache, stiff neck, sore throat
Meningitis	Many different causes	No	Fever, severe headache, stiff neck, sore throat
Methicillin-resistant Staphylococcus aureus (MRSA)*	Typically, by direct contact. In health care settings, common mode of transmission results from contaminated hands and inadequate hand washing. Rarely, by aerosolized respiratory secretions	No	Persistent skin lesions, including vesicular rashes, cellulitis, and abscesses
Mononucleosis	Contact with respiratory secretions or saliva, such as with mouth-to-mouth resuscitation	No	Fever, sore throat, fatigue
Mumps (infectious parotitis)	Respiratory aerosols and contact with saliva	Yes	Fever, swelling of salivary glands (parotid)
Pertussis	Direct contact with oral secretions; respiratory aerosols	Yes	Violent cough at night, whooping sound when cough subsides
Pneumonic plague	Biowarfare and naturally acquired: respiratory droplets	No	In general, progressive flu-like symptoms
Rubella	Respiratory aerosols and contact with respiratory secretions	Yes	Fever, rash
SARS	In general, respiratory droplets, but respiratory aerosols need to be considered	No	In general, progressive flu-like symptoms
Shingles (see varicella)			
Smallpox	Biowarfare — respiratory aerosol or cloud (any case should be considered an act of bioterrorism until proven otherwise)	Yes	Flu-like symptoms followed by characteristic rash
Syphilis	Primarily sexual contact; rarely through blood transfusion or contact with skin lesions	No	Genital and cutaneous lesions, nerve degeneration (late)
Tuberculosis, pulmonary	Airborne	No	Fever, night sweats, weight loss, cough
Varicella	Respiratory aerosols and contact with moist vesicles	Yes	Fever, rash, cutaneous vesicles (blisters)
West Nile virus	Arthropod-borne	No	Fever, skin rash with change in mental status
Whooping cough (see pertussis)			

*See Siegel, J.D., et al., *Management of Multi-drug Resistant Organisms in Healthcare Settings.*

Additionally, departments should provide firefighters with annual refresher trainings on tuberculosis and bloodborne pathogens. This includes training on the early recognition of patients with potentially communicable diseases such as tuberculosis, so that personal protection measures such as N95 respirator use can be implemented on EMS calls, or a surgical mask can be placed on the patient if medically feasible, to limit the exposure to firefighters and others.

A.4.5.2.5 Members who decline immunizations should be counseled by the fire department physician. If the member persists in refusing vaccination, a signed written declination is required.

A.4.6.4 For appropriate post-exposure guidelines, reference should be made to 29 CFR 1910.1030, "Bloodborne Pathogens"; "Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health Care and Public Safety Workers"; and *Guideline for Infection Control in Health Care Personnel.*

For guidance on post-exposure counseling, reference should be made to "Public Health Service Guidelines for Counseling and Antibody Testing to Prevent HIV Infection and AIDS," *Morbidity and Mortality Weekly Report,* Centers for Disease Control and Prevention.

A.4.6.5 Recordkeeping should be in accordance with the requirements of 29 CFR 1910.1030, "Bloodborne Pathogens." Figure A.4.6.5 is an example of an exposure report form.

A.5.1 State, provincial, and local laws and regulations are usually very specific about infection control standards for public use facilities. Public health agencies provide standards for food storage, preparation, and handling, as well as for disposal of general and medical or other regulated waste. Hotel bureaus sometimes have the ability to provide standards for sleeping areas and bathrooms.

FIRE DEPARTMENT INFECTIOUS EXPOSURE FORM

Exposed member's name: _____ Rank: _____

Soc. Sec. No.: _____

Field Inc. No.: _____ Shift: _____ Company: _____ District: _____

Name of patient: _____ Sex: _____

Age: _____ Address: _____

Suspected or confirmed disease: _____

Transported to: _____

Transported by: _____

Date of exposure: _____ Time of exposure: _____

Type of incident (auto accident, trauma): _____

What were you exposed to?

❑ Blood ❑ Tears ❑ Feces ❑ Urine ❑ Saliva ❑ Vomitus ❑ Sputum ❑ Sweat

❑ Other _____

What part(s) of your body became exposed? Be specific: _____

_____

_____

Did you have any open cuts, sores, or rashes that became exposed? Be specific: _____

_____

_____

How did exposure occur? Be specific: _____

_____

_____

Did you seek medical attention? ❑ yes ❑ no

Where? _____ Date: _____

Contacted infection control officer? Date: _____ Time: _____

Supervisor's signature: _____ Date: _____

Member's signature: _____ Date: _____

FIGURE A.4.6.5 Sample Exposure Report Form.

Emergency response agencies can learn important lessons from such state, provincial, and local agencies, which serve as valuable resources in developing standard operating procedures or guidelines for infection control in fire department facilities and in designing or remodeling facilities.

A.5.1.1 Control measures, such as air exchange, HEPA filtration, or UV irradiation, to reduce biological and chemical contaminants should be in accordance with accepted engineering practices.

A.5.2.4 Because of the potential for excessive use by a large number of people, commercial-grade appliances are needed in many fire department facilities. Such appliances often have a larger capacity and more durability for continuous or repeated use.

When determining the number of refrigerators needed, consideration should be given to the number of members who are to use a refrigerator or the amount of use the refrigerator is to receive. A large number of people using a small refrigerator results in the door being opened often, causing the refrigerator to lose its ability to maintain a proper temperature and resulting in the spoilage of food or the accumulation of bacteria or other sources of foodborne diseases.

A.5.4.1 Bathrooms are a significant source of infection if they are improperly designed or if members fail to practice proper hygiene, or both.

Bathrooms should have push-to-open doors without handles for egress. Such doors assist in eliminating a place for infectious agents to accumulate and breed. It should not be necessary for users to grasp sink faucets to turn them off or on. If grasping is necessary, users should use a paper towel to turn faucets off after drying their hands.

Hand-drying materials should be disposable, or an air-drying machine should be available. Such materials or machines decrease the possibility of infectious agents accumulating or breeding on a cloth that is used repeatedly.

The flush valve on toilets and urinals should be of a foot operated or electric eye–type that does not require the use of hands for operation.

A.5.5.1 The intent of this storage requirement is to ensure that emergency medical supplies are located in an area separate from other functional areas to minimize contamination. Temperature-sensitive materials should be stored in accordance with manufacturer's recommendations.

A.5.6.2 Consideration should be given to ventilating to the outside.

A.5.7.1 Where the fire department provides only emergency medical services at the first responder level, there should be at least one disinfecting facility available. Where the fire department provides basic life-support or advanced life-support emergency medical services, there should be a disinfecting facility in each fire station from which such services are provided.

A.5.7.4 Commercial models of washers (front-loading) and dryers are recommended to prevent agitator damage to clothing.

A.6.1.1 Relevant OSHA standards and CDC airborne pathogen regulations should be referenced.

A.6.2.4 The requirements of 6.2.4 are consistent with NFPA 1917 and the requirements of 3.13.4 of GSA Federal Specification KKK-A-1822F.

A.6.2.5 While TB is a major health concern, it should be pointed out that certain other pathogens are more easily transmitted or potentially dangerous. There is little information on the efficacy of HEPA filters for pathogens other than TB. Table A.6.2.5 provides recommendations from the CDC for the number of air changes per hour (ACH) for TB airborne infection isolation.

A.6.2.6 The requirements of 6.2.6 are consistent with the requirements of NFPA 1917 and 3.10.16 of GSA Federal Specification KKK-A-1822F.

A.7.1.2 If germicidal agents are readily available, they should be used in lieu of soap when washing skin surfaces.

A.7.1.5 The CDC and the APIC have developed a table with recommended work restrictions and return to work criteria for infected health care providers by type of organism. Some or all of these might be relevant for firefighters and/or EMS personnel. The APIC document, *Guide to Infection Prevention in Emergency Medical Services*, contains Table 2.2, which might be helpful.

A.7.2.5.2 The appropriate respiratory protection for airborne pathogens is controversial and varies by organization. In general, the CDC recommends air purifying respirators for aerosolized airborne transmission organisms (see A.3.3.41), and masks for aerosolized droplet transmission organisms. However, some states have opted for more restrictive respiratory protection than that recommended by the CDC. For example, the California Division of Occupational Safety and Health, under its Aerosol Transmissible Diseases Standard, requires air purifying respirators (e.g., at least an N-95) for both aerosols and droplets. If a NIOSH-approved respirator is used, federal and state OSHA require an initial medical clearance, and at least annual fit testing to ensure the employee can maintain an acceptable respiratory fit and seal, and education on its proper use *(see 29 CFR 1910.134)*.

A.7.2.5.3 Barrier face coverings (source control devices) should be in accordance with CDC guidance for the contagious disease incident.

Table A.6.2.5 Minutes Required for Removal Efficiency

ACH	99%	99.9%
2	138	207
4	69	104
6	46	69
12	23	35
15	18	28
20	14	21
50	6	8
400	<1	1

Notes:
(1) This table can be used to estimate the time necessary to clear the air of airborne *Mycobacterium tuberculosis* after the source patient leaves the area or when aerosol-producing procedures are complete.
(2) Time in minutes to reduce the airborne concentration by 99 percent or 99.9 percent.

A.7.2.9 The intent of this requirement is to ensure that members are not unnecessarily injured by melting, dripping, or burning caused by medical gloves worn under structural firefighting gloves. It is possible for firefighting gloves worn by members to be subjected to high heat without showing any external signs of damage, while the medical gloves degrade inside the firefighting glove, causing injury to the firefighter.

A.8.1.2 Liquid soaps containing triclosan, triclocarban, or other chemicals referred to as "antibacterial" should be avoided.

A.8.4.1.1 Clean protective clothing reduces health and safety risks. Clothing should be cleaned frequently to reduce the level of, and bodily contact with, contaminants. User agencies should establish guidelines for frequency and conditions for garment cleaning. For gross contamination with products of combustion, fire debris, or body fluids, removal of contaminants by flushing with water as soon as practical is necessary, followed by appropriate cleaning.

Decontamination is sometimes impossible where personal protective clothing is contaminated with chemical, radiological, or biological agents. Where decontamination is not possible, garments should be discarded in accordance with local, state, provincial, and federal regulations.

A.8.4.10 Departments often use their SCBA facepiece in conjunction with an adapter to configure the facepiece as part of an air-purifying respirator that when worn with appropriate filters or cartridges provides more portable protection against airborne pathogens and exposure to splatters of liquidborne pathogens. Alternatively, departments can have dedicated elastomeric half or full facepiece APRs.

A.8.4.10.2 It is recommended that departments use personal protective equipment that is certified to the respective product categories in NFPA 1999 for emergency medical single-use or multi-use garments, examination or cleaning gloves, eye and face protection devices, and respirators approved by NIOSH per 42 CFR 84.

A.8.4.10.3 SCBA manufacturers are required to provide cleaning instructions and disinfecting procedures as part of their user information as specified in NFPA 1981. Similarly, APR manufacturers are required to provide cleaning and disinfecting instructions for their products as part of the information for becoming approved respirators per 42 CFR 84 by NIOSH. These procedures might not address specific types of pathogens that warrant the use of certain disinfecting procedures to ensure complete decontamination of the facepiece and related parts. Where possible, departments should follow instructions specific to how individual parts of the SCBA facepiece are cleaned and disinfected, including the use of specific cleaning agents and disinfectants that are known not to adversely affect the continued use and performance of the APR or SCBA.

A.8.4.10.4 The procedures provided in this section are based on mandatory requirements established in Appendix B-2, Respirator Cleaning Procedures, of OSHA 29 CFR 1910.134 with minor adaptations to address specific concerns for disinfecting respirators that have been contaminated with airborne or liquidborne pathogens. These procedures are further consistent with the guidelines provided by the Centers for Disease Control and Prevention (CDC) at https://www.cdc.gov/coronavirus/2019-ncov/hcp/elastomeric-respirators-strategy/index.html.

A.8.4.10.4.5 The first two options for disinfecting procedures are given in Appendix B-2 of OSHA 29 CFR 1910.134. The third option is to use a disinfectant that has been registered with the U.S. Environmental Protection Agency (EPA) for demonstrating its effectiveness against specific pathogens to which the wearer has been exposed.

A.8.4.10.4.5(3) The EPA lists specific disinfectants for known forms of microbial contamination. For example, specific disinfectants for use against SARS-CoV-2, the virus responsible for COVID-19, can be found at https://www.epa.gov/pesticide-registration/list-n-disinfectants-use-against-sars-cov-2.

It is important to recognize that many disinfectants on this list might not be suitable for use on SCBA facepieces and related components. Any use of a specific disinfectant should be confirmed by both the respirator manufacturer and disinfectant supplier for its application for disinfecting the specific SCBA facepiece.

Departments are encouraged to obtain a copy of the registered EPA labeling for the respective disinfectant(s) under consideration to determine how the disinfectant should be properly used to be effective and to learn of any limitations for its use. A copy of the EPA-registered label instructions can be obtained from the supplier or conducting a search through the EPA website link https://iaspub.epa.gov/apex/pesticides/f?p=PPLS:1.

Searches can be conducted using the EPA registration number, supplier name, product name, and active ingredients.

A.8.4.10.4.7 The importance of thorough rinsing cannot be overemphasized. Detergents or disinfectants that dry on facepieces can result in dermatitis. In addition, some disinfectants can cause deterioration of rubber or corrosion of metal parts if not completely removed.

A.8.4.10.4.10 Certain types of unprotected filters known as pancake or flat filters cannot be reused. The department should make a determination if reuse of the filter is warranted based on information provided by the manufacturer or other competent sources.

A.8.5 For information regarding management of medical waste or other regulated waste, the following publications should be referenced:

(1) *EPA Guide for Infectious Waste Management*
(2) *Guideline for Environmental Infection Control in Health-Care Facilities*
(3) *Guideline for Hand Hygiene in Health-Care Settings*

A.8.7.2 Environmental and working surfaces include the following:

(1) Floors
(2) Woodwork
(3) Apparatus surfaces, such as seats, steering wheels, door handles, seat belts, radio controls, and mobile data terminals (MDTs).
(4) Countertops

Annex B Sample Policy Statements

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

B.1 The examples in this annex are reprinted from the US Fire Administration Publication FA-112, *Guide to Managing an Emergency Service Infection Control Program.*

Example 1: The Fire Department recognizes the potential exposure of its firefighters, in the performance of their duties, to communicable diseases. To minimize the risk of exposure, the Fire Department will implement an infection control program.

The infection control program will include standard operating procedures, initial training and continuing education in infection control practices, a vaccination program, the provision of proper infection control clothing and equipment, decontamination procedures for clothing and equipment, procedures for the disposal of medical waste, a system for reporting and managing exposures, a system for tracking exposures and ensuring confidentiality, monitoring of compliance with the standard operating procedures, the design of fire department facilities to minimize risk of infection, and a public information campaign.

Finally, exposure to communicable disease shall be considered an occupational health hazard, and any communicable disease contracted as the result of a documented workplace exposure shall be considered occupationally related.

Example 2: The Fire Department recognizes the potential exposure of its members to communicable diseases in the performance of their duties and in the normal work environment. The Fire Department is committed to a program that will reduce this exposure to a minimum and will take whatever measures are feasible to protect the health of its members.

In the emergency care setting, the infectious disease status of patients is frequently unknown by Fire Department personnel. All patients must be considered infectious. Blood and body fluid precautions must be taken with all patients.

To minimize the risk of exposure, the Fire Department will provide its members with proper infection control protective equipment, including disposable medical gloves, face masks, gowns, and eyewear, and will provide necessary cleaning and disinfecting supplies. The Fire Department also will provide initial instruction and continuing education in preventive health care practices so that firefighters possess a basic awareness of infectious diseases, understand the risks and severity of various types of exposures, and exhibit proper skills in infection control.

Standard prophylactic medical treatment will be given to exposed members, and necessary immunizations will be made available to protect members from potential exposure to infectious disease.

Fire Department members will contact the fire department infection control representative after any actual or suspected exposure to a contagious disease. The infection control representative will contact the hospital to initiate patient follow-up and determine the need for treatment of the exposed individual. A contagious disease exposure tracking system is a component of the medical records system that is maintained for each member.

The Fire Department believes that its members have the right to be fully informed if a patient is found to carry a communicable disease and if a probable exposure occurred. The responsibility for informing the Fire Department should rest with the medical institution receiving the patient and should occur as soon as possible after the medical institution becomes aware of the condition.

The Fire Department also recognizes the health concerns that can be involved in the station work environment, where a number of members share living quarters and work areas and, in some cases, use the same equipment. There is a particular need to isolate this environment from the infectious hazards that members can encounter in providing emergency care to the general public. There is also a need to provide facilities and equipment that do not expose members to additional health risks. This need also extends to preventing the spread of health risks encountered in the work environment to a member's home, family, and friends.

The Fire Department also believes that infectious disease exposure should be considered an occupational health hazard and supports the presumption that contracting a contagious disease should be considered an occupationally related condition.

Therefore, the Fire Department hereby adopts NFPA 1581.

It is possible that an existing program or policy meets the requirements of this standard; if so, the program or policy might need to be adopted, in whole or in part, in order to comply with this standard. An example of such an existing program or policy is a corporate infection control program or an employee immunization program.

A policy statement provides members with awareness that the department considers infection control to be an important issue.

The written policy statement should define the purpose, scope, and philosophy of the infection control program clearly. See Figure B.1 for a sample of an infection control program policy statement.

Infection Control Program Policy Statement

Purpose: To provide a comprehensive infection control system that maximizes protection against communicable diseases for all members and for the public that they serve.

Scope: This policy applies to all members, career and volunteer, providing fire, rescue, or emergency medical services.

This department recognizes that communicable disease exposure is an occupational health hazard. Communicable disease transmission is possible during any aspect of emergency response, including in-station operations. The health and welfare of each member is a joint concern of the member, the chain of command, and this department. Although each member is ultimately responsible for his or her own health, the department recognizes a responsibility to provide as safe a workplace as possible. The goal of this program is to provide all members with the best available protection from occupationally acquired communicable disease.

It is the policy of this department to do the following:

- Provide fire, rescue, and emergency medical services to the public without regard to known or suspected diagnoses of communicable disease in any patient.
- Regard all patient contacts as potentially infectious. Universal precautions will be observed at all times and will be expanded to include all body fluids and other potentially infectious material (body substance isolation).
- Provide all members with the training, immunizations, and personal protective equipment (PPE) needed for protection from communicable diseases.
- Recognize the need for work restrictions based on infection control concerns.
- Encourage participation in member assistance and critical incident stress debriefing (CISD) programs.
- Prohibit discrimination of any member for health reasons, including infection or seroconversion, or both, with HIV, HBV, or HCV.
- Regard all medical information as strictly confidential. No member health information will be released without the signed written consent of the member.

FIGURE B.1 Sample Infection Control Program Policy Statement.

Annex C Disinfection and Sterilization Methods

This annex is not a part of the requirements of this NFPA document but is included for informational purposes only.

C.1 General. The following disinfection and sterilization methods should be used for equipment used in providing emergency medical services:

(1) Sterilization
(2) High-level disinfection
(3) Intermediate-level disinfection
(4) Low-level disinfection
(5) Environmental disinfection
(6) Housekeeping

C.2 Sterilization. This method destroys all forms of microbial life, including high numbers of bacterial spores.

C.2.1 Sterilization can be achieved by steam under pressure (autoclave), gas (ethylene oxide), dry heat, or immersion in an EPA-approved chemical sterilant for a prolonged period of time (e.g., 6 to 10 hours) or according to manufacturer's instructions. Liquid chemical sterilants should be used only on instruments that are impossible to sterilize or disinfect with heat.

C.2.2 Sterilization should be used for instruments or devices, such as scalpels and needles, that penetrate skin or contact normally sterile areas of the body. The use of disposable invasive equipment eliminates the need to sterilize such items. Where indicated, however, arrangements should be made with a health care facility for sterilization of reusable invasive instruments.

C.3 High-Level Disinfection. This method destroys all forms of microbial life, except high numbers of bacterial spores.

C.3.1 High-level disinfection can be achieved by hot water pasteurization [80°C to 100°C (176°F to 212°F) for 30 minutes], exposure to an EPA-regulated sterilant, as specified in Section C.2, except that a short exposure time (e.g., 10 to 45 minutes) should be used, or adherence to manufacturer's instructions.

C.3.2 High-level disinfection should be used for reusable instruments or devices, such as laryngoscope blades and endotracheal tubes, that come into contact with mucous membranes.

C.4 Intermediate-Level Disinfection. Intermediate-level disinfection destroys *Mycobacterium tuberculosis*, vegetative bacteria, most viruses, and most fungi but does not kill bacterial spores, such as *B. anthracis* (anthrax) spores or Clostridium difficile.

C.4.1 Once soiled with patient material, contaminated environmental surfaces should be washed with hot soapy water and rinsed with clean water. Subsequently, disinfection should occur with disinfectants approved and registered with the Environmental Protection Agency (EPA) as tuberculocidal. If a disinfectant is tuberculocidal, it is strong enough to kill bacteria and viruses of concern. An equally effective and less expensive alternative to commercial disinfectants is household bleach. Using 1 part bleach to 100 parts tap water (approximately ¼ cup bleach per gallon of water) provides the recommended concentrations of hypochlorite (the active ingredient in bleach) in the range of 500 to 800 parts per million (ppm). See *Recommended Infection-Control Practices for Dentistry*, 1993, and W. A. Rutala, "APIC Guidelines for Infection Control Practice."

Due to the loss of potency of bleach solutions when exposed to light over time, bleach solution should be prepared daily or stored in a closed brown bottle for no more than a month. Members using disinfectants must be aware of safety and health precautions such as ventilation, use of appropriate PPE, and flammability and reactivity of the disinfectants. If commercial disinfectants are used, the manufacturer's instructions for use and storage should be followed. Bleach solutions at 1:100 dilution can be corrosive to metal and possibly interfere with the functioning of electronic equipment.

C.4.2 Intermediate-level disinfection can be used for surfaces (such as those of stethoscopes, blood pressure cuffs, and splints) that come into contact only with intact skin and have been visibly contaminated with body fluids. Surfaces should be precleaned of visible material before the germicidal chemical is applied for disinfection.

C.5 Low-Level Disinfection. This method destroys most bacteria, some viruses, and some fungi, but not *Mycobacterium tuberculosis* or bacterial spores.

C.5.1 Low-level disinfection can be achieved by EPA-registered hospital disinfectants (no label claim for tuberculocidal activity).

C.5.2 Low-level disinfection should be used for routine housekeeping or removal of soiling in the absence of visible body fluid contaminants. These agents are excellent cleaners.

C.6 Environmental Disinfection. Environmental surfaces that have become soiled should be cleaned and disinfected.

C.7 Housekeeping. Employers should ensure that the worksite is maintained in a neat condition, free of any contamination. The employer should determine and implement an appropriate written schedule for cleaning and decontamination. The method of decontamination should be based on location within the facility, type of surface to be cleaned, type of contamination, and tasks or procedures to be performed, such as the following:

(1) Protective ensembles and other clothing should be cleaned or laundered, or both.
(2) Emergency medical equipment should be cleaned and disinfected.
(3) Invasive medical instruments should be cleaned and sterilized.
(4) Contaminated surfaces should be cleaned and disinfected with a disinfectant appropriate for the surface.
(5) Contaminated work surfaces should be decontaminated immediately or as soon as feasible after completion of the emergency medical service operation.

CAUTION: To ensure the effectiveness of any sterilization or disinfection process, equipment and instruments first should be thoroughly cleaned of all visible soilage.

Annex D Informational References

D.1 Referenced Publications. The documents or portions thereof listed in this annex are referenced within the informational sections of this standard and are not part of the requirements of this document unless also listed in Chapter 2 for other reasons.

D.1.1 NFPA Publications. National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02169-7471.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program,* 2021 edition.

NFPA 1901, *Standard for Automotive Fire Apparatus,* 2016 edition.

NFPA 1917, *Standard for Automotive Ambulances,* 2019 edition.

NFPA 1981, *Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services,* 2019 edition.

NFPA 1999, *Standard on Protective Clothing and Ensembles for Emergency Medical Operations,* 2018 edition.

D.1.2 Other Publications.

D.1.2.1 CDC Publications. Centers for Disease Control and Prevention, 1600 Clifton Rd., Atlanta, GA 30333. www.cdc.gov

Bolyard, Elizabeth A., et al. *Guideline for Infection Control in Health Care Personnel* (1998). http://www.cdc.gov/hicpac/pdf/infectcontrol98.pdf.

A Curriculum Guide for Public-Safety and Emergency-Response Workers, Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus, Publication 89–108 (February 1989). http://www.cdc.gov/niosh/docs/89-108/89-108.pdf.

Gibbins, J. and E. Page. *Health Hazard Evaluation Report, Evaluation of Tuberculin Skin Test Conversions at a Mississippi Fire Department.* HETA No. 2007-0012-3046. http://www.cdc.gov/niosh/hhe/reports/pdfs/2007-0012-3046.pdf.

Guideline for Hand Hygiene in Health-Care Settings: Recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force (2002). http://www.cdc.gov/mmwr/PDF/rr/rr5116.pdf.

"Guidelines for Preventing the Transmission of Mycobacterium Tuberculosis in Health-Care Settings." *MMWR* 54 (RR-17) (2005). http://www.cdc.gov/mmwr/PDF/rr/rr5417.pdf.

"Guidelines for Prevention of Transmission of Human Immunodeficiency Virus and Hepatitis B Virus to Health Care and Public Safety Workers." *MMWR* 38, no. S-6 (1989):3–37, http://www.cdc.gov/mmwr/preview/mmwrhtml/00001450.htm.

"Guidelines for Using the QuantiFERON-TB Gold Test for Detecting Mycobacterium Tuberculosis Infection, United States." *MMWR* 54 (RR-15) (2005):49–55. http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5415a4.htm.

"Public Health Service Guidelines for Counseling and Antibody Testing to Prevent HIV Infection and AIDS." *MMWR* 36, no. 31 (1987):509–515. http://www.ncbi.nlm.nih.gov/pubmed/3112540.

"Recommendations for Prevention of HIV Transmission in Health-Care Settings." *MMWR* 36 (SU02) (1987). http://www.cdc.gov/mmwr/preview/mmwrhtml/00023587.htm.

"Recommended Infection-Control Practices for Dentistry." *MMWR* 42 (RR8) (1993). http://www.cdc.gov/mmwr/preview/mmwrhtml/00021095.htm.

Schulster, L. M., et al. *Guidelines for Environmental Infection Control in Health-Care Facilities: Recommendations from CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC)* (2003). https://www.cdc.gov/infectioncontrol/pdf/guidelines/environmental-guidelines-P.pdf.

Siegel, J.D., et al. *Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006: Recommendations from the CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC)* (2006). http://www.cdc.gov/hicpac/pdf/MDRO/MDROGuideline2006.pdf.

D.1.2.2 IAFF Publications. International Association of Fire Fighters, 1750 New York Avenue, Suite 300, NW, Washington, DC 20006-5395.

Training for Hazardous Material Response: Infectious Diseases.

D.1.2.3 EPA Publications. Environmental Protection Agency, William Jefferson Clinton East Building, 1200 Pennsylvania Avenue, NW, Washington, DC 20460.

EPA Guide for Infectious Waste Management, 1986.

D.1.2.4 USFA Publications. US Fire Administration, Publications Office, 16825 S. Seton Ave., Emmitsburg, MD 21727.

Infection Control for Emergency Response Personnel: The Supervisor's Role (Student Manual), February 1992.

Publication FA-112, *Guide to Managing an Emergency Service Infection Control Program*, January 2002.

D.1.2.5 US Government Publications. US Government Publishing Office, 732 North Capitol Street, NW, Washington, DC 20401-0001.

HHS and USDA Select Agents and Toxins list (7 CFR Part 331, 9 CFR Part 121, and 42 CFR Part 73). Dec. 4, 2012.

Public Law 111-87, Ryan White HIV/AIDS Treatment Extension Act of 2009.

Title 29, Code of Federal Regulations, Part 1910.134, "Respiratory Protection."

Title 29, Code of Federal Regulations, Part 1910.134, Appendix B-2, Respirator Cleaning Procedures.

Title 29, Code of Federal Regulations, Part 1910.1030, "Bloodborne Pathogens."

Title 42, Code of Federal Regulations, Part 84.

US General Services Administration, Federal Specification KKK-A-1822F, *Star-of-Life Ambulance*, July 1, 2018.

D.1.2.6 Other Publications.

California Code of Regulations, Title 8, Section 5199. Aerosol Transmissible Diseases Standard, https://www.dir.ca.gov/title8/5199.html.

Gamsky, T.E. and R. C. Alexander."QuantiFERON-TB Blood Testing in the Occupational Setting." *Journal of Occupational and Environmental Medicine* 50 (2008):3–4.

Rutala, W.A. "APIC Guidelines for Infection Control Practice," *American Journal of Infection Control* 18 (1990):99–117.

D.2 Informational References. (Reserved)

D.3 References for Extracts in Informational Sections.

NFPA 1500™, *Standard on Fire Department Occupational Safety, Health, and Wellness Program*, 2021 edition.

Index

-A-

Administration, Chap. 1
- Application, 1.3
- Equivalency, 1.4
- Purpose, 1.2
- Scope, 1.1

Ambulance
- Definition, 3.3.1

Approved
- Definition, 3.2.1, A.3.2.1

Authority Having Jurisdiction (AHJ)
- Definition, 3.2.2, A.3.2.2

-B-

Blood
- Definition, 3.3.2

Body Fluids
- Definition, 3.3.3

-C-

Cleaning
- Definition, 3.3.4

Cleaning Gloves
- Definition, 3.3.5

Cleaning, Disinfecting, and Disposal, Chap. 8
- Clothing and Personal Protective Equipment, 8.4
  - APR and SCBA Facepieces Exposed to Airborne and Liquidborne Pathogens, 8.4.10, A.8.4.10
  - Contaminated Clothing, 8.4.5
  - Fire Department Role, 8.4.1
- Disinfectants, 8.2
- Disposal of Materials, 8.5, A.8.5
  - Moving Containers, 8.5.4
  - Noncontaminated Waste Collection, 8.5.6
- Emergency Medical Equipment and Environmental Surfaces, 8.3
- Housekeeping, 8.7
  - Fire Department Role, 8.7.1
- Labeling, 8.8
- Linen, 8.6
- Skin Washing, 8.1

Contaminated
- Definition, 3.3.6

Contaminated Sharps
- Definition, 3.3.7

-D-

Decontamination
- Definition, 3.3.8

Definitions, Chap. 3

Disinfection
- Definition, 3.3.9, A.3.3.9

Disinfection and Sterilization Methods, Annex C
- Environmental Disinfection, C.6
- General, C.1
- High-Level Disinfection, C.3
- Housekeeping, C.7
- Intermediate-Level Disinfection, C.4
- Low-Level Disinfection, C.5
- Sterilization, C.2

-E-

Emergency Medical Services
- Definition, 3.3.10

Engineering Controls
- Definition, 3.3.11, A.3.3.11

Environmental Surface
- Definition, 3.3.12

Explanatory Material, Annex A

Exposure
- Definition, 3.3.13
- Infectious Exposure
  - Definition, 3.3.13.1
- Occupational Exposure
  - Definition, 3.3.13.2

Eyewear
- Definition, 3.3.14

-F-

Face Protection Devices
- Definition, 3.3.15

Facility Fire Brigade
- Definition, 3.3.16

Fire Apparatus
- Definition, 3.3.17

Fire Department
- Definition, 3.3.18, A.3.3.18

Fire Department Apparatus, Chap. 6
- General, 6.1
- Vehicles Used to Transport Patients, 6.2
  - Ambient Air Filtration, 6.2.5, A.6.2.5
  - Vehicle Interior Surfaces, 6.2.6, A.6.2.6
  - Ventilation, 6.2.4, A.6.2.4

Fire Department Facilities, Chap. 5
- Bathrooms, 5.4
- Cleaning Areas, 5.6
- Disinfecting Facilities, 5.7
- Disposal Areas, 5.8
- Equipment Storage Areas, 5.5
  - Contaminated Storage, 5.5.5

Potentially Contaminated Personal Protective Equipment, 5.5.4
General, 5.1, A.5.1
Hand Washing Capacity, 5.1.2
Kitchen Areas, 5.2
Food Storage, 5.2.5
Shelving Above Sinks, 5.2.2
Sleeping Areas, 5.3
Fire Department Facility
Definition, 3.3.19, A.3.3.19
Fire Department Member
Definition, 3.3.20
Fluid-Resistant Clothing
Definition, 3.3.21

-G-

Garment
Definition, 3.3.22

-H-

Handwashing Facility
Definition, 3.3.23
Health and Safety Officer
Definition, 3.3.24, A.3.3.24
Health Data Base
Definition, 3.3.25
Hepatitis
Definition, 3.3.26
HBV
Definition, 3.3.26.1
HCV
Definition, 3.3.26.2
HIV
Definition, 3.3.27

-I-

Immunization
Definition, 3.3.28
Infection
Definition, 3.3.29
Infection Control Officer
Definition, 3.3.30
Infection Control Program
Definition, 3.3.31, A.3.3.31
Informational References, Annex D

-K-

Kitchen
Definition, 3.3.32, A.3.3.32

-L-

Leakproof Bags
Definition, 3.3.33

-M-

Mask
Definition, 3.3.34
Medical Gloves
Definition, 3.3.35, A.3.3.35
Medical Waste
Definition, 3.3.36
Member
Definition, 3.3.37, A.3.3.37
Mucous Membrane
Definition, 3.3.38

-N-

Needle
Definition, 3.3.39

-P-

Parenteral
Definition, 3.3.40
Pathogens
Aerosolized Airborne Transmission
Definition, 3.3.41.1
Aerosolized Droplet Transmission
Definition, 3.3.41.2, A.3.3.41.2
Bioterrorism or Biologic Warfare Agents
Definition, 3.3.41.3, A.3.3.41.3
Contact and Body Fluid Exposures
Definition, 3.3.41.4, A.3.3.41.4
Definition, 3.3.41, A.3.3.41
Patient
Definition, 3.3.42
Personal Protective Equipment (PPE)
Definition, 3.3.43, A.3.3.43
Pocket Mask
Definition, 3.3.44
Post-Exposure Prophylaxis
Definition, 3.3.45
Potentially Infectious Materials
Definition, 3.3.46
Program Components, Chap. 4
Health Maintenance, 4.5
Immunizations and Infectious Disease Screening, 4.5.2
Infection Control Officer, 4.4
Infectious Exposures, 4.6
Policy, 4.1
Risk Management, 4.2, A.4.2
Training and Education, 4.3
Protection for Emergency Medical Service Operations, Chap. 7
Handling of Sharp Objects, 7.3
Personal Protective Equipment, 7.2
Resuscitation Equipment, 7.2.6
Personnel, 7.1
Protective Ensemble
Definition, 3.3.47, A.3.3.47

-R-

Referenced Publications, Chap. 2
Regulated Waste
Definition, 3.3.48

Resuscitation Equipment
Definition, 3.3.49
Risk
Definition, 3.3.50

-S-

Sample Policy Statements, Annex B
Shall
Definition, 3.2.3
Sharps Containers
Definition, 3.3.51
Should
Definition, 3.2.4
Source Individual
Definition, 3.3.52
Splash-Resistant Eyewear
Definition, 3.3.53
Standard
Definition, 3.2.5
Sterilization
Definition, 3.3.54, A.3.3.54
Structural Firefighting Gloves
Definition, 3.3.55

-U-

Universal Precautions
Definition, 3.3.56, A.3.3.56