

NFPA® 1580

Standard for Emergency Responder Occupational Health and Wellness

2025 Edition



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NFPA® 1580

Standard for

Emergency Responder Occupational Health and Wellness

2025 Edition

This edition of NFPA 1580, *Standard for Emergency Responder Occupational Health and Wellness*, was prepared by the Technical Committee on Emergency Responders Occupational Health. It was issued by the Standards Council on November 16, 2024, with an effective date of December 6, 2024.

This edition of NFPA 1580 was approved as an American National Standard on December 6, 2024.

Origin and Development of NFPA 1580

This first edition of NFPA 1580, *Standard on Emergency Responder Occupational Health and Wellness*, has been developed as part of the consolidation plan for NFPA's Emergency Response and Responder Safety (ERRS) standards. At the April 2019 NFPA Standards Council meeting, all ERRS technical committees and NFPA staff were directed to consolidate and unify the ERRS standards with similar content areas. The goal of this effort is to increase usability, reduce errors and conflicts, and ultimately produce higher quality standards. For more information on the ERRS consolidation project, see nfpa.org/errs.

The 2025 edition of NFPA 1580 marks the integration of NFPA 1581, *Standard on Fire Department Infection Control Program*, NFPA 1582, *Standard on Comprehensive Occupational Medical Program for Fire Departments*, NFPA 1583, *Standard on Health-Related Fitness Programs for Fire Department Members*, and NFPA 1584, *Standard on the Rehabilitation Process for Members During Emergency Operations and Training Exercises*, into a single standard that establishes a common set of criteria for emergency responder occupational health.

In addition to the structural changes related to the consolidation project, this edition also contains several new technical changes. One significant change incorporated into the new standard is the tentative interim amendments (TIAs) issued on the 2022 edition of NFPA 1582 which created common criteria for both members and candidates. The technical committee also incorporated a recommended age/gender adjustments for cardiorespiratory fitness and aerobic capacity and clarified roles and responsibilities for decision makers. The technical committee also took the opportunity to update requirements related to fitness and rehabilitation.

For more information about the ERRS consolidation project, see nfpa.org/errs.

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Committee Scope: This committee shall have primary responsibility for documents on occupational health, medical, and wellness requirements for emergency responders. The committee shall also have responsibility for documents pertaining to contamination and infection control.

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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 K.

Chapter 1 Administration

1.1 Scope. This standard contains minimum requirements for a fire department infection control program; descriptive requirements for a comprehensive occupational medical program for fire departments; establishes the minimum requirements for the development, implementation, and management of a health-related fitness program (HREFP) for members of the fire department involved in emergency operations; and establishes the minimum criteria for developing and implementing processes for member prehabilitation, contamination control, rehabilitation, and recovery from incident scene operations and training exercises.

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; to outline an occupational medical program that, when implemented in a fire department, will reduce the risk and burden of fire service occupa-

tional morbidity and mortality while improving the health, and thus the safety and effectiveness, of firefighters operating to protect members of the public’s life and property; to provide the minimum requirements for a health-related fitness program for fire department members that enhances the members’ ability to perform occupational activities efficiently and safely and reduces the risk of injury, disease, and premature death, to help fire departments develop a health-related fitness program for fire department members that requires mandatory participation but is nonpunitive; and describes the prerehabilitation, contamination control, rehabilitation, and post-incident recovery processes for members prior to, during, and after incident scene operations, training, and exercises.

1.3* Application. This standard can be applied as follows:

- (1) Chapters 1 through 3; 4 through 8; and Annexes A, B, C, and K constitute NFPA 1581.
- (2) Chapters 1 through 3; 9 through 13; and Annexes A, D, E, F, G, and K constitute NFPA 1582.
- (3) Chapters 1 through 3; 14 through 19; and Annexes A, H, I, and K constitute NFPA 1583.
- (4) Chapters 1 through 3; 20 through 23; and Annexes A, J, and K, constitute NFPA 1584.

1.4 Units. In this standard, equivalent values in SI units shall not be considered as the requirement, as these values can be approximate. (See Table 1.4.)

Table 1.4 US-to-SI Conversions

Quantity	US Unit/Symbol	SI Unit/Symbol	Conversion Factor
Length	inch (in.)	millimeter (mm)	1 in. = 25.4 mm
	foot (ft)	meter (m)	1 ft = 0.305 m
Area	square foot (ft²)	square meter (m²)	1 ft² = 0.0929 m²

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 1006, *Standard for Technical Rescue Personnel Professional Qualifications*, 2021 edition.

NFPA 1010, *Standard on Professional Qualifications for Firefighters*, 2024 edition.

NFPA 1021, *Standard for Fire Officer Professional Qualifications*, 2020 edition.

NFPA 1140, *Standard for Wildland Fire Protection*, 2022 edition.

NFPA 1403, *Standard on Live Fire Training Evolutions*, 2018 edition.

NFPA 1550, *Standard for Emergency Responder Health and Safety*, 2024 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 1900, *Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances*, 2024 edition.

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

2.3 Other Publications.

2.3.1 CDC Publications. Centers for Disease Control and Prevention, 1600 Clifton Road, Atlanta, GA 30333.

“Poliomyelitis Prevention in the United States: Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP),” *Morbidity and Mortality Weekly Report*, 49(No. RR-5):1-22, May 19, 2000.

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

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 1910.95, “Occupational Noise Exposure,” 1996.

Title 29, Code of Federal Regulations, Part 1910.120, “Hazardous Waste Operations and Emergency Response,” 2002.

Title 29, Code of Federal Regulations, Part 1910.134, “Respiratory Protection,” 1998.

Title 29, Code of Federal Regulations, Part 1910.1020, “Access to Employee Exposure and Medical Records,” 1996.

Title 29, Code of Federal Regulations, Part 1910.1030, “Bloodborne Pathogens,” 2001.

US Dept. of Health & Human Services, National Heart, Lung and Blood Institute, *Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC 8), 2014.

2.3.3 Other Publications.

American Psychiatric Association, *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5_TR), fifth edition. <https://www.psychiatry.org/psychiatrists/practice/dsm>

International Council of Ophthalmology, “International Clinical Diabetic Retinopathy Disease Severity Scale,” San Francisco, CA, October 2002. <http://www.icoph.org/standards/pdrdetail.html>

Merriam-Webster’s Collegiate Dictionary, 11th edition, Merriam-Webster, Inc., Springfield, MA, 2020.

2.4 References for Extracts in Mandatory Sections.

NFPA 470, *Hazardous Materials/Weapons of Mass Destruction (WMD) Standard for Responders*, 2022 edition.

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

NFPA 1010, *Standard on Professional Qualifications for Firefighters*, 2024 edition.

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

NFPA 1550, *Standard for Emergency Responder Health and Safety*, 2024 edition.

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

NFPA 1900, *Standard for Aircraft Rescue and Firefighting Vehicles, Automotive Fire Apparatus, Wildland Fire Apparatus, and Automotive Ambulances*, 2024 edition.

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

Chapter 3 Definitions

3.1 General.

3.1.1 The definitions contained in this chapter shall apply to the terms used in this standard.

3.1.2 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.

3.1.3 *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 phrases “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 Active Cooling. See 3.3.16.1.

3.3.2 Advanced Life Support (ALS). Functional provision of advanced airway management including intubation, advanced cardiac monitoring, manual defibrillation, establishment and maintenance of intravenous access, and drug therapy.

3.3.3 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. [1900, 2024]

3.3.4* Basic Life Support (BLS). A specific level of prehospital medical care provided by trained responders, focused on rapidly evaluating a patient's condition; maintaining a patient's airway, breathing, and circulation; controlling external bleeding; preventing shock; and preventing further injury or disability by immobilizing potential spinal or other bone fractures.

3.3.5* Biological Sex. The sex assigned at birth.

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

3.3.7 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.

3.3.8 Candidate. A person who has submitted an application to become a member of the fire department. [1550, 2024]

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

3.3.10 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.

3.3.11 Company. A group of members (1) under the direct supervision of an officer; (2) trained and equipped to perform assigned tasks; (3) usually organized and identified as engine companies, ladder companies, rescue companies, squad companies, or multi-functional companies; (4) operating with one piece of fire apparatus (pumper, aerial fire apparatus, elevating platform, quint, rescue, squad, ambulance) except where multiple apparatus are assigned that are dispatched and arrive together, continuously operate together, and are managed by a single company officer; (5) arriving at the incident scene on fire apparatus. [1550, 2024]

3.3.12 Contaminants. Harmful, irritating, or nuisance material foreign to the normal atmosphere. [1550, 2024]

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

3.3.14 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.

3.3.15 Contamination. The accumulation of products of combustion and other hazardous materials on or in an ensemble element that includes carcinogenic, toxic, corrosive, or allergy-causing chemicals, body fluids, infectious microorganisms, or [chemical, biological, radiological, and nuclear defense] CBRN terrorism agents. [1851, 2020]

3.3.16 Cooling.

3.3.16.1 Active Cooling. The process of using external methods or devices (e.g., hand and forearm immersion, misting fans, ice vests) to reduce elevated core body temperature.

3.3.16.2 Passive Cooling. The process of using natural evaporative cooling (e.g., sweating, doffing personal protective

equipment, moving to a cool environment) to reduce elevated core body temperature.

3.3.17* Core Body Temperature. The temperature deep within a living body.

3.3.18 Crew. A team of two or more firefighters. [1550, 2024]

3.3.19 Debilitating Illness or Injury. A condition that temporarily or permanently prevents a member of the fire department from engaging in normal duties and activities as a result of illness or injury. [1550, 2024]

3.3.20 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.

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

3.3.22 Emergency Incident. Any situation to which an emergency services organization responds to deliver emergency services, including rescue, fire suppression, emergency medical care, special operations, law enforcement, and other forms of hazard control and mitigation. [1550, 2024]

3.3.23 Emergency Medical Care. 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.

3.3.24 Emergency Medical Services. The provision of treatment, such as first aid, cardiopulmonary resuscitation, basic life support, advanced life support, and other prehospital procedures including ambulance transportation, to patients. [1550, 2024]

3.3.25 Emergency Operations. Activities of the fire department relating to rescue, fire suppression, emergency medical care, and special operations, including response to the scene of the incident and all functions performed at the scene. [1550, 2024]

3.3.26 Energy Drink. A type of beverage containing stimulant drugs (caffeine and other ingredients such as taurine, ginseng, and guarana) that is marketed as providing mental or physical stimulation.

3.3.27* 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.

3.3.28 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.

3.3.29 Essential Job Task. Task or assigned duty that is critical to successful performance of the job. (*See Chapter 10 and Section 13.3.*)

3.3.30 Evaluation. See 3.3.68, Medical Evaluation.

3.3.31 Exposure.

3.3.31.1 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 food-borne pathogens or toxins.

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

3.3.32 Eyewear. See 3.3.105, Splash-Resistant Eyewear.

3.3.33 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.

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

3.3.35 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. [1900, 2024]

3.3.36* Fire Department An organization providing rescue, fire suppression, and related activities, including any public, governmental, private, industrial, or military organization engaging in this type of activity. [1010, 2024]

3.3.37* Fire Department Facility. Any building or area owned, operated, occupied, or used by a fire department on a routine basis. [1550, 2024]

3.3.38 Fire Department Member. See 3.3.72, Member.

3.3.39 Fire Department Physician. A licensed doctor of medicine or osteopathy who has been designated by the fire department to provide professional expertise in the areas of occupational safety and health as they relate to emergency services.

3.3.40* Fire Suppression. The activities involved in controlling and extinguishing fires. [1550, 2024]

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

3.3.42 Functional Capacity Evaluation. An assessment of the correlation between that individual's capabilities and the essential job tasks.

3.3.43 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.

3.3.44 Gross Decontamination. A term used in the hazardous materials response industry to indicate the partial removal of exterior contamination from protective clothing, usually by rinsing with water, sometimes with detergent, to allow for the safe exit of the responder from the protective clothing in the contamination reduction zone of an emergency incident. [1851, 2020]

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

3.3.46* Hazard. A condition that presents the potential for harm or damage to people, property, or the environment.

3.3.47 Health and Fitness Coordinator. The person who, under the supervision of the fire department physician, has been designated by the department to coordinate and be responsible for the health and fitness programs of the department. [1550, 2024]

3.3.48 Health and Safety Committee. A representative group of individuals who serve along with the fire department physician and health and fitness coordinator, and is chaired by the fire department health and safety officer, who oversee the implementation of the fire department occupational safety and health program.

3.3.49* 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. [1550, 2024]

3.3.50 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. [1550, 2024]

3.3.51 Health Promotion. Preventive activities that identify real and potential health risks in the work environment and that inform, motivate, and otherwise help people to adopt and maintain healthy practices and lifestyles.

3.3.52* Health-Related Fitness Program (HRFP). A comprehensive program designed to promote the member's capacity to perform occupational activities; reduce the risk of musculoskeletal injuries, chronic disease, premature death; and improve overall well-being.

3.3.53 Hepatitis.

3.3.53.1 HBV. Hepatitis B virus.

3.3.53.2 HCV. Hepatitis C Virus.

3.3.54 HIV. Human immunodeficiency virus.

3.3.55* Hydration. The introduction of water in the form of food or fluids into the body.

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

3.3.57 Implementation Outcomes. The specific results or effects that occur during the process of implementing a particular program, intervention, or innovation.

3.3.57.1 Acceptability Outcome. The perception among implementation stakeholders that a given treatment, service, practice, or innovation is agreeable, palatable, or satisfactory.

3.3.57.2 Adoption Outcome. The intention, initial decision, or action to try or employ an innovation or evidence-based practice.

3.3.57.3 Appropriateness Outcome. The perceived fit, relevance, or compatibility of the innovation or evidence-based practice for a given practice setting, provider, or consumer;

and/or the perceived fit of the innovation to address a particular issue or problem.

3.3.57.4 Feasibility Outcome. The extent to which a new treatment, or an innovation, can be successfully used or carried out within a given organization or setting.

3.3.57.5 Fidelity Outcome. The degree to which an intervention was implemented as it was prescribed in the original protocol or as it was intended by the program developers.

3.3.57.6 Implementation Cost Outcome. Reflects the financial, time, and resource investments required to implement an intervention, program, or policy, as well as any cost savings or cost-effectiveness associated with its implementation.

3.3.57.7 Penetration Outcome. The integration of an innovation, practice, or program within a service setting and its subsystems.

3.3.57.8 Sustainability Outcome. The extent to which a newly implemented treatment, program, or practice is maintained or institutionalized within a service setting's ongoing, stable operation.

3.3.58 Incident Commander (IC). The individual responsible for all incident activities, including the development of strategies and tactics and the ordering and the release of resources. [470, 2022]

3.3.59* Incident Management System (IMS). A system that defines the roles and responsibilities to be assumed by responders and the standard operating procedures to be used in the management and direction of emergency incidents and other functions. [1550, 2024]

3.3.60 Individual. A candidate or member.

3.3.61 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.

3.3.62 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.

3.3.63* 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. [1550, 2024]

3.3.64 Infectious Disease. An illness or disease resulting from invasion of a host by disease-producing organisms such as bacteria, viruses, fungi, or parasites. [1550, 2024]

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

3.3.66 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.

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

3.3.68 Medical Evaluation. The analysis of information for the purpose of making a determination of medical certification. Medical evaluation includes a medical examination.

3.3.69 Medical Examination. An examination performed or directed by the fire department physician.

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

3.3.71 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.

3.3.72* Member. A person involved in performing the duties and responsibilities of a fire department, under the auspices of the organization. [1550, 2024]

3.3.73 Member Assistance Program (MAP). A generic term used to describe the various methods used in the fire department for the control of alcohol and other substance abuse, stress, and personal problems that adversely affect member performance, including behavioral health and wellness.

3.3.74* Mental Health Professional. A board-certified psychiatrist, a psychiatric nurse practitioner, clinical psychologist, clinical professional counselor, or clinical social worker that is independently licensed to evaluate, diagnose, and treat mental health disorders in their state of practice and is in good standing with their state licensure board.

3.3.75* Morbidity. The state of being diseased.

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

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

3.3.78 Occupational Injury. An injury sustained during the performance of the duties, responsibilities, and functions of a fire department member. [1550, 2024]

3.3.79 Occupational Safety and Health Program. An occupation specific program, implemented to reduce the risks associated with the occupation, that outlines the components of a program and the roles and responsibilities of the fire department and its members.

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

3.3.81 Passive Cooling. See 3.3.16.2.

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

3.3.82.1 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.

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

3.3.82.3* 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.

3.3.82.4* 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.

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

3.3.84 Peer Fitness Trainer (PFT). A member with the background knowledge and practical expertise to share wellness- and fitness-related information with department members.

3.3.85* Peer Support. Emotional and practical support between two people who share a common experience, such as a mental health challenge or illness.

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

3.3.87 Personnel Accountability System. A system that readily identifies both the location and function of all members operating at an incident scene. [1550, 2024]

3.3.88 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.

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

3.3.90 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.

3.3.91 Prehabilitation. Physical and lifestyle preparation strategies to increase capability and capacity, reduce the potential for injury, and improve readiness in anticipation of an upcoming stressor.

3.3.92* Preliminary Exposure Reduction. Techniques for reducing soiling and contamination levels on the exterior of protective clothing and equipment following incident operations. This is not the same as cleaning or decontamination.

3.3.93 Procedure. An organizational directive issued by the authority having jurisdiction or by the department that establishes a specific policy that must be followed. [1550, 2024]

3.3.94* 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.

3.3.95 Punitive. Inflicting or aiming to inflict punishment or sanctions.

3.3.96 Qualified Person. A person who, by possession of a recognized degree, certificate, professional standing, or skill, and who, by knowledge, training, and experience, has demonstrated the ability to deal with problems related to the subject matter, the work, or the project. [1451, 2018]

3.3.97 Recovery. The process of returning a member's physiological and psychological states to levels that indicate the person is able to perform additional emergency tasks, be reassigned, or released without any adverse effects.

3.3.98 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.

3.3.99* Rehabilitation. An intervention designed to mitigate against the physical, physiological, and emotional stress of fire-fighting in order to sustain a member's energy, improve performance, and decrease the likelihood of on-scene injury or death.

3.3.100 Rehabilitation Manager. The person or officer assigned to manage rehabilitation.

3.3.101 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.

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

3.3.103 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 Blood-borne Pathogens Standard. [29 CFR Part 1910.1030]

3.3.104 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.

3.3.105 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 3.3.33.*)

3.3.106 Sports Drink. A fluid replacement beverage that is between 4 percent and 8 percent carbohydrate and contains between 0.5 g and 0.7 g of sodium per liter of solution.

3.3.107 Standard Operating Guideline. A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely, which can be varied due to operational need in the performance of designated operations or actions. [1550, 2024]

3.3.108* Standard Operating Procedure. A written organizational directive that establishes or prescribes specific operational or administrative methods to be followed routinely for the performance of designated operations or actions. [1550, 2024]

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

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

3.3.111 Supervisor. An emergency services responder who has responsibility for overseeing the performance of other responders assigned to a specific division or group.

3.3.112* Symptom-Limiting Exercise Stress Test with Imaging. An exercise test protocol that is discontinued only in the event of limiting symptoms, exertional hypotension, or ventricular tachycardia, without respect to peak heart rate.

3.3.113* 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 Infection Control Program Components (NFPA 1581)

4.1 Administration.

4.1.1 Scope. Chapters 4 through 8 contain minimum requirements for a fire department infection control program.

4.1.2 Purpose. The purpose of Chapters 4 through 8 is to provide minimum criteria for infection control in the fire station, in the emergency vehicles, during procedures at an incident scene, and at any other area where fire department members are involved in routine or emergency operations.

4.1.3 Application.

4.1.3.1 The requirements of Chapters 4 through 8 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.

4.1.3.2 Chapters 4 through 8 do not apply to facility fire brigades, which might also be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.

4.1.4 Equivalency.

4.1.4.1* The requirements of Chapters 4 through 8 are intended to meet or exceed the most current applicable federal regulations of the Occupational Safety and Health Administration (OSHA) and guidelines of the US Centers for Disease Control and Prevention (CDC).

4.1.4.2 The requirements in Chapters 4 through 8 are designed to provide minimum levels of protection from infection for members and patients, and for the public at fire department facilities.

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

4.2 Policy.

4.2.1 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*).

4.2.2 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.

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

- (1) Protective ensembles in accordance with NFPA 1851
- (2) Self-contained breathing apparatus (SCBA), including the facepiece and second-stage regulator, in accordance with NFPA 1852
- (3) Firefighting tools and other equipment
- (4) Station/work uniforms
- (5) Emergency medical equipment
- (6)* Emergency vehicles, ambulances, and other fire department vehicles (patient compartments and areas used by firefighters/EMS providers)
- (7) Fire department facilities

4.3* Risk Management.

4.3.1* The fire department shall incorporate infection control in the written risk management plan that meets the requirements specified in NFPA 1550.

4.3.2 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

4.4 Training and Education.

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

4.4.2 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

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

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

4.5 Infection Control Officer.

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

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

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

4.5.1.3 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.

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

4.5.3* 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.

4.5.4 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 4.7.5

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

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

4.5.7 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.4.4.3*):

- (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

4.6 Health Maintenance.

4.6.1 A confidential health data base shall be established and maintained for each member as specified in NFPA 1550 and NFPA this standard, and in accordance with 29 CFR 1910.1020, "Access to Employee Exposure and Medical Records."

4.6.1.1 This data base shall include:

- (1) Any occupational exposures
- (2) Vaccination status

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

4.6.2 Immunizations and Infectious Disease Screening.

4.6.2.1* 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

4.6.2.1.1 The infection control officer shall ensure the immunizations listed in 4.6.2.1 are consistent with current CDC guidelines.

4.6.2.2 If a member has a positive tuberculosis test, CDC guidelines for management and subsequent chest radiographic surveillance shall be followed.

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

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

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

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

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

4.7 Infectious Exposures.

4.7.1 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.

4.7.2 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.

4.7.3 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.

4.7.4* 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

4.7.5* All infectious exposures shall be recorded in writing, in accordance with NFPA 1550, as soon as possible after the exposure using a standardized form designed to allow for follow-up.

4.7.5.1 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

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

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

4.7.7 Infectious exposure data, without personal identifiers, also shall be added to the fire department health data base as specified in Chapter 13 of NFPA 1550.

4.7.8 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.

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

Chapter 5 Infection Control for Fire Department Facilities (NFPA 1581)

5.1* General.

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

5.1.1.1* Engineering controls shall be used to minimize surface contact to prevent or reduce the spread of contaminants.

5.1.1.2 All exposed floor and wall materials shall be hard surface, nonporous, and easy to clean or sanitize.

5.1.1.3 Infection control areas shall be designated as follows:

- (1) Red — Spaces likely to be exposed to bloodborne pathogens or infectious agents
- (2) Yellow — Transition areas between red and green control areas
- (3) Green — Clean areas such as living areas, kitchen, dormitory, and offices

5.1.2 Hand Washing Capacity.

5.1.2.1 Hand washing capacity shall be available in all areas of the fire station as identified in NFPA 1550.

5.1.2.2* If hand washing capacity is 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 clean areas (green areas) of the facility.

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 m² (60 ft²) 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 A clearly visible sign reminding members to wash their hands shall be posted prominently in each bathroom.

5.4.2 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 Personal Protective Equipment (PPE) Exposed to Infectious Agents.

5.5.4.1 PPE contaminated with blood or body fluids shall be isolated, cleaned, then stored in a dedicated, well-ventilated area or room.

5.5.4.2 Structural ensembles or ensemble elements contaminated with blood or body fluids shall be isolated as soon as possible and be cleaned in accordance with NFPA 1851.

5.5.4.3 PPE contaminated with blood or body fluids shall not be brought into the home or washed in home or public laundries.

5.5.4.4* PPE contaminated with blood or body fluids shall not be transported in private vehicles unless isolated.

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 Infection Control for Fire Department Emergency Vehicles (NFPA 1581)

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 1900.

6.2.2 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.

6.2.3* Ventilation.

6.2.3.1 Ventilation systems shall provide complete ambient air exchanges in both driver and patient compartments at least every 2 minutes when the vehicle is stationary.

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

6.2.4* 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 heating and air-conditioning system.

6.2.5* Vehicle Interior Surfaces. The interiors of fire department vehicles used to transport patients shall meet or exceed the requirements of NFPA 1900 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 Infection Control Protection for Emergency Medical Service Operations (NFPA 1581)

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 spurring 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, including pocket masks or bag valve masks, shall be used as a barrier device while performing airway management.

7.2.7* Medical gloves shall not be worn under structural fire-fighting gloves.

7.2.8 Disposable 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.

7.3 Handling of Sharp Objects.

7.3.1 All members shall take precautions during procedures to prevent injury or exposure while using needles, scalpel blades, and other sharp instruments or devices.

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

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

7.3.4 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.

7.3.5 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 Infection Control Cleaning, Disinfecting, and Disposal (1581)

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 informed of the flammability and reactivity of disinfectants.

8.2.2.2 Members shall follow the disinfectant manufacturer's instructions.

8.2.2.3 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 Blood-borne 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 before reaching $\frac{3}{4}$ full.

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.

Chapter 9 Occupational Medical: Roles and Responsibilities (NFPA 1582)

9.1 Administration.

9.1.1 Scope. Chapters 9 through 13 contain descriptive requirements for a comprehensive occupational medical program for fire departments.

9.1.1.1* The medical requirements in Chapters 9 through 13 are applicable to fire department candidates and members whose duties as defined by the authority having jurisdiction (AHJ) are outlined in NFPA 1010, NFPA 1006, NFPA 1021, and NFPA 1140.

9.1.1.2 Chapters 9 through 13 provide information and guidance for physicians and other health care providers responsible for fire department occupational medical programs.

9.1.1.3* The requirements in Chapters 9 through 13 are applicable to public, governmental, military, private, and industrial fire department organizations providing rescue, fire suppression, hazardous materials mitigation, special operations, and other emergency services.

9.1.1.4 Chapters 9 through 13 shall not apply to facility fire brigades that also can be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.

9.1.2 Purpose. The purpose of Chapters 9 through 13 is to outline an occupational medical program that, when implemented in a fire department, will reduce the risk and burden of fire service occupational morbidity and mortality while improving the health, and thus the safety and effectiveness, of firefighters operating to protect members of the public's life and property.

9.1.2.1 Chapters 9 through 13 specify the following information:

- (1) Minimal medical requirements for individuals
- (2) Occupational medical, behavioral health, and physical fitness evaluations for individuals
- (3)* Information regarding fire department activities and essential job tasks that assist the department physician in providing proper medical, behavioral health, and physical fitness support for individuals
- (4) Methods and types of data that must be collected to sustain comprehensive occupational medical programs for fire departments

9.1.2.2* The implementation of the medical requirements outlined in Chapters 9 through 13 ensures that individuals are medically capable of performing their required duties and will reduce the risk of occupational injuries and illnesses.

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

9.1.3 Implementation.

9.1.3.1 The medical requirements of Chapters 9 through 13 shall be implemented when this standard is adopted by an AHJ on an effective date specified by the AHJ.

9.1.3.2* When Chapters 9 through 13 are adopted by a jurisdiction, date(s) shall be set for individuals to achieve compliance by establishing a phase-in schedule for compliance with specific requirements, if needed.

9.1.3.3* The fire department risk management plan as described in NFPA 1550 shall include implementation of a comprehensive occupational medical program that is compliant with Chapters 9 through 13.

9.2 Fire Department Responsibilities.

9.2.1 The fire department shall establish a comprehensive occupational medical program that includes medical evaluations for candidates and members. (*See Annex D.*)

9.2.2 The medical evaluations and any additional medical tests ordered by the fire department physician shall be provided at no cost to the members.

9.2.2.1* This obligation shall not extend to medical tests beyond the basic medical evaluation for candidates.

9.2.3 The fire department shall be responsible for making decisions about hiring, disqualifying, restricting, and determining reasonable accommodations.

9.2.4* The fire department shall have an officially designated physician who shall be responsible for guiding, directing, and advising the members with regard to their health, fitness, and suitability for duty as required by NFPA 1550.

9.2.5* The fire department shall ensure that the fire department physician is a licensed doctor of medicine or osteopathy who has completed residency training in an accredited medical training program and/or is American Boards of Medical Specialties (ABMS) or American Osteopathic Association (AOA) board certified or international equivalent.

9.2.6* The fire department shall provide the fire department physician with a fire service overview, current job descriptions, and the essential job tasks required for all fire department positions and ranks.

9.2.7 The fire department shall provide the fire department physician with the department's organizational statement that outlines types and levels of services provided by the department, in accordance with NFPA 1550.

9.2.8 For the purpose of conducting medical evaluations, the fire department shall assist the fire department physician to understand the physiological and psychological demands placed on members as well as the environmental conditions under which they must perform and the personal protective equipment (PPE) they must wear during various types of emergency operations.

9.2.9 The fire department shall ensure member access to evaluation by medical specialists, medical and/or surgical treatment, rehabilitation, and any other intervention prescribed by a medical provider, in consultation with the fire department physician, following an injury or illness resulting from a member's participation in fire department functions.

9.2.10 The fire department shall require that the fire department health and safety officer and the health and fitness coordinator maintain a liaison relationship with the fire department physician to ensure that all aspects of the comprehensive occupational medical program are actively engaged.

9.2.11 The fire department shall ensure employee privacy and confidentiality regarding medical conditions identified during the medical evaluation except as required by law.

9.2.12 Where possible, the fire department shall provide alternate duty position for members when the fire department physician recommends temporary work restrictions.

9.2.13 Medical Record Keeping.

9.2.13.1* The fire department comprehensive occupational medical program shall include collection and maintenance of a confidential medical and health information system for members.

9.2.13.2 All medical record keeping shall comply with the requirements of 29 CFR 1910.1020, "Access to employee exposure and medical records," and other applicable regulations and laws.

9.2.14 The provisions of 9.2.13 shall apply to all health and medical records regarding individual members and to all methods of communicating or transferring the information contained in these records, including written, oral, electronic, and any other means of communication.

9.3 Fire Department Physician Responsibilities.

9.3.1 The fire department physician shall fulfill the following responsibilities:

- (1) Be familiar with the requirements of Chapters 1 through 3; 9 through 13; and Annexes A, D, E, F, G, and K related to a fire department's comprehensive occupational medical program
- (2) Understand and be familiar with local, state, and federal legal requirements related to the medical evaluation
- (3) Understand the physiological, psychological, and environmental demands placed on firefighters
- (4) Evaluate individuals to identify medical conditions that could affect their ability to safely respond to and participate in emergency operations
- (5) Use the essential job task descriptions supplied by the fire department to determine an individual's medical certification
- (6) Identify and report job restrictions associated with any essential job tasks that cannot be safely and effectively performed by the individual due to a medical condition(s) or physical fitness
- (7) Inform the fire chief or his/her designee whether or not the individual is medically certified to safely perform the essential job tasks
- (8) Report the results of the medical evaluation to the individual, including any medical condition(s) identified during the medical evaluation, and the recommendation as to whether the individual is medically certified to safely perform the essential job tasks
- (9) Forward copies of any abnormal results along with patient instructions regarding primary care follow-up to individuals who were instructed to seek (as appropriate) medical follow-up to address any medical conditions, or lab abnormalities, identified during the medical evaluation
- (10) In collaboration with the department's health and fitness coordinator, review the design, methods, and results of the annual occupational fitness evaluation as described in Chapter 12

- (11) Provide or arrange for a prescriptive rehabilitation and/or fitness program when indicated to aid a member's recovery from illness or injury and to improve a member's fitness so as to enhance his/her ability to safely and effectively perform essential job tasks
- (12) Be aware of and promote injury prevention and health promotion programs for firefighters

9.3.2 When medical evaluations are conducted by a physician or medical provider other than the fire department physician, the evaluation shall be reviewed and approved by the fire department physician.

9.3.3 The fire department physician shall review individual medical evaluations and aggregate data from member evaluations in order to detect evidence of occupational exposure(s) or clusters of occupational disease.

9.3.4 The fire department physician shall be a member of the Fire Department Occupational Safety and Health Committee chaired by the health and safety officer as required by NFPA 1550.

9.3.5 The fire department physician shall provide medical supervision for the fire department fitness, return-to-duty rehabilitation, and physical conditioning programs as required by Chapters 9 through 13.

9.3.6* The fire department physician shall ensure adequate on-scene medical support at the incident scene rehabilitation sector for members during emergency operations as required by NFPA 1550, and Chapters 9 through 13.

9.3.7 The fire department physician shall provide supervision for the fire department infection control program as required by Chapters 9 through 13.

9.4 Individual Responsibilities. Each individual shall adhere to the following requirements:

- (1) Cooperate, participate, and comply with the medical evaluation process
- (2) Provide complete and accurate information to the fire department physician and other authorized medical care provider(s)
- (3) Report any occupational exposure such as exposure to hazardous materials or toxic substances and exposure to infectious or contagious diseases
- (4) Report to the fire department physician any medical condition that could interfere with the ability of the individual to safely perform essential job tasks, such as illness or injury, use of prescription or nonprescription drugs, and pregnancy

9.5 Confidentiality of Medical Information.

9.5.1* Specific information concerning medical diagnosis shall be released by the fire department physician only with written permission from the individual and/or as required by law.

9.5.2 No fire department personnel, other than the fire department physician or appropriate medical staff, shall have access to another member's medical records without the express written consent of that member.

Chapter 10 Occupational Medical: Essential Job Tasks (NFPA 1582)

10.1 Essential Job Tasks and Descriptions.

10.1.1 The fire department shall evaluate the following 15 essential job tasks against the types and levels of emergency services provided to the local community by the fire department, the types of structures and occupancies in the community, and the configuration of the fire department to determine which tasks apply to individuals:

- (1)* Wearing personal protective equipment (PPE) and self-contained breathing apparatus (SCBA) while performing firefighting tasks (e.g., hose line operations, extensive crawling, lifting and carrying heavy objects, ventilating roofs or walls using power or hand tools, forcible entry), rescue operations, and other emergency response actions under stressful conditions, including working in extremely hot or cold environments for prolonged time periods
- (2) Wearing the respirators required by the jurisdiction (e.g., N-95, half-face elastomeric, PAPR, SCBA), which includes a demand-valve-type positive-pressure facepiece or filter respirator, achieving a successful fit-test and tolerating increased respiratory workloads
- (3) Exposure to toxic fumes, irritants, particulates, biological (i.e., infectious) and nonbiological hazards, or heated gases, despite the use of PPE and SCBA
- (4) Climbing at least six flights of stairs or walking a similarly strenuous distance and incline in jurisdictions without tall buildings while wearing PPE and SCBA, commonly weighing 40–50 lb (18–23 kg) and carrying equipment/tools weighing an additional 20–40 lb (9–18 kg)
- (5) Wearing PPE and SCBA that is encapsulating and insulating, which will result in significant fluid loss that frequently progresses to clinical dehydration and can elevate core temperature to levels exceeding 102.2°F (39°C)
- (6) Working alone while wearing PPE and respirators required by the jurisdiction, searching, finding, and rescue-dragging or carrying victims to safety in hazardous conditions and low visibility
- (7) While wearing PPE and SCBA, advancing water-filled hose lines up to 1 ¾ in. (45 mm) in diameter from fire apparatus to occupancy [approximately 150 ft (50 m)], which can involve negotiating multiple flights of stairs, ladders, and other obstacles
- (8) While wearing PPE and SCBA, climbing ladders, operating from heights, walking or crawling in the dark along narrow and uneven surfaces that might be wet or icy, and operating in proximity to electrical power lines or other hazards
- (9) Unpredictable, prolonged periods of extreme physical exertion as required by emergency operations without benefit of a warm-up period, scheduled rest periods, meals, access to medication(s), or hydration
- (10) Operating fire apparatus or other vehicles in an emergency mode with emergency lights and sirens
- (11) Critical, time-sensitive, complex problem solving during physical exertion in stressful, hazardous environments, including hot, dark, tightly enclosed spaces, that is further aggravated by fatigue, flashing lights, sirens, and other distractions
- (12) Ability to communicate (i.e., give and comprehend written or verbal orders) while wearing PPE and respirators

required by the jurisdiction under conditions of high background noise, poor visibility, and drenching from hose lines or fixed protection systems (e.g., sprinklers)

- (13) Functioning as an integral component of a team, where sudden incapacitation of a member can result in mission failure or in risk of injury or death to members of the public or other team members
- (14) Working in shifts, including during nighttime, that can extend beyond 12 hours
- (15) Performing emergency medical service (EMS) tasks, such as cardiopulmonary resuscitation (CPR) or lifting or moving patients, while wearing PPE and respirators required by the jurisdiction

10.1.2 The fire department shall provide the fire department physician with the list of essential job tasks, as developed per 10.1.1, to be used in the medical evaluation of individuals.

10.1.3 The fire department physician shall consider the physical, physiological, intellectual, and psychological demands of the occupation when evaluating the individual's ability to perform the essential job tasks.

10.2 Essential Job Tasks for Specialized Teams.

10.2.1 If the fire department operates specialized teams such as hazardous materials units, self-contained underwater breathing apparatus (SCUBA) teams, technical rescue teams, emergency medical services (EMS) teams, or units supporting tactical law enforcement operations, the fire department shall identify for each team it operates the additional essential job tasks and specialized personal protective equipment (PPE) not specified in 10.1.1(1) through 10.1.1(15) that would apply to the individuals of that team.

10.2.2 The fire department shall also provide the fire department physician with the list of additional essential job tasks and specialized PPE specific to each specialized team.

10.2.3 When performing the medical evaluation of individuals of a specialized team, the fire department physician shall also consider the following:

- (1) Additional medical and/or physical requirements that are related to the job tasks being performed by the team that are not enumerated in this standard
- (2) The impact on individuals of having to wear or use specialized PPE that can increase weight, environmental isolation, sensory deprivation, and/or dehydration potential above levels experienced with standard fire suppression PPE

Chapter 11 Occupational Medical: Evaluation of Members (NFPA 1582)

11.1 General.

11.1.1 The fire department shall establish and maintain a confidential occupational medical evaluation program for members.

11.1.2 Occupational medical evaluations shall be conducted as a baseline for surveillance and annually thereafter.

11.1.3* An occupational medical evaluation shall be performed following a member's occupational exposure, illness, injury, or protracted absence from the job.

11.1.3.1 The scope of that evaluation shall be determined by the fire department physician after reviewing the type and severity of the condition.

11.1.4 The components of the medical evaluations shall conform to all applicable US OSHA standards, including 29 CFR 1910.120, "Hazardous waste operations and emergency response"; 29 CFR 1910.134, "Respiratory protection"; 29 CFR 1910.95, "Occupational noise exposure"; and 29 CFR 1910.1030, "Bloodborne pathogens."

11.2 Member Education Regarding Occupational Medical Evaluation Program.

11.2.1 The fire department, the fire department physician, and member organizations where they exist shall be responsible to convey the purposes and importance of the annual occupational medical evaluation to members and to the AHJ.

11.2.2 The purpose of the annual occupational medical evaluation of members shall include but cannot be limited to the following:

- (1) Identifying conditions that interfere with a member's physical or mental ability to safely perform essential job tasks without undue risk of harm to self or others
- (2) Monitoring the effects of exposure to specific biological, physical, or chemical agents on individual members
- (3) Detecting changes in a member's health that can be related to harmful working conditions
- (4) Detecting patterns of disease or injury occurrence in the workforce that could indicate underlying work-related problems
- (5)* Providing members with information about their current health, promoting wellness, and referring them for appropriate further evaluation and treatment
- (6) Providing members with information and education about occupational hazards
- (7) Providing a cost-effective investment in work-related disease prevention, early detection, and health promotion for members
- (8) Complying with federal, state, provincial, local, and/or other jurisdictional requirements

11.3 Timing of the Annual Occupational Medical Evaluation of Members.

11.3.1 All members shall receive a baseline medical evaluation after hiring and prior to performing firefighter emergency functions and at least annually thereafter.

11.3.2 The baseline medical evaluation shall include the components of the annual occupational medical evaluation not performed as part of the candidate medical evaluation, provided the candidate medical evaluation was performed within the past 12 months.

11.3.3 The annual evaluation shall be completed every 12 months (± 3 months).

11.3.4 Annual medical evaluations shall be compared to baseline and subsequent evaluations to identify clinically relevant changes.

11.3.5 The interval requirements for performance of the annual occupational medical evaluation shall not preclude more frequent medical evaluations of members for new or recurring conditions when requested by the member, fire department physician, or AHJ.

11.4 Components of the Annual Occupational Medical Evaluation of Members.

11.4.1 All components listed in Section 11.5 through Section 11.7 shall be included in the baseline and annual occupational medical evaluations of members.

11.4.2 It shall be acceptable for certain components of the annual occupational medical evaluation to be performed by a member's private physician, provided full results are forwarded in the required time frame to the fire department physician.

11.4.3 Each medical evaluation shall include a medical history, including exposure and behavioral health histories; physical examination; blood tests; urinalysis; vision tests; audiograms; spirometry; chest x-ray, as indicated; ECG; cancer screening, as indicated; and immunizations and infectious disease screening, as indicated.

11.4.4 Tests for illegal drugs shall not be performed as part of the annual medical evaluation.

11.5 Medical History.

11.5.1* A medical history questionnaire shall be completed by each member to provide baseline information with which to compare future medical concerns.

11.5.2 An annual medical history questionnaire, which includes changes in health status and known occupational exposures since the previous annual evaluation, shall be completed by each member to provide follow-up information.

11.5.3 Information on the questionnaire and interval concerns shall be reviewed with each member by the fire department physician or designated medical evaluator.

11.6 Physical Examination. The annual physical examination shall include each of the following components:

- (1) Vital signs [temperature, pulse, and respiratory rate, and blood pressure (BP)]
 - (a) BP shall be measured according to the recommendations of the *Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC 7)
- (2) Head, eyes, ears, nose, and throat (HEENT)
- (3) Neck
- (4) Cardiovascular
- (5) Pulmonary
- (6) Breast
- (7) Gastrointestinal with digital rectal exam as clinically indicated
- (8) Hernia
- (9) Lymph nodes
- (10) Neurological
- (11) Musculoskeletal
- (12)* Skin (includes screening for cancers)
- (13) Vision

11.7 Ancillary Tests.

11.7.1* Blood Tests. Blood tests shall be performed for fire-fighters, at minimum, every three years for those under the age of 40, and every year for those over the age of 40, and shall include the following:

- (1) CBC with differential, RBC indices and morphology, and platelet count
- (2) Electrolytes (Na, K, Cl, HCO₃, or CO₂)

- (3) Renal function (BUN, creatinine)
- (4) Glucose
- (5) Liver function tests (ALT, AST, direct and indirect bilirubin, alkaline phosphatase)
- (6) Total cholesterol, HDL, LDL, clinically useful lipid ratios (e.g., percent LDL), and triglycerides

11.7.2 Urine Laboratory Tests. The urine laboratory tests required shall include the following:

- (1) Dipstick analysis for glucose, ketones, leukocyte esterase, protein, blood, and bilirubin
- (2) Microscopic analysis for RBC, WBC, casts, and crystals if indicated by results of dipstick analysis
- (3) Analysis for occupational chemical exposure if indicated

11.7.3* Audiology. Hearing thresholds shall be assessed annually in each ear at each of the following frequencies:

- (1) 500 Hz
- (2) 1000 Hz
- (3) 2000 Hz
- (4) 3000 Hz
- (5) 4000 Hz
- (6) 6000 Hz
- (7) 8000 Hz

11.7.3.1 The fire department physician or other qualified medical evaluator shall compare audiogram results obtained during yearly evaluations with baseline and subsequent test results.

11.7.3.2 Standard threshold shifts shall be corrected for age as permitted by OSHA.

11.7.4 Spirometry.

11.7.4.1* Pulmonary function testing (spirometry) shall be conducted annually to measure the member's forced vital capacity (FVC), forced expiratory volume in 1 second (FEV₁), and the absolute FEV₁/FVC ratio.

11.7.4.2 The fire department physician or other qualified medical evaluator shall compare spirometry results obtained during yearly evaluations with baseline and subsequent test results.

11.7.4.3* FEV₁ and FVC results shall be expressed as the absolute value (liters or milliliters) and as percent predicted adjusted for gender, age, height, and ethnicity using NHANES III normative equations.

11.7.5 Chest Radiographs.

11.7.5.1 Chest x-rays shall include an initial baseline and shall be repeated as medically indicated.

11.7.5.2 The fire department physician or other qualified medical evaluator shall compare any chest radiographs with baseline and subsequent radiographs.

11.7.6 Electrocardiograms (ECGs).

11.7.6.1 A resting 12-lead ECG shall be performed as part of the baseline medical evaluation and shall be performed annually after age 40 or as clinically indicated.

11.7.6.2 The fire department physician or other qualified medical evaluator shall compare baseline and subsequent ECGs.

11.7.6.3 The fire department physician or other qualified medical evaluator shall compare baseline and subsequent stress tests, when available, to identify clinically relevant changes.

11.7.7 Risk Stratification.

11.7.7.1 Asymptomatic firefighters 40 years of age or older with no known atherosclerotic cardiovascular disease (ASCVD) shall be assessed annually for their 2-year or 10-year risks of ASCVD, defined as coronary death, nonfatal myocardial infarction, or fatal or nonfatal stroke.

11.7.7.2 Asymptomatic firefighters younger than 40 years of age known to be at high risk for ASCVD shall be assessed for coronary artery disease.

11.7.7.3 The 2-year Framingham risk tables or the 10-year heart risk calculator created by the American College of Cardiology/American Heart Association (ACC/AHA) shall be used to generate a 2-year or 10-year risk of ASCVD, taking into consideration the individual's age, sex, race, total cholesterol, high-density lipoprotein (HDL) cholesterol, systolic blood pressure, blood-pressure-lowering medication use, diabetes status, and smoking status.

11.7.7.3.1 Those members assessed as being at an ASCVD risk of ≥ 2 percent over the next 2 years or ≥ 5 percent over the next 10 years shall be counseled on risk factor reduction and referred to their PCP for risk factor reduction options.

11.7.7.3.1.1* Those members assessed as being at 2–4 percent ASCVD over the next 2 years or 10 to <20 percent risk of ASCVD over the next 10 years shall be further evaluated using symptom-limiting exercise stress testing (EST) with imaging [e.g., echocardiography, technetium (^{99m}Tc) sestamibi study] to at least the adjusted minimum threshold level of aerobic capacity (in METs) corresponding to the 35th percentile of cardiorespiratory fitness for the general population, based on age and biological sex.

11.7.7.3.1.2 Negative ESTs shall be repeated at least every 2 to 5 years or as clinically indicated.

11.7.7.3.1.3 Positive ESTs shall be referred to a cardiologist for further evaluation and treatment.

11.7.7.3.2 Those members assessed as being at 4 percent risk of ASCVD over the next 2 years or 20 percent or higher risk of ASCVD over the next 10 years shall be referred to a cardiologist for further evaluation and treatment.

11.7.8 Mammography.

11.7.8.1 Mammography shall be performed on each female member bi-annually for those over the age of 40 and annually for those over the age 50 or as clinically indicated.

11.7.8.2 A qualified radiologist shall compare mammograms to prior mammograms.

11.7.8.3 The fire department physician shall compare mammography reports to prior reports.

11.7.9 Immunizations and Infectious Disease Screening. The following infectious disease immunizations or infectious disease screenings shall be provided, as indicated:

- (1)* Tuberculosis (TB) screening—baseline, by either tuberculin skin testing using the tuberculin purified protein derivative (PPD) or the tuberculin blood test (i.e., interferon gamma release assay); subsequent tuberculosis

screening to be performed annually or at a frequency according to CDC guidelines unless the member has history of a positive tuberculin screening test, in which case CDC guidelines for management and subsequent chest radiographic surveillance apply

- (2) Hepatitis C virus screening—baseline, following occupational exposure, and if requested by the fire department physician or member
- (3) Hepatitis B virus vaccinations and titers—as specified in CDC guidelines; laboratory confirmation of immunity to be tested 1–2 months after completion of the vaccination 3 dose series
- (4)* Tetanus/diphtheria (Td) or Tetanus/diphtheria/pertussis (Tdap) vaccine—Tdap vaccine should be given once to replace the one Td booster which is given every 10 years or the 5-year wound management Td dose
- (5)* Measles, mumps, rubella vaccine (MMR)—in absence of documented immunity, two doses of MMR to be administered according to current immunization guidelines
- (6) Polio vaccine—a single booster of IPV for members traveling to endemic areas in the line of duty, or as outlined in the *Morbidity and Mortality Weekly Report* article, “Polio-myelitis Prevention in the United States: Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP)”
- (7) Hepatitis A vaccine offered to high-risk personnel [HAZMAT, USAR, and SCUBA] and other personnel with frequent exposure to contaminated water
- (8) Varicella vaccine—offered to all non-immune personnel
- (9) Influenza vaccine — offered to all personnel annually unless required by state or local regulations
- (10) HIV screening—baseline, following occupational exposure, and if requested by the fire department physician or member

11.7.9.1 Prescreening and immunization against biological threat agents shall be made available to members following CDC guidelines or recommendations.

11.7.9.2* All members shall be offered immunizations against infectious diseases as required by the AHJ and by 29 CFR 1910.1030, “Bloodborne Pathogens.”

11.7.9.3 The fire department physician shall ensure that all members are offered currently recommended immunizations.

11.7.10 Post-Exposure Bloodborne Pathogen Testing.

11.7.10.1 Physicians who care for members shall follow current CDC recommendations for post-exposure prophylaxis (PEP) for bloodborne pathogen (BBP) exposures.

11.7.10.2* There shall be a written protocol for members who present with BBP exposures.

11.7.11 HIV Testing. HIV testing shall be offered on a confidential basis as part of post-exposure protocols and as requested by the fire department physician or member.

11.7.11.1 All results from HIV tests shall be provided directly to the member and shall be maintained by the physician as confidential documents.

11.7.11.2 Results from HIV tests shall not be forwarded to any local, state, provincial, national, or international authorities or databases unless mandated by public health statutes.

11.7.12 Heavy Metal Evaluation.

11.7.12.1 Baseline testing for heavy metals shall be required when indicated by known exposure or substantial risk.

11.7.12.2 Evaluations shall be performed following known exposures, for recurrent exposures, or where required under federal, state, or provincial regulations.

11.7.13 Colon Cancer Screening.

11.7.13.1* Stool-based blood testing risks and benefits shall be discussed with all members above the age of 40, or earlier if clinically indicated.

11.7.13.2* Visual exams (e.g., colonoscopy, CT colonoscopy, or flexible sigmoidoscopy) or stool-based testing shall be recommended to all members ages 45 to 75, or earlier if clinically indicated and repeated at regular intervals.

11.7.14* Prostate Cancer.

11.7.14.1 Due to increased prostate cancer risk, the fire department physician shall discuss the risks and benefits of prostate cancer screening, including prostate-specific antigen (PSA) testing, with all male firefighters beginning at age 50 and annually thereafter.

11.7.14.2 For firefighters who are at a higher risk for prostate cancer (e.g., African-Americans or where one or more first-degree relatives have been diagnosed with prostate cancer at an early age), the physician shall discuss the risks and benefits of prostate cancer screening, including PSA testing, beginning at age 40 and annually thereafter.

11.7.15 Lung Cancer Screening.

11.7.15.1 Low-dose computed tomography (LDCT) shall be performed annually on firefighters ages 50–74 who have at least a 20-pack-per-year smoking history and currently smoke or have quit within the past 15 years.

11.7.15.2 Screening shall be discontinued once a firefighter has not smoked cigarettes for 15 years or is too ill to benefit.

11.7.16 Cervical Cancer Screening. Female firefighters shall be screened for cervical cancer with cytology (i.e., Pap smear) every 3 years from ages 21 to 65 or, for firefighters who want to lengthen the screening interval, with high-risk human papillomavirus (HPV) testing with or without cytology every 5 years.

11.7.17 Testicular Cancer Screening.

11.7.17.1 A baseline examination shall be performed by a health care provider.

11.7.18 Bladder Cancer Screening.

11.7.18.1 Urine shall be evaluated for blood (hematuria).

11.7.18.2 A positive dipstick for hematuria shall require a follow-up and referral which could involve upper tract imaging, cystoscopy, and/or urine cytology.

11.7.19 Oral Cancer Screening.

11.7.19.1 The entire mouth shall be examined for signs of oral and oropharyngeal cancers.

11.7.20 Thyroid Cancer Screening.

11.7.20.1 Physical exam for palpable nodules shall be part of the annual physical examination.

11.7.21 Skin Cancer Screening. Physical exam of a member's skin shall be conducted annually for evidence of cancer.

11.7.22 Sleep Disturbance Screening.

11.7.22.1 Screening for sleep disorders using a validated questionnaire, such as the Berlin Questionnaire or Epworth Sleepiness Scale, shall be provided annually.

11.7.22.2* For firefighters with a high index of suspicion for a sleep disorder based on questionnaires or biometric data, the physician shall discuss the risks and benefits of testing and treatment.

11.7.23* Cancer and Cardiovascular Disease Risk Reduction.

11.7.23.1 The fire department physician shall annually inform members of the heightened risks of cardiovascular disease and various types of cancer associated with firefighting.

11.7.23.2 In addition to medical screening for these entities as outlined in this standard, the member shall be apprised of occupational routes of hazardous exposures related to firefighting, as well as common signs, symptoms, and preventive measures for both cardiovascular disease and cancers.

11.7.24 Occupational Stress Awareness Consultation.

11.7.24.1 The fire department physician shall, during the annual physical, inform the member of, and assess for the heightened risks of, stress associated with occupational exposures related to firefighting.

11.7.24.2 The fire department physician shall make the member aware of common adverse signs and symptoms of occupational stress, inform the member of practices that might limit the damaging effects of occupational stress, and provide the member with referral to licensed behavioral health specialists trained to recognize and treat stress-related disorders in first responders as indicated.

11.7.25 Hormone Imbalance Awareness Consultation. During the annual physical, the fire department physician shall inform the member of the heightened risks of certain hormone therapy, such as testosterone therapy in male members, that can have adverse effects on a member's health.

11.7.26 Behavioral Health Screening.

11.7.26.1* The fire department physician or qualified health-care provider shall, in advance of or during the annual physical, provide behavioral health screening for posttraumatic stress disorder (PTSD), major depressive disorder, active suicidality, and substance-use disorder.

11.7.26.1.1 Prior to conducting screening, the fire department physician or qualified healthcare provider shall provide the member a written explanation of the purpose of behavioral health screening.

11.7.26.1.2 The behavioral health screening explanation shall state behavioral health screening is not intended to provide a diagnosis but to identify symptoms that might indicate a behavioral health risk and warrant further evaluation.

11.7.26.1.3 The behavioral health screening explanation shall state that screening results will be kept strictly confidential.

11.7.26.1.4 Behavioral health screening results shall not be used to remove a member from duty, unless the member

displays an imminent threat to the physical safety of self or others.

11.7.26.2 The fire department physician or qualified health-care provider shall use a validated screening instrument to screen for PTSD, major depressive disorder, active suicidality, and substance-use disorder. (*See Annex G.*)

11.7.26.3 Self-Screening.

11.7.26.3.1 An incumbent firefighter shall be provided with the selected screening instruments in self-administered format, where applicable, to complete prior to entering their annual physical exam.

11.7.26.3.2 Screening results shall be reviewed and interpreted by the department physician or qualified healthcare provider prior to or during the annual physical exam.

11.7.26.4 Referrals.

11.7.26.4.1 An incumbent firefighter who screens positively for PTSD, major depressive disorder, or substance-use disorder shall receive a referral to a qualified behavioral health care provider.

11.7.26.4.2 A fire department shall provide the fire department physician or qualified healthcare provider conducting the annual screening a referral list of three preferred behavioral health providers that was updated in the last six months.

11.7.26.5* An incumbent firefighter who displays a threat to their physical safety or the safety of others at the time of their annual examination shall be referred to a qualified behavioral health care provider or facility for an emergency psychiatric evaluation.

Chapter 12 Occupational Medical: Annual Fitness Evaluation of Members (NFPA 1582)

12.1 Weight and Body Composition.

12.1.1* Body weight shall be measured and recorded annually.

12.1.2 A body composition evaluation shall be conducted on personnel solely for the purpose of departmental health surveillance using one of the following:

- (1)* Circumferential measurements
- (2) Hydrostatic weighing or Bod-Pod
- (3)* Skinfold measurements
- (4) Bio impedance analysis

12.2 Annual Fitness Evaluation.

12.2.1 General.

12.2.1.1 All members shall receive a baseline fitness evaluation that is not punitive or competitive after hiring and prior to performing firefighter emergency functions and at least annually thereafter as part of an individualized program.

12.2.1.2 All component results of the fitness evaluation shall be used to establish an individual's baseline or be compared to the individual's previous assessments and measured against recognized standards or norms.

12.2.1.3* The fitness evaluation shall include a medical pre-evaluation procedure and the components in 12.2.2 and 12.2.3.

12.2.2* Aerobic Capacity.

12.2.2.1* An evaluation of aerobic capacity shall be performed to assess cardiorespiratory fitness after the medical pre-evaluation.

12.2.2.2* Testing shall be conducted with a maximal or submaximal protocol using an empirically validated measure of cardiorespiratory fitness.

12.2.2.3* For an individual whose cardiorespiratory fitness levels are above the 35th percentile but below the 50th percentile for the general population standardized by biological sex and age, the fire department physician shall require participation in a prescribed cardiorespiratory (aerobic) fitness program without job restrictions.

12.2.2.4* For an individual whose cardiorespiratory fitness falls below the 35th percentile for the general population standardized by biological sex and age the fire department physician shall do both of the following:

- (1) Recommend to the AHJ that the individual be restricted from performing essential job tasks 1, 2, 4, 5, 6, 7, 8, 9, and 13
- (2) Require the individual to participate in a prescribed cardiorespiratory (aerobic) fitness program

12.2.3* Strength, Endurance, and Mobility. The mandatory fitness evaluation shall also include an evaluation of muscular strength, endurance, and joint mobility.

Chapter 13 Occupational Medical: Evaluations (NFPA 1582)

13.1 Medical Evaluation. Occupational medical evaluations shall be conducted at baseline and annually thereafter.

13.1.1* The occupational medical evaluation shall be an individualized assessment of the individual's ability to safely and effectively perform the essential job tasks in accordance with Section 13.3.

13.1.2* The occupational medical evaluation shall include a medical history, examination, and any medical tests required to assess medical conditions that can affect an individual's ability to safely and effectively perform the essential job tasks.

13.1.3 The occupational medical evaluation shall include an assessment of and motivation for wellness and fitness necessary to safely and effectively perform the essential job tasks.

13.2 Medical Conditions Affecting Ability to Perform Essential Job Tasks. Following the occupational medical evaluation, any essential tasks that the individual is not able to safely and effectively perform shall be reported to the AHJ.

13.3 Essential Job Tasks of a Firefighter.

13.3.1 The fire department physician shall use the list of essential job tasks in 10.1.1 in evaluating the ability of an individual to safely and effectively perform each essential job task.

13.3.2 Only job tasks that are essential for the position description provided by the AHJ shall be used to determine the medical qualifications of the individual.

13.3.3 Special Teams.

13.3.3.1* In addition to the essential job tasks specified in Chapter 10, individuals of specialized teams, such as hazardous

materials units, dive teams, technical rescue teams, EMS teams, or units supporting tactical law enforcement operations, shall be evaluated for their ability to perform essential job tasks and wear specialized PPE related to the duties of those specialized teams.

13.3.3.2 Prior to an occupational medical evaluation of individuals of specialized teams, the AHJ shall provide both of the following to the fire department physician:

- (1) A list of any specialized essential job tasks associated with the specialized team
- (2) A description of the risks associated with the essential job tasks and specialized PPE, as well as any additional medical or physical requirements that are not enumerated in this standard, such as increased weight, environmental isolation, sensory deprivation, metabolic cost, or dehydration potential above levels experienced with standard fire suppression PPE

13.3.3.3 Prior to the occupational medical evaluation of individuals of specialized teams, the fire department physician shall review the information provided by the AHJ to determine medical examination criteria for any specialized essential job tasks.

13.3.4* For an individual who has any of the medical conditions identified in Table 13.6, Table 13.7, or Table 13.8, an aerobic cardiorespiratory fitness capacity equal to the 50th percentile for the general population based on the selected exercise protocol and the individual's biological sex and age shall be required.

13.3.4.1* For an individual whose cardiorespiratory fitness falls below the 50th percentile for the general population based on the selected exercise protocol and the individual's biological sex and age, the fire department physician shall do both of the following:

- (1) Recommend to the AHJ that the individual be restricted from performing essential job tasks 1, 2, 4, 5, 6, 7, 8, 9, and 13
- (2) Require the individual to participate in a prescribed cardiorespiratory fitness program

13.4* Fire Department Physician Role. After completing the occupational medical evaluation, the fire department physician shall report to the AHJ any applicable job restrictions associated with specific essential job tasks that cannot be safely and effectively performed by the individual due to a medical condition(s) or physical fitness.

13.4.1 The fire department physician shall perform an individualized assessment of the individual.

13.4.2 The fire department physician shall be responsible for determining the medical qualification status of the individual in accordance with the following:

- (1) *No restriction:* There are no essential job tasks that the individual cannot safely and effectively perform.
- (2) *Permanent restriction:* There are specific essential job tasks that the individual cannot safely and effectively perform due to a permanent or long-term medical condition.

- (3) *Temporary restriction:* There are specific essential job tasks that the individual cannot safely and effectively perform due to a medical condition that the fire department physician considers could be temporary, allowing the individual to return for reevaluation if allowed within that jurisdiction by the AHJ.

13.4.3 Removal of an individual from permanent or temporary restriction status shall be approved by the fire department physician.

13.4.4 The fire department physician shall provide the AHJ a written statement that identifies the specific essential job task(s) the individual is restricted from performing.

13.4.5 The fire department physician shall not make a recommendation regarding the individual's employment in the fire department.

13.4.6 There shall be no blanket exclusions.

13.4.7* The AHJ shall determine the individual's employment status in consideration of any restrictions identified by the fire department physician and whether any reasonable accommodations might permit the individual to safely and effectively perform the essential job tasks. (*See Annex D for additional legal considerations.*)

13.5* Medical Conditions Involving the Eyes, Ears, Nose, Mouth, or Throat. The physician shall report any applicable job restrictions associated with the conditions in Table 13.5.

13.5.1 A hearing assistive device(s) shall be permitted if the individual meets the minimum hearing standard without the device(s).

13.6* Medical Conditions Involving the Lungs, Chest, and Respiratory System. The physician shall report any applicable job restrictions associated with the conditions in Table 13.6 based on the physician's consideration of the following guidance:

- (1) Efficient breathing and respiratory gas exchange are required to safely and effectively perform essential job tasks 1, 2, 3, 4, 5, 6, 7, 9, and 13.
- (2) Wearing protective clothing increases the oxygen consumption required to perform these tasks and, therefore, increases the respiratory workload.
- (3) SCBA is a positive-pressure demand valve respirator that provides a barrier against the inhalation of noxious or toxic gases and particulate matter but at increased metabolic cost due to its weight and increased respiratory workload (i.e., resistance and dead space).
- (4) If respiratory function or gas exchange is already compromised (i.e., increased work of breathing from structural or functional abnormalities, hypoxia, or hypercapnia) prior to the performance of essential job tasks, then the increased oxygen demand of strenuous physical exertion, while wearing PPE or SCBA, leads to early onset of fatigue or respiratory insufficiency.
- (5) Lung, chest wall, and respiratory disorders can compromise the individual's ability to safely and effectively perform essential job tasks 1, 2, 3, 4, 5, 6, 7, 9, and 13.

Table 13.5 Medical Conditions Involving the Eyes, Ears, Nose, Mouth, or Throat

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
Disorders of the Eyes or Vision*			
(1)* Loss of far visual acuity	Meets either of the following criteria: a) Has worse than 20/100 binocular vision, uncorrected b) Has worse than 20/40 binocular vision, corrected with hard or soft contact lenses or spectacles	Has 20/40 or better binocular vision, corrected with soft contact lenses, regardless of uncorrected visual acuity	6, 8, 10, 12
(2)* Loss of color vision	Has monochromatic vision resulting in inability to use thermal imaging cameras	—	6, 10
(3)* Surgery and treatment	Had radial keratotomy or Lasik within 2 weeks or had repair of retinal detachment within 3 months	—	6, 8, 10
(4)* Loss of depth perception	Has monocular vision stereopsis without fusional capacity	Is able to accommodate for depth perception with at least 6 months experience after loss of binocular vision	10
(5) Loss of peripheral vision	Has less than 110 degrees in the horizontal meridian in either eye	—	10
(6) Loss of near visual acuity	Has worse than 20/40 binocular, corrected vision	—	6, 8, 10, 12
Disorders of the Ears or Hearing*			
(7)* Hearing loss	Meets any of the following criteria: a) Is unable to hear or understand the spoken voice under conditions of high background noise b) Is unable to hear, recognize, or localize cries for assistance or audible alarms c) Has average hearing loss of 40 dB or more at 500 Hz, 1000 Hz, 2000 Hz, and 3000 Hz, in the unaided, better ear (<i>See 13.5.1.</i>)	—	2, 6, 8, 10, 12, 13
(8)* Asymmetric (unequal) hearing loss	Is unable to localize cries for assistance or audible alarms	—	6
(9) Abnormal hearing, including the following: a) Atresia, stenosis, or tumor of the auditory canal b) *External otitis, recurrent c) *Agenesis or traumatic deformity of the auricle d) *Mastoiditis or surgical deformity of the mastoid e) *Ménière's disease, labyrinthitis, or tinnitus f) *Otitis media, recurrent or chronic	Meets either of the following criteria: a) Is unable to hear or understand the spoken voice under conditions of high background noise b) Is unable to hear, recognize, or localize cries for assistance or audible alarms	—	2, 6, 8, 10, 12, 13

(continues)

Table 13.5 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
g) Surgical procedures to correct or improve hearing or other conditions of the ear			
(10)* Vertigo, ataxia, or disturbance of gait or balance	Is unable to tandem gait walk	—	1, 8, 10, 13
Disorders of the Nose, Mouth, or Throat			
(11)* Deformity of nose, mouth, or jaw	Is unable to successfully pass a respirator fit test	—	1, 2, 3, 4, 5, 6, 7, 8, 12, 15
(12) Aphonia (inability to speak)	Is unable to communicate verbally	—	12, 13
(13) Chronic disease of the nose, nasopharynx, oropharynx, or mouth, including the following: a) *Allergic rhinitis b) *Epistaxis, recurrent c) *Sinusitis, recurrent d) *Dysphonia e) *Anosmia f) Nasopharyngeal polyposis	Meets any of the following criteria: a) Is unable to successfully wear PPE for extended periods of time while performing firefighting tasks b) Is unable to communicate clearly while wearing PPE c) Is unable to identify the presence of smoke or chemicals by smell		
(14)* Obstructive sleep apnea	Has apnea hypopnea index greater than 15, with clinically significant oxygen desaturation or with toxic arrhythmias	Meets all the following provisions: a) If treatment is indicated, has medical records demonstrating compliance b) Experiences no excessive daytime sleepiness c) Has a signed statement from a sleep specialist (sleep, pulmonary, or neurology), indicating that the individual can safely and effectively perform the essential job tasks	10, 11, 14

*Additional information is provided in A.13.5.

Table 13.6 Medical Conditions Involving the Lungs, Chest, and Respiratory System

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1) Tracheostomy, not sealed	Is unable to successfully pass a respirator fit test Is unable to communicate due to oropharyngeal dysfunction Is unable to clear secretions or inhaled particulate matter	— — —	1, 2, 3, 4, 5, 6, 7, 8, 12, 15 12, 15 3
(2)* Chronic cough (productive or nonproductive with or without hemoptysis)	Is unable to wear a respirator continuously and without interruption or to safely and effectively perform in an irritant environment due to any of the following: a) The severity of the cough b) The impact of irritants and SCBA use on cough severity c) The impact of cough severity on the ability to wear a respirator, especially SCBA d) The impact of cough severity on the ability to safely and effectively perform strenuous exertion		2, 3
(3)* Asthma	—	Meets all the following provisions annually or at the frequency indicated: a) Has no bronchospasm and does not use or require bronchodilator rescue medications during exertion, temperature or humidity extremes, irritant exposures, fire suppression, or hazmat or training activities b) Has not required systemic corticosteroids, emergency room treatment, or hospital admission for asthma or other pulmonary disease in the past 2 years c) Shows reserve in pulmonary function (i.e., both FVC and FEV ₁ greater than or equal to 80% of predicted) without a bronchodilator response (i.e., an increase in FEV ₁ from baseline by at least 12% and at least 200 ml), measured off all bronchodilators on the day of testing d) If a bronchial challenge test is indicated, has a normal or negative response of less than 20% decline in FEV ₁ from baseline for provocative challenge testing (e.g., for methacholine provocation a PC ₂₀ greater than 8 mg/ml is considered normal, as response at dose greater than 8 mg/ml might not be clinically significant), or less than 13% decline in FEV ₁ from baseline for exercise challenge testing using cold air	1, 2, 3, 4, 5, 6, 7, 9, 13, 15

(continues)

Table 13.6 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		e) Has a signed statement from a pulmonary or asthma specialist that the individual meets the provisions specified in (a) through (d) and can safely and effectively perform the essential job tasks without the use of bronchodilator rescue medications	
(4)* Allergic lower respiratory disorders	Has allergic trigger(s) that could be encountered during performance of essential job tasks	Meets the special provisions for asthma in (3)	1, 2, 3, 4, 5, 6, 7, 9, 13, 15
(5)* Chronic obstructive pulmonary disease (COPD)	Has pulmonary function tests with an absolute FEV ₁ /FVC ratio less than 0.70 and an FEV ₁ less than 70% of predicted measured off all bronchodilators on the day of testing	Meets all the following provisions annually or at the frequency indicated: a) Has 60% or greater of predicted FEV₁ and no bronchodilator response (i.e., an increase in FEV₁ from baseline by at least 12% and at least 200 ml), measured off all bronchodilators on the day of testing b) Has no bronchospasm and does not use or require bronchodilator rescue medications during exertion; temperature or humidity extremes; irritant exposures; or fire suppression, hazmat, or training activities c) Has not required systemic corticosteroids, emergency room treatment, or hospital admission for COPD or other pulmonary disease in the past 2 years d) Has experienced continuous tobacco cessation for more than 3 months e) Does not have a chronic cough that compromises the performance of the essential job tasks [see (4)] f) Every 2 to 3 years, as medically indicated, when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (see 13.3.4.1): i. Bronchospasm ii. A decline in FEV₁ to less than 60% predicted iii. Oxygen desaturation (i.e., a fall in oxygen saturation on room air by 4% from baseline or to below 90%) iv. Cardiac ischemia or toxic arrhythmias g) Has a signed statement and medical records from a pulmonary specialist, indicating that the individual meets the criteria specified in (a) through (f) and can safely and effectively perform the essential job tasks	

(continues)

Table 13.6 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(6)* Hypoxemic disorders, moderate to severe	Has oxygen saturation less than 90%, measured at rest and corrected to sea level on room air	—	1, 2, 3, 4, 5, 6, 7, 9, 13, 15
(7)* Exertional-related oxygen desaturation	Has either of the following: a) An oxygen saturation of 90% to 94%, corrected to sea level on room air, at rest b) A drop in oxygen saturation by 4% from baseline during exercise or physical exertion	Meets all the following provisions annually or at the frequency indicated: a) Every 2 to 3 years, as medically indicated, when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>): i. Bronchospasm ii. A decline in FEV ₁ to less than 60% of predicted iii. Oxygen desaturation (i.e., a fall in oxygen saturation on room air by 4% from baseline or to below 90%) iv. Cardiac ischemia or toxic arrhythmias b) Has a signed statement and medical records from a pulmonary specialist, indicating that the individual meets (a) and can safely and effectively perform the essential job tasks	
(8)* Hypercapnic disorders	Has elevated carbon dioxide with serum P _{CO2} greater than or equal to 45 mm Hg	—	1, 2, 3, 4, 5, 6, 7, 9, 13, 15
(9)* Pulmonary hypertension	Has mean pulmonary arterial pressure greater than 20 mm Hg	Meets all the following provisions annually or at the frequency indicated: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Is not hypoxemic at rest [<i>see (6) and (7)</i>] d) Every 2 to 3 years, as medically indicated, when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>): i. Bronchospasm ii. A decline in FEV ₁ to less than 60% of predicted iii. Oxygen desaturation (i.e., a fall in oxygen saturation on room air by 4% from baseline or to below 90%) iv. Cardiac ischemia or toxic arrhythmias	1, 2, 3, 4, 5, 6, 7, 8, 9, 13, 15

(continues)

Table 13.6 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		e) Has a signed statement and medical records from a pulmonary or cardiology specialist, indicating that the individual meets (a) through (d) and can safely and effectively perform the essential job tasks	
(10) Tracheal stenosis or tracheomalacia	Has pulmonary function (FVC or FEV ₁) less than 70% of predicted without the use of bronchodilators	Meets all the following provisions annually or at the frequency indicated: a) Has 60% or greater of predicted FEV ₁ without the use of bronchodilators b) Inspiratory flow volume loop and inspiratory flow rates normal or minimally reduced. c) Every 2 to 3 years, as medically indicated, when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>): i. Bronchospasm ii. A decline in FEV ₁ to less than 60% of predicted iii. Oxygen desaturation (i.e., a fall in oxygen saturation on room air by 4 percent from baseline or to below 90 percent) iv. Cardiac ischemia or toxic arrhythmias d) Has a signed statement and medical records from a pulmonary specialist, indicating that the individual meets (a) through (c) and can safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 6, 7, 8
(11) Pulmonary resection surgery, chest wall surgery, or pneumothorax	Meets any of the following criteria: a) Has not had time for healing and pain resolution (typically 3 months) b) Has pulmonary function tests (FVC or FEV ₁) less than 70% predicted without the use of bronchodilators c) Has hypoxemia [<i>see (8)</i>] d) Has diffusing capacity (DLCO) less than 60% of predicted e) Has not received clearance by a thoracic surgeon or pulmonary specialist	Meets all the following provisions annually or at the frequency indicated, after time for healing and pain resolution (typically 3 months) and with clearance by a thoracic surgeon or pulmonary specialist: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Is not hypoxemic at rest [<i>see (6) and (7)</i>] d) Every 2 to 3 years, as medically indicated, when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>): i. Bronchospasm ii. A decline in FEV ₁ to less than 60% of predicted	1, 2, 4, 5, 6, 7, 13

(continues)

Table 13.6 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		iii. Oxygen desaturation (i.e., a fall in oxygen saturation on room air by 4% from baseline or to below 90%) iv. Cardiac ischemia or toxic arrhythmias	
(12)* Spontaneous pneumothorax	Meets any of the following criteria: a) Has not had time for healing and pain resolution (typically 3 months) b) Has pulmonary function tests (FVC or FEV ₁) less than 70% of predicted without the use of bronchodilators c) Has elevated risk for recurrence due to cystic or bullous lung disease as indicated with chest CT imaging	Meets all the following provisions after time for healing and pain resolution (typically 3 months) and with clearance by the thoracic surgeon: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (6) and (7)] d) Has minimal or surgically corrected cystic or bullous disease as demonstrated on a chest CT scan e) Is not required to perform SCUBA diving as part of the individual's essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 13
(13) Chest wall deformity, fibrothorax, or diaphragm abnormalities	Has pulmonary function (FVC or FEV ₁) less than 70% predicted without the use of bronchodilators	Meets all the following provisions: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (6) and (7)]	1, 2, 4, 5, 6, 7, 8
(14)* Pleural effusion(s)	Meets any of the following criteria: a) Has not had time for healing and pain resolution (typically 3 months) b) Has pulmonary function tests (FVC or FEV ₁) less than 70% of predicted without the use of bronchodilators c) Has hypoxemia [see (8)] d) Has not received clearance by a thoracic surgeon or pulmonary, cardiology, or oncology specialist, depending on the etiology of the effusion	Meets all the following provisions after time for healing and pain resolution (typically 3 months) and with clearance by the thoracic surgeon or pulmonary, cardiology, or oncology specialist: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (6) and (7)] d) Has no evidence of congestive heart failure or cardiomyopathy due to any etiology, including any disease leading to a lower-than-normal left or right ventricular ejection fraction (see section specific to the underlying disease) e) Has no evidence of an underlying cancer as the cause of the effusion(s)	1, 2, 4, 5, 6, 7, 8
(15) Bronchiectasis or bronchiolitis obliterans	Has pulmonary function (FVC or FEV ₁) less than 70% of predicted without the use of bronchodilators	Meets all the following provisions annually: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (6) and (7)] d) Does not have a chronic cough that compromises the performance of the essential job tasks [see (4)]	1, 2, 3, 4, 5, 6, 7, 8

(continues)

Table 13.6 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(16) Interstitial lung diseases	Meets any of the following criteria: a) Has pulmonary function (FVC or FEV ₁) less than 70% of predicted without the use of bronchodilators b) Has hypoxemia [see (8)] c) Has diffusing capacity (DLCO) less than 60% of predicted	Meets all the following provisions annually or at the frequency indicated: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (6) and (7)] d) Does not have a chronic cough that compromises the performance of the essential job tasks [see (4)] e) Every 2 to 3 years, as medically indicated, when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (see 13.3.4.1): i. Bronchospasm ii. A decline in FEV ₁ to less than 60% of predicted iii. Oxygen desaturation (i.e., a fall in oxygen saturation on room air by 4% from baseline or to below 90%) iv. Cardiac ischemia or toxic arrhythmias f) Has a signed statement and medical records from a pulmonary specialist, indicating that the individual meets the criteria specified in (a) through (d) and can safely and effectively perform the essential job tasks	
(17)* Sarcoidosis	Meets any of the following criteria: a) Has pulmonary function (FVC or FEV ₁) less than 70% of predicted without the use of bronchodilators b) Has hypoxemia [see (8)] c) Has diffusing capacity (DLCO) less than 60% of predicted d) Has visual impairment (see Section 13.5) e) Has cardiac dysfunction (e.g., cardiomyopathy or arrhythmia) at rest or exercise f) Has other moderate to severe end-organ dysfunction g) Needs treatment with systemic corticosteroids or other immunosuppressive medications	Meets all the following provisions annually: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (8)] d) Has no evidence of end-organ dysfunction e) Has normal cardiac function and electrical rhythm activity as assessed with electrocardiogram and echocardiography f) Has not been prescribed immunosuppressive medications (e.g., high-dose systemic corticosteroids, methotrexate, or TNF-alpha blockers) for at least 3 months g) Has a signed statement and medical records from a pulmonary specialist, indicating that the individual meets the provisions specified in (a) through (f) and can safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 13

(continues)

Table 13.6 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(18)* Pulmonary embolism	Meets any of the following criteria: a) Has hypoxemia [see (8)] b) Is currently prescribed anticoagulation medication (see Section 13.13) c) Has persistent blood clots d) Has high risk for recurrent pulmonary embolism	Meets all the following provisions: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (8)] d) Is not currently prescribed anticoagulation medication (see Section 13.13) e) Has resolved or controlled the underlying risk factor for pulmonary embolism	1, 2, 3, 4, 5, 6, 7, 8, 13
(19) Cystic lung diseases	Meets any of the following criteria: a) Has pulmonary function (FVC or FEV ₁) less than 70% of predicted without the use of bronchodilators b) Has hypoxemia [see (8)] c) Has diffusing capacity (DLCO) less than 60% of predicted	Meets all the following provisions: a) Has 60% or greater of predicted FVC without the use of bronchodilators b) Has 60% or greater of predicted diffusing capacity (DLCO) c) Has no hypoxemia [see (6) and (7)] d) Has minimal or surgically corrected cystic or bullous disease as demonstrated on a chest CT scan e) Is not required to perform SCUBA diving as part of the individual's essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 13
(20) Tuberculosis	See Section 13.16	See Section 13.16	1, 2, 3, 4, 5, 6, 7, 8, 13
(21) Lung cancer	See Section 13.20	See Section 13.20	See Section 13.20
(22) Lung transplant (<i>also see Section 13.13 for anti-rejection medication</i>)	—	—	1, 2, 3, 4, 5, 6, 7, 9, 13, 15

*Additional information is provided in A.13.6.

13.7* Medical Conditions Involving the Cardiovascular System. The physician shall report any applicable job restrictions associated with the conditions in Table 13.7.

13.8* Medical Conditions Involving the Endocrine System and Metabolic Function. The physician shall report any applicable job restrictions associated with the conditions in Table 13.8.

13.9* Medical Conditions Involving the Gastrointestinal Tract and Abdominal Viscera. The physician shall report any applicable job restrictions associated with the conditions in Table 13.9 based on physician's evaluation of the individual's nutrition regimen and a propensity for symptomatic dehydration, anemia, chronic diarrhea, or incapacitating pain syndromes.

13.10* Medical Conditions Involving the Spine. The physician shall report any applicable job restrictions associated with the conditions in Table 13.10 based on physician's evaluation of peripheral motor weakness, loss of strength, loss of sensation, and loss of reflexes affecting endurance, strength, flexibility, pain, or gait.

13.11* Medical Conditions Involving Orthopedics. The physician shall report any applicable job restrictions associated with

the conditions in Table 13.11 with consideration of the following:

- (1) Firefighters with active, ongoing, or recurrent orthopedic disorders can have difficulty due to reduced motor strength, sensation, and flexibility as well as problems with fatigue, coordination, gait, and equilibrium.
- (2) PPE and SCBA can place the firefighter's involved extremity at a biomechanical disadvantage due to added weight and altered center of gravity.
- (3) Certain medications (e.g., narcotics and muscle relaxants) used to treat orthopedic conditions can produce or worsen somnolence, discoordination, and disequilibrium.

13.12* Medical Conditions Involving Neurologic Functions. The physician shall report any applicable job restrictions associated with the conditions in Table 13.12, which could impair the individual's neurologic functions, including central regulation, cognitive abilities, strength, perception, reflexes, coordination, gait, and equilibrium.

Table 13.7 Medical Conditions Involving the Cardiovascular System

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1)* Coronary artery disease	—	Meets the following provisions annually or at the frequency indicated: a) Has absence of angina pectoris, even if relieved by medication b) Has absence of stenosis in any coronary artery (i.e., greater than 70% lumen diameter narrowing) following treatment c) Every 2 to 3 years, as medically indicated, has normal left ventricular ejection fraction as measured by radionuclide scan, contrast ventriculography, or echocardiography d) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response e) Has control of modifiable risk factor(s) for acute coronary plaque rupture f) Had no myocardial infarction within the previous 6 months g) Had no coronary artery bypass surgery within the previous 6 months h) Had no angioplasty, with or without stent placement, within the previous 3 months i) Is not currently prescribed anticoagulation medication, regardless of dose (<i>see Section 13.13 for anticoagulation medication</i>) j) Has completed cardiac rehabilitation, if indicated k) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (j) and can safely and effectively perform the essential job tasks	1, 2, 4, 5, 6, 7, 8, 13, 15
(2) Myocardial infarction or coronary revascularization procedure	—	Meets the following provisions: a) Has no exercise-induced myocardial ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) b) Is not currently prescribed anticoagulation medication, regardless of dose (<i>see Section 13.13 for anticoagulation medication</i>)	1, 2, 4, 5, 6, 7, 8, 13, 15
(3) Congestive heart failure (CHF)	Has CHF due to any etiology, including any disease leading to a lower than normal left or right ventricular ejection fraction, even if corrected by medication	Meets the following provisions every 2 to 3 years, as medically indicated: a) Has no structural abnormalities as demonstrated by cardiac imaging b) Has normal left ventricular function as demonstrated by cardiac imaging	1, 2, 4, 5, 6, 7, 8, 13, 15

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		c) Has no exercise-induced evidence of ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response observed when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) d) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks If due to a reversible process (e.g., hyperthyroidism, anemia), has no abnormality in cardiac performance off all cardiac medications	
(4) Restrictive cardiomyopathy and constrictive pericarditis	Has heart failure	Meets the following provisions every 2 to 3 years, as medically indicated: a) Has no structural abnormalities as demonstrated by cardiac imaging b) Has normal left ventricular function as demonstrated by cardiac imaging c) Has no exercise-induced evidence of toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) d) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	1, 2, 4, 5, 6, 7, 8, 13, 15
(5)* Acute pericarditis, acute endocarditis, and acute myocarditis	—	Meets the following provisions every 2 to 3 years, as medically indicated: a) Has no structural abnormalities as demonstrated by cardiac imaging b) Has normal left ventricular function as demonstrated by cardiac imaging	1, 2, 4, 5, 6, 7, 8, 9, 13, 15

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		c) Has no exercise-induced evidence of toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response observed when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) d) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	
(6) Chronic pericarditis, endocarditis, or myocarditis	Has heart failure, valvular incompetence, or arrhythmias	Meets the following provisions every 2 to 3 years, as medically indicated: a) Has no structural abnormalities as demonstrated by cardiac imaging b) Has normal left ventricular function as demonstrated by cardiac imaging c) Has no exercise-induced evidence of toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response observed when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) d) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	1, 2, 4, 5, 6, 7, 8, 13, 15
(7)* Hypertrophic obstructive cardiomyopathy —		Meets the following provisions annually or at the frequency indicated: a) Has no history of syncope b) Has no history of cardiac arrest c) Has no history of toxic arrhythmias, including recent monitoring by Holter or loop recorder d) Has left ventricle thickness of less than 30 mm as demonstrated by cardiac imaging	1, 2, 4, 5, 6, 7, 8, 13, 15

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		e) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response observed when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) f) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (e) and can safely and effectively perform the essential job tasks	
(8)* Recurrent syncope	—	Has no recurrence within the last 2 years (<i>If the underlying cause is identified, see the relevant section for that condition.</i>)	13
(9)* Pacemaker or automatic implantable defibrillator	—	Meets the following provisions annually or at the frequency indicated: a) Is no longer dependent on the pacemaker or automatic defibrillator (even if still implanted) b) Is not currently prescribed cardiac anti-arrhythmic medication and has no inducible toxic arrhythmias as determined by a cardiologist with testing (e.g., 24-hour or longer duration loop recorders, or electrophysiology testing) c) Has no structural abnormalities as demonstrated by cardiac imaging d) Has normal left ventricular function as demonstrated by cardiac imaging e) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response observed when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) f) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (e) and can safely and effectively perform the essential job tasks	13
(10)* Mitral valve stenosis	Stage C or D		1, 2, 4, 5, 6, 7, 8, 13

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(11)* Mitral valve insufficiency (regurgitation)	Stage C or D		1, 2, 4, 5, 6, 7, 8, 13
(12)* Mitral valve prolapse	1. Arrhythmias 2. Abnormal left ventricular ejection fraction (LVEF) 3. Mitral valve regurgitation (stage C or D) 4. Left atrial dilatation 5. Mitral annular disjunction	No arrhythmias No history of arrhythmogenic syncope Normal ECG	1, 2, 4, 5, 6, 7, 8, 13
(13)* Aortic valve stenosis	Stage C or D		1, 2, 4, 5, 6, 7, 8, 13
(14)* Aortic valve insufficiency (regurgitation)	Stage C or D		1, 2, 4, 5, 6, 7, 8, 13
(15) Prosthetic cardiac valves or valve repair (<i>see Section 13.13 for anticoagulation medication</i>)	—	Meets the following provisions annually: a) Is not currently prescribed anticoagulation medication, regardless of dose (<i>see Section 13.13</i>) b) Has normal function of the prosthetic or repaired valve as demonstrated by cardiac imaging c) Has normal left ventricular function as demonstrated by cardiac imaging d) Has a signed statement and medical records from a cardiologist or thoracic surgeon, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	1, 2, 4, 5, 6, 7, 8, 13
(16)* Wolff-Parkinson-White (WPW) syndrome	Has WPW with structural heart disease Has WPW without structural heart disease but with a history of supraventricular tachycardia (SVT)	— Meets the following provisions annually: a) Is treated successfully with ablation b) Is not currently prescribed cardiac anti-arrhythmic medication and has no toxic arrhythmias present as determined by a cardiologist with testing (e.g., 24-hour or longer duration loop recorders, or electrophysiology testing) c) Has no structural abnormalities as demonstrated by cardiac imaging d) Has normal left ventricular function as demonstrated by cardiac imaging e) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (d) and can safely and effectively perform the essential job tasks	13
(17)* Toxic arrhythmias	Has supraventricular arrhythmias, atrial fibrillation, atrial flutter, or paroxysmal atrial tachycardias where persistent or recurrent	Meets the following provisions annually or at the frequency indicated: a) Has normal function and no structural abnormalities as demonstrated by cardiac imaging	8, 13

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		b) Is not currently prescribed cardiac anti-arrhythmic medication and has no toxic arrhythmias present as determined by a cardiologist with testing (e.g., 24-hour or longer duration loop recorders, or electrophysiology testing) c) Is not currently prescribed anticoagulation medication d) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of ischemia, toxic arrhythmias, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) e) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (d) and can safely and effectively perform the essential job tasks	
	Has ventricular arrhythmias (e.g., ventricular tachycardia and ventricular fibrillation) where persistent or recurrent or frequent toxic-appearing ectopy	Meets the following provisions annually or at the frequency indicated: a) Has normal function and no structural abnormalities as demonstrated by cardiac imaging b) Is not currently prescribed cardiac anti-arrhythmic medication and has no toxic arrhythmias present as determined by a cardiologist with testing (e.g., 24-hour or longer duration loop recorders, or electrophysiology testing) c) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>), off cardiac medications d) Every 2 to 3 years, as medically indicated, shows that ventricular ectopy, if present, resolves with increasing levels of exercise	13

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		e) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (d) and can safely and effectively perform the essential job tasks	
(18) Atrioventricular block	Has third-degree or complete atrioventricular block	Meets the following provisions annually or at the frequency indicated: a) Has no structural abnormalities as demonstrated by cardiac imaging b) Has normal left ventricular function as demonstrated by cardiac imaging c) Has no evidence for sinus pause greater than 3 seconds d) Has normal increase in heart rate with exercise in the absence of a mechanical pacemaker e) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>)	13
(19)* Hypertension, moderate to severe	Has systolic pressure greater than or equal to 160 mm Hg or diastolic pressure greater than or equal to 100 mm Hg	Meets the following provisions annually or at the frequency indicated: a) Has controlled normal blood pressure as demonstrated by three normal readings over at least a 30-day period b) Has a risk of ASCVD under 10% as determined by the ACC/AHA Heart Risk Calculator c) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of left ventricular systolic dysfunction, ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) d) Has no restrictions associated with end-organ damage (see the section of this chapter that corresponds to the specific organ that is damaged)	1, 2, 4, 5, 6, 7, 9, 13, 15

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(20)* Hypertension, mild	Has systolic blood pressure of 140 to 159 mm Hg or diastolic blood pressure of 90 to 99 mm Hg and either of the following: a) Evidence of end-organ damage b) 10% or greater risk of ASCVD over the next 10 years, as determined by using the 10-year ACC/AHA Heart Risk Calculator	Meets the following provisions annually or at the frequency indicated: a) Is referred to their primary care physician to ensure that their blood pressure is controlled (i.e., three normal readings over at least a 30-day period), to screen for end-organ damage, and to address underlying co-morbidities and the possible need for lifestyle modifications b) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of left ventricular systolic dysfunction, ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, or abnormal blood pressure response observed when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) c) Has no restrictions associated with end-organ damage (<i>see the section of this chapter that corresponds to the specific organ that is damaged</i>)	1, 2, 4, 5, 6, 7, 9, 13, 15
(21)* Metabolic syndrome	—	Meets the following provisions annually or at the frequency indicated: a) Has control of modifiable risk factor(s) b) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response observed when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>)	1, 2, 4, 5, 6, 7, 13
(22) Congenital abnormalities of the heart, aorta, or other major vessels	Has a history of a cardiovascular congenital abnormality that has been treated by surgery but with residual complications or that has not been treated by surgery, leaving residuals or complications	—	1, 2, 4, 5, 6, 7, 8, 13
(23) Cardiac hypertrophy	—	Meets the following provisions annually or at the frequency indicated: a) Has normal or only minimally reduced left ventricular function as demonstrated by cardiac imaging	1, 2, 4, 5, 6, 7, 13

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		b) Has normal increase in heart rate with exercise in the absence of a mechanical pacemaker c) Every 2 to 3 years, as medically indicated, has normal blood pressure at rest d) Every 2 to 3 years, as medically indicated, has no exercise-induced evidence of ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>), off cardiac medications e) Has a signed statement and medical records from a cardiologist, indicating that the individual meets the provisions specified in (a) through (d) and can safely and effectively perform the essential job tasks	
(24) Heart transplant (<i>see Section 13.13 for antirejection medication</i>)	—	—	1, 2, 4, 5, 6, 7, 13
Vascular Disorders*			
(25) Aortic dilation or aneurysm (i.e., thoracic aortic aneurysm or abdominal aortic dilation or aneurysm greater than or equal to 4.5 cm)	—	Meets the following provisions annually or at the frequency indicated: a) Has controlled normal blood pressure as demonstrated by three normal readings over at least a 30-day period b) Every 1 to 2 years, has stable aortic measurement as demonstrated by cardiac imaging c) Has a signed statement and medical records from a cardiologist, thoracic surgeon, or vascular surgeon, indicating that the individual meets the provisions specified in (a) and (b) and can safely and effectively perform the essential job tasks d) If the thoracic or abdominal aortic aneurysm is surgically repaired, has no complications after 6 months of postsurgical healing and meets (a) through (c)	1, 2, 4, 5, 6, 7, 13
(26)* Carotid artery disease	Is symptomatic and has reduction in blood flow of greater than 70%	—	13
(27) Thoracic outlet syndrome	Is symptomatic	—	1, 13
(28) Peripheral vascular disease (arterial or venous)	Is symptomatic (e.g., claudication, Raynaud's phenomenon) or has severe peripheral edema	—	1, 4, 5, 6, 7, 9, 13

(continues)

Table 13.7 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(29) Thrombophlebitis or deep venous thrombosis	Has persistent or recurrent condition or is prescribed anticoagulation medication, regardless of dose (<i>see Section 13.13 for anticoagulation medication</i>)	Meets both of the following: a) Is able to wear PPE b) Has no restrictions related to any underlying cause c) Is not currently prescribed anticoagulation medication, regardless of dose (<i>see Section 13.13 for anticoagulation medication</i>)	
(30) Circulatory instability, as indicated by orthostatic hypotension or persistent tachycardia	—	—	13
(31) Chronic, severe lymphedema or massive edema of any type (e.g., due to lymphadenopathy, severe venous valvular incompetency, endocrine abnormalities, or low flow states)	—	Meets both of the following: a) Is able to wear PPE b) Has no restrictions related to any underlying cause	1, 4, 5, 6, 7, 9, 13
(32) Congenital or acquired lesions of the aorta or major blood vessels	Has a lesion that interferes with circulation or increases the potential for life-threatening sudden incapacitation	—	1, 4, 7, 13

*Additional information is provided in A.13.7.

Table 13.8 Medical Conditions Involving the Endocrine System and Metabolic Function

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1)* Type 1 diabetes mellitus	Requires treatment with insulin	Meets the following provisions annually or at the frequency indicated: a) Is maintained by a physician knowledgeable in current management of diabetes mellitus on a basal/bolus (i.e., can include subcutaneous insulin infusion pump) regimen using insulin analogs b) Has demonstrated over a period of at least 6 months the motivation and understanding required to closely monitor and control capillary blood glucose levels through nutritional therapy and insulin administration, including any experience and history dealing with erratic meal schedules, sleep disruption, and high aerobic and anaerobic workloads intrinsic to firefighting c) Has a dilated retinal exam by a qualified ophthalmologist or optometrist that shows no higher grade of diabetic retinopathy than mild nonproliferative (microaneurysms only), as indicated on the International Clinical Diabetic Retinopathy Disease Severity Scale d) Has normal renal function based on a calculated creatinine clearance greater than 60 mL/min using the Cockcroft-Gault or similar formula and has absence of proteinuria (defined as 24-hour urine excretion of greater than or equal to 300 mg protein or greater than or equal to 300 mg of albumin per gram of creatinine in a random sample) e) Has no autonomic neuropathy (determined by evidence of gastroparesis, postural hypotension, or abnormal tests of heart rate variability) or peripheral neuropathy (determined by diminished ability to feel the vibration of a 128-Hz tuning fork or the light touch of a 10 g monofilament on the dorsum of the great toe proximal to the nail) f) Every 2 to 3 years, as medically indicated, has normal cardiac function without exercise-induced evidence of myocardial ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>)	5, 9, 13, 14

(continues)

Table 13.8 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		g) Has a signed statement and medical records from an endocrinologist or a physician with demonstrated knowledge in the current management of diabetes mellitus, indicating that the individual meets the following provisions: i. Is maintained on a stable basal/bolus regimen using insulin analogs and has demonstrated over a period of at least 6 months the motivation and understanding required to monitor and control capillary blood glucose levels through nutritional therapy and insulin administration despite varied activity schedules ii. Has had hemoglobin A1C measured at least four times a year, at intervals of two to three months, over the last 12 months prior to evaluation if the diagnosis of diabetes has been present over 1 year iii. Does not have an increased risk of hypoglycemia due to alcohol use or other predisposing factors iv. Has had no episodes of severe hypoglycemia (i.e., requiring assistance of another) in the preceding year, with no more than two episodes of severe hypoglycemia in the preceding 3 years v. Is certified not to have a medical contraindication to firefighting training and operations h) Where a hemoglobin A1C reading of 8% or greater, is medically evaluated to determine if a condition exists in addition to diabetes that is responsible for the hemoglobin A1C not accurately reflecting average glucose levels, including evidence of a set schedule for blood glucose monitoring and a thorough review of data from such monitoring	
(2)* Type 2 diabetes mellitus — that requires treatment with insulin	—	Meets the following provisions annually or at the frequency indicated: a) Is maintained by a physician knowledgeable in current management of diabetes mellitus on a basal/bolus (i.e., can include subcutaneous insulin infusion pump) regimen using insulin analogs b) Has demonstrated over a period of at least 3 months the motivation and understanding required to monitor and control capillary blood glucose levels through nutritional therapy and insulin administration, including any experience and history dealing with erratic meal schedules, sleep disruption, and high aerobic and anaerobic workloads intrinsic to firefighting	5, 9, 13, 14

(continues)

Table 13.8 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		c) Has a dilated retinal exam by a qualified ophthalmologist or optometrist that shows no higher grade of diabetic retinopathy than mild nonproliferative (microaneurysms only), as indicated on the International Clinical Diabetic Retinopathy Disease Severity Scale d) Has normal renal function based on a calculated creatinine clearance greater than 60 mL/min using the Cockcroft-Gault or similar formula and has absence of proteinuria (defined as 24-hour urine excretion of greater than or equal to 300 mg protein or greater than or equal to 300 mg of albumin per gram of creatinine in a random sample) e) Has no autonomic neuropathy (determined by evidence of gastroparesis, postural hypotension, or abnormal tests of heart rate variability) or peripheral neuropathy (determined by diminished ability to feel the vibration of a 128-Hz tuning fork or the light touch of a 10 g monofilament on the dorsum of the great toe proximal to the nail) f) Every 2 to 3 years, as medically indicated, has normal cardiac function without exercise-induced evidence of myocardial ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) g) Has a signed statement and medical records from an endocrinologist or a physician with demonstrated knowledge in the current management of diabetes mellitus, indicating that the individual meets the following provisions: i. Is maintained on a stable insulin regimen and has demonstrated over a period of at least 3 months the motivation and understanding required to monitor and control capillary blood glucose levels through nutritional therapy and insulin administration ii. Has had hemoglobin A1C measured at least four times a year, at intervals of two to three months, over the last 12 months prior to evaluation if the diagnosis of diabetes has been present over 1 year	

(continues)

Table 13.8 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		iii. Does not have an increased risk of hypoglycemia due to alcohol use or other predisposing factors iv. Has had no episodes of severe hypoglycemia (i.e., requiring assistance of another) in the preceding year, with no more than one episode of severe hypoglycemia in the preceding 5 years v. Is certified not to have a medical contraindication to firefighting training and operations h) Where a hemoglobin A1C reading of 8% or greater, is medically evaluated to determine if a condition exists in addition to diabetes that is responsible for the hemoglobin A1C not accurately reflecting average glucose levels, including evidence of a set schedule for blood glucose monitoring and a thorough review of data from such monitoring	
(3)* Type 2 diabetes mellitus that does not require insulin therapy and is able to control the condition with diet, exercise, or oral hypoglycemic agents	—	Meets the following provisions annually or at the frequency indicated: a) Has had hemoglobin A1C measured at least four times a year, at intervals of two to three months, over the last 12 months prior to evaluation if the diagnosis of diabetes has been present over 1 year b) If on oral hypoglycemic agents, has had no episodes of severe hypoglycemia (i.e., requiring assistance of another) in the preceding year c) Has a dilated retinal exam by a qualified ophthalmologist or optometrist that shows no higher grade of diabetic retinopathy than mild nonproliferative (microaneurysms only), as indicated on the International Clinical Diabetic Retinopathy Disease Severity Scale d) Has normal renal function based on a calculated creatinine clearance greater than 60 mL/min using the Cockcroft-Gault or similar formula and has absence of proteinuria (defined as 24-hour urine excretion of greater than or equal to 300 mg protein or greater than or equal to 300 mg of albumin per gram of creatinine in a random sample) e) Has no autonomic neuropathy (determined by evidence of gastroparesis, postural hypotension, or abnormal tests of heart rate variability) or peripheral neuropathy (determined by diminished ability to feel the vibration of a 128-Hz tuning fork or the light touch of a 10 g monofilament on the dorsum of the great toe proximal to the nail)	5, 9, 13, 14

(continues)

Table 13.8 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		f) Every 2 to 3 years, as medically indicated, has normal cardiac function without exercise-induced evidence of myocardial ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>) g) Where a hemoglobin A1C reading of 8% or greater, is medically evaluated to determine if a condition exists in addition to diabetes that is responsible for the hemoglobin A1C not accurately reflecting average glucose levels, including evidence of a set schedule for blood glucose monitoring and a thorough review of data from such monitoring	
(4) Nutritional deficiencies, including those caused by congenital or acquired disorders of metabolism	Is unable to safely and effectively perform the essential job tasks due to severity and functional impact of a nutritional deficiency, based on the physician's assessment with consideration for percent of ideal body weight, body mass index (BMI), muscle strength, endurance, energy levels, and abilities to feed, hydrate, and absorb essential nutrients pre- and postfire activities	—	1, 5, 9, 13, 14
(5)* Diseases of the adrenal gland, pituitary gland, parathyroid gland, or thyroid gland	Has untreated or uncontrolled disease(s) of the adrenal gland, pituitary gland, parathyroid gland, or thyroid gland	Has hyper- or hypo-hormonal disturbance that is controlled clinically with normal exam and normal serum levels, verified annually	1, 5, 9, 13, 14

*Additional information is provided in A.13.8.

Table 13.9 Medical Conditions Involving the Gastrointestinal Tract and Abdominal Viscera

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1)* Gastrointestinal disorders, including cholecystitis, gastritis, GI bleeding, inflammatory bowel disease or irritable bowel syndrome, intestinal obstruction, pancreatitis, diverticulitis, cirrhosis, or gastric or other GI ulcers, including Zollinger-Ellison syndrome	Has uncontrolled symptomatic dehydration, anemia, or incapacitating pain syndromes	Has symptoms under control without frequent acute flairs and without functional impairment, such as malnutrition, symptomatic dehydration, anemia, chronic diarrhea, or chronic pain syndrome	1, 5, 9, 13, 14
(2)* Gastrointestinal surgery (e.g., cholecystectomy, appendectomy, splenectomy), excluding transplant	—	Postoperatively, has healed without functional impairment, such as malnutrition, symptomatic dehydration, anemia, chronic diarrhea, or chronic pain syndrome	—
(3)* Abdominal wall, inguinal, or femoral hernia	Has high risk for incarceration and bowel strangulation during heavy exertion and lifting or for weakening of the abdominal wall musculature, as judged by the fire department physician	Has umbilical hernia that is small and asymptomatic or has abdominal wall hernia that has been surgically corrected and well-healed with surgeon's clearance for full lifting	1, 4, 6, 7, 13
(4) Liver transplant (<i>see Section 13.13 for antirejection medication</i>)	—	—	—
(5) Kidney disease	Has chronic, Stage 4 or greater kidney disease [glomerular filtration rate (GFR) < 30 ml/min]	—	9, 11, 13, 14, 15
(6) Hemodialysis or continuous ambulatory peritoneal dialysis	—	Meets the following provisions annually or at the frequency indicated: a) Has demonstrated, over a period of at least 6 months, the motivation and understanding required to adhere to the prescribed dialysis schedule while working b) On dialysis, has acceptable metabolic parameters (creatinine, BUN, potassium, and so forth) c) Every 2 to 3 years, as medically indicated, when a symptom-limited imaging stress test is performed to at least 85% maximum predicted heart rate and to a MET level of at least the 50th percentile cardiorespiratory fitness level for the general population based on the selected exercise protocol and the individual's biological sex and age (<i>see 13.3.4.1</i>), has normal cardiac function without exercise-induced evidence of myocardial ischemia, toxic arrhythmias, hypoxia, exercise hemoglobin oxygen desaturation, left ventricular dysfunction, or abnormal blood pressure response d) Has a signed statement and medical records from a nephrologist or physician that manages the individual's dialysis, indicating that the individual can safely and effectively perform the essential job tasks	9, 11, 13, 14, 15
(7) Kidney transplant (<i>see Section 13.13 for antirejection medication</i>)	—	—	—

*Additional information is provided in A.13.9.

Table 13.10 Medical Conditions Involving the Spine

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1) Any of the following spine conditions: a) Scoliosis of thoracic or lumbar spine with angle greater than or equal to 40 degrees b) Any spinal or skeletal condition producing sensory or motor deficit(s) or pain due to radiculopathy or nerve compression c) Any spinal or skeletal condition causing pain that frequently or recurrently requires narcotic analgesic medication d) Cervical vertebral fractures with multiple vertebral body compression greater than 25%; evidence of posterior element involvement, nerve root damage, disc involvement, dislocation (i.e., partial, moderate, severe), abnormal exam, ligament instability, symptomatic, or less than 6 months post injury or less than 1 year since surgery e) Thoracic vertebral fractures with vertebral body compression greater than 50%; evidence of posterior element involvement, nerve root damage, disc involvement, dislocation (e.g., severe — with or without surgery), abnormal exam, ligament instability, symptomatic, or less than 6 months post injury or less than 1 year since surgery f) Lumbosacral vertebral fractures with vertebral body compression greater than 50%; evidence of posterior element involvement, nerve root damage, disc involvement, dislocation (i.e., partial, moderate, severe), fragmentation, abnormal exam, ligament instability, symptomatic, or less than 6 months post injury or less than 1 year since surgery g) History of spine surgery or injury		Is evaluated to be able to safely and effectively perform the essential job tasks	1, 2, 4, 5, 6, 7, 8, 13
(2) Spinal fusion	—	—	
(3) Ankylosing spondylitis	—	—	1, 2, 4, 5, 6, 7, 8, 13
(4) Radiculopathy	—	—	1, 2, 4, 5, 6, 7, 8, 13
(5)* Spine structural abnormality, fracture, or dislocation that causes progressive or recurrent impairment	—	—	1, 2, 4, 5, 6, 7, 8, 13
(6) Disc herniation	Has herniation of nucleus pulposus or a history of laminectomy, discectomy, or single-level fusion dislocation	—	1, 2, 4, 5, 6, 7, 8, 13

*Additional information is provided in A.13.10.

Table 13.11 Medical Conditions Involving Orthopedics

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1) Amputation or congenital absence of arm, hand, or thumb	—	Has no impairment of grip and other physical abilities required to rapidly perform essential job tasks in an immediately dangerous to life and health (IDLH) environment	1, 4, 6, 7, 8, 13
(2) Amputation or congenital absence of finger(s), other than a thumb	—	Has no impairment of grip and other physical abilities required to rapidly perform essential job tasks in an IDLH environment	1, 8
(3) Above-the-knee amputation or congenital absence of lower extremity limb (i.e., leg)	—	Has no impairment of ambulation and other weight-bearing activities required to rapidly perform essential job tasks in an IDLH environment	1, 4, 6, 7, 8, 13
(4) Below-the-knee amputation or congenital absence of lower extremity limb (i.e., leg or foot)	—	Meets the following provisions annually: a) Has a stable, unilateral BKA with at least the proximal third of the tibia present for a strong and stable attachment point with the prosthesis b) Is fitted with a prosthesis that will tolerate the conditions present in firefighting, when worn in conjunction with standard firefighting PPE c) Has at least 6 months of prosthetic use in a variety of physically demanding activities with no functional difficulties d) Has no significant inflammation, persistent pain, necrosis, or indications of instability at the amputee limb attachment point e) Demonstrates no disabling psychosocial issues pertaining to the loss of limb or use of prosthesis f) Has passed the department's physical ability test without accommodations or modification of the protocol g) Has a signed statement and medical records from a prosthetist or orthopedic specialist with expertise in the fitting and function of prosthetic limbs, indicating that the individual can safely and effectively perform the essential job tasks, including wearing PPE and SCBA while climbing ladders, operating from heights, and walking or crawling in the dark along narrow and uneven surfaces that might be wet or icy	1, 4, 6, 7, 8, 13
(5) Amputation or congenital absence of partial foot or toe(s)	—	Has no impairment of ambulation and other physical abilities required to rapidly perform essential job tasks in an IDLH environment	1, 4, 8
(6)* Single dislocation of a major joint	Has residual limitation of motion, depending on degree, with or without surgery	—	1, 4, 6, 7, 8

(continues)

Table 13.11 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(7)* Recurrent dislocation of a major joint	—	Has full functional motion, strength, and stability of the joint when examined after surgical repair	1, 4, 6, 7, 8
(8)* Ligament or meniscus knee disease	Has symptoms of locking, buckling, or giving way	Has full functional motion, strength, and stability of the joint when examined after surgical repair	1, 4, 6, 7, 8
(9) Joint replacements or artificial joints	—	Meets the following provisions annually: a) Has normal range of motion, strength, and joint stability without history of dislocations postreplacement b) Has no pain or impairment with repetitive and prolonged pulling, bending, rotations, kneeling, crawling, and climbing c) Has no limiting pain d) Postsurgical replacement, has a signed statement and medical records from an orthopedic specialist, indicating that the individual can safely and effectively perform the essential job tasks	1, 4, 6, 7, 8
(10) Limitation of joint motion	Has significant limitation of motion or strength	—	1, 4, 6, 7, 8
(11) Joint reconstruction	Has significant residual limitation of motion or strength	Meets the following provisions annually: a) Has normal range of motion, strength, and joint stability without history of dislocations postreconstruction b) Has no pain or impairment with repetitive and prolonged pulling, bending, rotations, kneeling, crawling, and climbing c) Has no limiting pain d) Postsurgical reconstruction, has a signed statement and medical records from an orthopedic specialist, indicating that the individual can safely and effectively perform the essential job tasks	1, 4, 6, 7, 8
(12) Fractures	Is unable to safely and effectively perform the essential job tasks due to the fracture location, fracture severity, or progress in healing or repair, as judged by the fire department physician	Has healed the fracture as assessed with a radiograph and physician's examination	1, 4, 6, 7, 8
(13)* Appliances (e.g., screws, pins, or metal plates)	Is unable to safely and effectively perform the essential job tasks due to the appliance location, as judged by the fire department physician	—	1, 4, 6, 7, 8
(14) Bone grafts	—	Has healed the graft as assessed with a radiograph and physician's examination	1, 4, 6, 7, 8

(continues)

Table 13.11 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(15) Osteoarthritis or traumatic arthritis	Has frequent episodes of pain or reduced range of motion, strength, or endurance	—	1, 4, 6, 7, 8
(16) Inflammatory arthritis	Has frequent episodes of pain or reduced range of motion, strength, or endurance		1, 4, 6, 7, 8
(17) Complex regional pain syndrome	Has severe pain, requires narcotics or muscle relaxants, or has limited strength or flexibility	—	1, 4, 6, 7, 8
(18) Osteomyelitis or septic arthritis	Has active condition that is causing pain, local drainage, systemic infection, or increased risk for pathologic or traumatic fractures	—	1, 4, 6, 7, 8

*Additional information is provided in A.13.11.

Table 13.12 Medical Conditions Involving Neurologic Functions

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1)* Epilepsy, including, but not limited to, simple, partial complex, generalized, psychomotor, or provoked seizure at high risk for recurrence	Two or more unprovoked seizures more than 24 hours apart	Meets the following provisions annually: a) Had no seizures for the most recent consecutive 10 years b) Is currently on a stable regimen of antiepileptic drugs for the most recent 5 years with no side effects impacting the performance of the essential job tasks, or on no antiepileptic drugs for the most recent 5 years c) Has normal neurological examination results d) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	1, 6, 8, 9, 10, 11, 13, 14
(2) Single unprovoked seizure, including, but not limited to, simple partial, complex partial, generalized, and psychomotor seizure disorders	—	Meets the following provisions annually: a) Had no seizures for the most recent consecutive 5 years b) Is currently on a stable regimen of antiepileptic drugs for the most recent 5 years with no side effects impacting the performance of the essential job tasks, or on no antiepileptic drugs for the most recent 5 years c) Has normal neurological examination results d) Has normal brain MRI results or meets the special provisions for epilepsy in (1) e) Has normal awake and asleep photic stimulation and hyperventilation EEG study results or meets the requirements for epilepsy in (1) f) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions specified in (a) through (e) and can safely and effectively perform the essential job tasks	1, 6, 8, 9, 10, 11, 13, 14
(3) Provoked seizures associated with one of the following factors that have a low risk of recurrence: (a) Medications (b) Toxin exposures (c) Metabolic abnormalities (d) Withdrawal (e.g., alcohol, benzodiazepines) (e) Drugs (e.g., cocaine, amphetamines, PCP)	—	Meets the following provisions annually: a) The underlying cause of the seizure is no longer present and the risk of encountering the precipitating factor again is minimal b) Has normal neurological examination results c) Has normal brain MRI results or meets the special provisions for epilepsy in (1) d) Has normal awake and asleep photic stimulation and hyperventilation EEG study results or meets the special provisions for epilepsy in (1)	1, 6, 8, 9, 10, 11, 13, 14

(continues)

Table 13.12 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		e) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions specified in (a) through (d) and can safely and effectively perform the essential job tasks	
(4) Provoked seizures associated with one of the following factors that have a high risk of recurrence:		Meets the following provisions annually:	1, 6, 8, 9, 10, 11, 13, 14
(a) Head trauma that occurred more than 7 days before the seizure		a) Had no seizures for the most recent consecutive 10 years	
(b) Intracerebral or intracranial hemorrhage		b) Is currently on a stable regimen of antiepileptic drugs for the most recent 5 years with no side effects impacting the performance of the essential job tasks, or on no antiepileptic drugs for the most recent 5 years	
(c) Brain infection — encephalitis, bacterial meningitis, abscess, cysticercosis		c) Has normal neurological examination results	
(d) Stroke — ischemic or hemorrhagic		d) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	
(e) Brain surgery			
(f) Structural brain lesion, such as brain tumor			
(g) Active phase of an autoimmune disease	—		
Other Neurologic or Neurovascular Conditions			
(5) Any of the following neuromuscular, demyelinating, or other progressive neurologic diseases:		Meets the following provisions annually:	1, 4, 6, 8, 9, 10, 13, 14, 15
a) Amyotrophic lateral sclerosis (ALS), Huntington's chorea, and bulbar palsy		a) Is not prescribed medication that can impair job function	
b) Ataxias of heredo-degenerative type		b) Has normal neurological and cognitive examination results	
c) Cerebral aneurysm		c) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	
d) Dementia or other cognition impairments (e.g., Alzheimer's and other neurodegenerative diseases) with symptomatic loss of function or cognitive impairment (e.g., less than or equal to 28 on Mini-Mental Status Exam)			
e) Hemiparalysis or paralysis of a limb			
f) Migraines			
g) Multiple sclerosis			
h) Muscular dystrophy or atrophy			
i) * Myasthenia gravis			
j) Myopathy or myositis			
k) Myoneuropathies (e.g., Guillain-Barré, post-botulism, post-polio syndrome)			
l) Narcolepsy			
m) Neuropathies			
n) Parkinson's disease and other movement disorders resulting in uncontrolled movements, bradykinesia, or cognitive impairment (e.g., less than or equal to 28 on Mini-Mental Status Exam)			

(continues)

Table 13.12 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(6) Other neurologic or neurovascular condition that affects any of the following: a) Neurologic function b) Gait, balance, or movement c) Cognitive function d) Stamina or energy level/fatigue e) Neurological sensitivity to medications, treatments, or operational environment, including heat, hazards, stress, and exertion)	—	Meets the following provisions annually: a) Is not prescribed medication that can impair job function (<i>see Section 13.13</i>) b) Has normal neurological and cognitive examination results c) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions in (a) and (b) and can safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
(7)* Cerebrovascular disease	Has documented episodes of focal, reversible, or neurological impairment	Meets the following provisions annually: a) Has not experienced a transient ischemic attack in the last 12 months, has controlled risk factors, and is treated with an antiplatelet agent, other than aspirin b) Has not experienced an ischemic stroke in the last 12 months or for a time suitable to the estimated risk of seizure c) Has no decreased sensation or weakness that interferes with essential job tasks d) Has no physical limitations that interfere with essential job tasks e) Has no cognitive limitations that interfere with essential job tasks f) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions in (a) through (c) and can safely and effectively perform the essential job tasks	1, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15
(8)* Cerebrovascular bleed	—	Meets the following provisions annually: a) Has had the cause of bleeding surgically corrected, if indicated b) Has normal physical examination results, including blood pressure c) Has no history of seizure or meets the requirements for epilepsy or seizures in (1), (2), (3), or (4), as applicable d) Has not experienced a hemorrhagic stroke or subarachnoid hemorrhage in the last 12 months or for a time suitable to the estimated risk of seizure e) Has no decreased sensation or weakness that interferes with essential job tasks f) Has no physical limitations that interfere with essential job tasks g) Has no cognitive limitations that interfere with essential job tasks	1, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15

(continues)

Table 13.12 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		h) Has a signed statement from a neurologic specialist, indicating that the individual meets the provisions in (a) through (d) and can safely and effectively perform the essential job tasks	
(9) Head trauma, including concussion, — brain contusion, subarachnoid hemorrhage, or subdural or epidural hematoma		Meets the following provisions annually: a) Has no decreased sensation or weakness that interferes with essential job tasks b) Has no physical limitations that interfere with essential job tasks c) Has no cognitive limitations that interfere with essential job tasks d) If required by the fire department physician, has a signed statement from a neurologic specialist, indicating that the individual meets the provisions specified in (a) through (c) and can safely and effectively perform the essential job tasks	1, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15

*Additional information is provided in A.13.12.

13.13* Medications and Their Side Effects. The physician shall report any applicable job restrictions associated with the effects of any medication taken by the individual, whether prescribed or over the counter, including, but not limited to, the medications identified in Table 13.13. (*Refer to the applicable section for the underlying condition being treated by the medication.*)

13.13.1 Annual Follow-Up. The physician shall ensure specialized annual follow-up of members taking medications referenced in Table 13.13.

13.13.2 Special Considerations for Antihypertensive Agents.

13.13.2.1 An individual on beta-blockers, high-dose diuretics, or central agents, such as clonidine, shall not be considered able to safely and effectively perform the essential job tasks.

13.13.2.2 An individual on calcium channel blockers or angiotensin converting enzyme inhibitors or enzyme blockers used as antihypertensive medication and not for cardiac treatment shall be considered able to safely and effectively perform the essential job tasks. (*If used for cardiac treatment, refer to Section 13.7.*)

13.13.2.3 An individual that has a change in antihypertensive medication shall be re-evaluated for duty once stable.

13.14 Pregnancy and Reproductive Health.

13.14.1 Educational Materials. The fire department shall make educational materials outlining the risks from firefighting to reproductive health available to all male and female firefighters.

13.14.2* Hazards and Restrictions.

13.14.2.1 Once informed of the individual's pregnancy or lactation, the fire department physician shall do all the following:

- (1) Inform the individual of the numerous hazards to the pregnancy and the fetus during routine firefighting tasks or obtain a signed statement from the individual's obstetrician, indicating that the individual has been counseled on these hazards.
- (2) Inform the individual of the hazards to breast milk from toxic substances encountered during routine firefighting tasks or obtain a signed statement from the individual's obstetrician or child's pediatrician indicating that the individual has been counseled on these hazards.
- (3) Evaluate the individual for the ability to safely and effectively perform essential job tasks 1, 2, 3, 4, 5, 6, 7, 8, and 9 due to anticipated issues with diminished aerobic capacity, dyspnea, balance, speed, and agility during later stages of pregnancy or obtain a signed statement from the individual's obstetrician indicating that the individual can safely and effectively perform the essential job tasks.
- (4) Inform the AHJ of any applicable job restrictions that will remain in effect until after delivery and recovery from pregnancy.

13.14.2.2 If the individual requests an alternative-duty assignment in an environment deemed safe for the pregnancy, the fetus, or breast milk, the physician shall recommend restrictions for essential job tasks 1, 3, 5, 6, 7, and 8 so that the AHJ can determine if a reasonable accommodation can be found.

13.15* Chronic Systemic Diseases and Miscellaneous Conditions. The physician shall report any applicable job restrictions associated with the conditions in Table 13.15.

Table 13.13 Medications with Noteworthy Side Effects That Can Interfere with the Performance of Essential Job Tasks

Medication Type	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1)* Anticoagulation medications (full- or low-dose) or any drugs that prolong prothrombin time, partial thromboplastin time, or international normalized ratio (INR)	Is unable to safely and effectively perform the essential job tasks due to the risk of internal bleeding from trauma with potential for rapid incapacitation from shock or central nervous system hemorrhage	—	8
(2) Opioids	Is unable to safely and effectively perform the essential job tasks due to alterations in mental status, including vigilance, judgment, and other neurologic functions	—	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(3) Muscle relaxants	Is unable to safely and effectively perform the essential job tasks due to alterations in mental status and other neurologic functions	—	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(4) Sedatives or hypnotics, including benzodiazepines, dronabinol, and marijuana (medical or recreational)	Is unable to safely and effectively perform the essential job tasks due to alterations in mental status, including vigilance, judgment, and other neurologic functions	—	1, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(5) Neuroleptics (<i>See Section 13.21 for the psychiatric condition or psychological disorder being treated.</i>)	Is unable to safely and effectively perform the essential job tasks due to increased risk of heat stress, movement disorders, and somnolence	—	5, 8, 11, 13, 14, 15
(6)† Certain anti-hypertensive agents (e.g., high-dose diuretics, and central agents such as clonidine) (<i>See Section 13.7 for the hypertensive condition being treated.</i>)	(a) Is unable to safely and effectively perform the essential job tasks due to a high risk for dehydration, electrolyte disorders, lethargy, disequilibrium, cardiovascular dysfunction, or alterations in mental status, including vigilance, judgment, and other neurologic functions (b) See 13.13.2.		5, 8
(7) Beta-blockers	Is unable to safely and effectively perform the essential job tasks due to reduce capacity to achieve full aerobic performance.	Prescribed low dose as needed is acceptable if there are no performance issues or fatigue and are not being used for the treatment of cardiac disease	5, 8
(8)* Inhaled bronchodilators (beta-agonists, anticholinergics; short or long lasting) (<i>See Section 13.6 for the asthmatic condition being treated.</i>)	Is unable to safely and effectively perform the essential job tasks without use of the inhaled bronchodilator	—	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15

(continues)

Table 13.13 *Continued*

Medication Type	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(9) High-dose corticosteroids for chronic disease	Is unable to safely and effectively perform the essential job tasks due to the risk for dehydration, electrolyte disorders, myopathy, altered sensorium, lethargy, or infection	—	3, 5, 8
(10) Systemic corticosteroids, at any dose	Is unable to safely and effectively perform the essential job tasks due to the risk for dehydration, electrolyte disorders, myopathy, altered sensorium, lethargy, or infection	—	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(11)*† Anti-inflammatory or antirejection medications (e.g., cyclosporin), methotrexate, CellCept® (mycophenolate mofetil), Cytosan® (cyclophosphamide), or TNF-alpha blockers (commonly referred to as biologics) used for chronic inflammatory disease management	Is unable to safely and effectively perform the essential job tasks due to the risk for dehydration, electrolyte disorders, myopathy, altered sensorium, lethargy, or infection	—	3, 8, 15
(12) Anabolic steroid	Is unable to safely and effectively perform the essential job tasks due to alterations in mental status, including vigilance, judgment, and other neurologic functions	—	1, 5, 9, 10, 11, 12, 13, 15

* Additional information is provided in A.13.13.

† Trademarks used herein are trademarks of their respective owners.

Table 13.15 Medical Conditions Involving Chronic Systemic Diseases and Miscellaneous Conditions

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1) Rheumatologic, connective tissue diseases, such as dermatomyositis, systemic lupus erythematosus, scleroderma, and rheumatoid arthritis	Is unable to safely and effectively perform the essential job functions due to impairment from the disease or medication, as judged by the fire department physician	—	1, 2, 3, 4, 5, 6, 7, 8, 9
(2)* A history of thermal, chemical, or electrical burn injury or other injury with residual functional deficit	Is unable to safely and effectively perform the essential job functions due to impairment from the disease or medication, as judged by the fire department physician	—	1, 2, 3, 4, 5, 6, 7, 8, 9

*Additional information is provided in A.13.15.

13.16* Infectious Diseases. The physician shall report any applicable job restrictions associated with systemic, local, acute, and chronic infections, as well as postinfectious processes, including the diseases identified in Table 13.16, with consideration for the following:

- (1) Ability to control body temperature, hydration, and nutritional status
- (2) Presence of severe pain, muscle weakness, or compromised mobility or ability to perform heavy physical exertion
- (3) Ability to interact with other firefighters and individuals of the public without posing a public health risk due to contagious disease
- (4)* Presence of acute or self-limited infectious processes that require temporary work restriction until resolution

13.17 Chronic Skin Conditions. The physician shall report any applicable job restrictions associated with the conditions in Table 13.17.

13.18 Hematologic Disorders and Their Treatment. The physician shall report any applicable job restrictions associated with the conditions in Table 13.18.

13.19 Heat Stress and Heat-Related Illness. The physician shall report any applicable job restrictions associated with the conditions in Table 13.19 with consideration for the following:

- (1) Documented evidence of a predisposition to, history of, or recurrence of heat illness, rhabdomyolysis, metabolic acidosis, or exertion-related incapacitation, which can increase the risk for potentially life-threatening recurrence during training or on the fireground
- (2) Presence of a neurologic (e.g., myasthenia gravis, multiple sclerosis) or other condition that is exacerbated by heat stress
- (3) Requirement for medications (e.g., MAOIs, phenothiazines, anticholinergics, tricyclic antidepressants) that increase an individual's risk of heat stress
- (4) Heat exposure restrictions imposed during pregnancy
- (5) Signed statement from a physician knowledgeable in heat stress, heat-related conditions, and rhabdomyolysis, indicating that the individual's risk for recurrence is minimal and that the individual can safely and effectively perform the essential job tasks

13.20* Tumors — Malignant or Benign. The physician shall report any applicable job restrictions associated with the conditions in Table 13.20.

13.21* Psychiatric Conditions and Psychological Disorders. The physician shall report any applicable job restrictions associated with the conditions in Table 13.21 in consultation with a mental health professional if clinically indicated.

Table 13.16 Infectious Diseases That Can Interfere with the Performance of Essential Job Tasks

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1) Skin conditions, infections, ulcers, or cysts	Is unable to wear PPE Presents a high risk for exposure to infectious agents and toxins	— —	1, 2, 5 3, 15
(2) Upper or lower respiratory infections	Is unable to safely and effectively perform the essential job tasks due to impairment from the infection, its frequent recurrence, or its treatment, as judged by the fire department physician	—	1, 2, 3, 4, 5, 7, 15
(3) Ear infections	Is unable to safely and effectively perform the essential job tasks due to interference with balance or hearing, as judged by the fire department physician	—	8, 12
(4) Gastrointestinal infections, including parasites	Is unable to safely and effectively perform the essential job tasks due to dehydration or frequent use of toilet facilities (at least temporarily)	—	1, 2, 5, 9
(5) Kidney or urinary infections	Is unable to safely and effectively perform the essential job tasks due to dehydration or frequent use of toilet facilities (at least temporarily)	—	1, 5, 9
(6)* Other Infection	Is unable to safely and effectively perform the essential job tasks due to dizziness, significant weakness, significant weight loss, or pain-limiting functional capacity	—	1, 2, 5, 8, 9
(7)* Highly contagious infections (e.g., active pulmonary tuberculosis, mumps, measles, chicken pox, rubella, MRSA skin infections, SARS, COVID-19)	Poses a public health risk to other individuals and the community	Is no longer contagious	2, 3, 13, 15
(8)* Hepatitis and treatment thereof, specifically infectious diseases of the liver caused by viruses including, but not limited to, A, B, C, D, and E	Has either of the following conditions: a) Is unable to safely and effectively perform the essential job tasks due to impairment from the infection or its treatment b) Poses a public health risk to other individuals and the community (e.g., acute Hepatitis A)	Meets current CDC guidelines, including recommendations for restriction from various types of duty	1, 2, 9, 13, 15
(9)* Human immunodeficiency virus (HIV) infection	Has any of the following conditions resulting from HIV infection such that the ability to safely and effectively perform the essential job tasks is impaired: (a) Organ damage or dysfunction (b) Anemia, cardiopulmonary dysfunction, or neurologic dysfunction (c) Peripheral neuropathy (d) Dementia	—	1, 2, 3, 4, 5, 7, 8, 9, 11, 12, 13

*Additional information is provided in A.13.16.

Table 13.17 Chronic Skin Conditions

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
Chronic skin condition that results in loss of skin integrity, inflammation, or irritation of the skin surface	Has increased risk of burns, infection, dehydration, or inability to wear PPE, including thermal protective gear or respirators, while firefighting	—	1, 2, 3, 5, 9, 15

Table 13.18 Hematologic Disorders and Their Treatment

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1) Hematologic disorder, such as anemia, leukopenia, polycythemia vera, splenomegaly, bleeding disorders, and hypercoagulable conditions	—	Is not prevented from safely and effectively performing the essential job tasks due to any of the following: a) Fatigue b) Oxygen deprivation c) Risk of infection d) Bleeding	1, 2, 3, 5, 9, 15
(2) Treatment of a hematologic disorder with drugs that prolong prothrombin time, partial thromboplastin time, or international normalized ratio (INR)	Has increased risk of internal bleeding from trauma with potential for rapid incapacitation from shock or central nervous system hemorrhage	—	8

Table 13.19 Heat and Stress Illness

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
A history of heat stress and heat-related illness, including rhabdomyolysis	—	Meets both of the following provisions: a) Has no history of severe or recurrent heat stress or heat-related illness b) Has no history or risk of heat stress or heat-related illness due to an underlying, persistent condition or its treatment	1, 5, 9

Table 13.20 Tumors — Malignant or Benign

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1)* Benign tumor	Has reduced energy levels or reduced functions of the involved organ system due to the space-occupying lesion or its treatment	—	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
(2) Acute illness related to malignancy or its treatment	Has low energy levels, anemia, weight loss, or debilitation due to the specific aspects of that organ's dysfunction	—	1, 2, 3, 4, 5, 6, 7, 8, 9, 13
(3)* Central nervous system tumor (<i>If applicable, see Section 13.12 for seizures.</i>)	Has low energy levels, anemia, undernutrition, weight loss, inability to wear PPE or SCBA, or specific organ dysfunction (e.g., seizures, loss of balance, inability to communicate, inability to process complicated commands in an emergency situation, weakness)	Has a signed statement from a specialist, indicating that the individual has undergone successful treatment and is able to safely and effectively perform the essential job tasks	1, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
(4)* Head or neck malignancy	Has low energy levels, anemia, undernutrition, weight loss, inability to clear oral secretions, or other specific organ dysfunction that interferes with respiration, communication, hydration, or eating	Has a signed statement from a specialist, indicating that the individual has undergone successful treatment and is able to safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13
(5)* Lung cancer	Has low energy levels, anemia, dyspnea, undernutrition, weight loss, weakness, paraneoplastic syndromes, or specific organ dysfunction (e.g., abnormal secretions, dyspnea, or pulmonary dysfunction interfering with or prohibiting use of SCBA or strenuous physical activities)	Has a signed statement from a specialist, indicating that the individual has undergone successful treatment, has pulmonary function consistent with Section 13.6, and is able to safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 7, 8, 9, 13
(6)* Gastrointestinal malignancy	Has low energy levels, anemia, undernutrition, weight loss, weakness, paraneoplastic syndromes, or specific organ dysfunction (e.g., abnormal secretions or bowel function interfering with or prohibiting prolonged use of personal protective clothing or prohibiting strenuous physical activities)	Has a signed statement from a specialist, indicating that the individual has undergone successful treatment, has normal gastrointestinal function, and is able to safely and effectively perform the essential job tasks	1, 3, 4, 5, 7, 8, 9
(7) Genitourinary malignancy	Has altered urinary function that prevents prolonged activity without use of toilet facilities, low energy levels, anemia, undernutrition, weight loss, or specific organ dysfunction	Has a signed statement from a specialist, indicating that the individual has undergone successful treatment and is able to safely and effectively perform the essential job tasks	1, 3, 4, 5, 7, 8, 9
(8)* Hematologic or lymphatic malignancy (e.g., leukemias, lymphomas)	Has anemia, lymphopenia, thrombocytopenia, or adverse effects of treatment	Has a signed statement from a specialist, indicating that the individual has undergone successful treatment and is able to safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 7, 8, 9
(9) Skin cancer that requires significant resection, chemotherapy, or other systemic anti-neoplastic therapy, or that results in the loss of skin integrity	Has low energy levels, anemia, undernutrition, weight loss, or increased risk of burns, infection, dehydration, or heat rash while firefighting and wearing PPE	Has a signed statement from a specialist, indicating that the individual has undergone successful treatment and is able to safely and effectively perform the essential job tasks	1, 3, 4, 5, 7, 8, 9

*Additional information is provided in A.13.20.

Table 13.21 Psychiatric Conditions and Psychological Disorders

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(1) Anxiety disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(2) Bipolar disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no suicide attempts within the previous 12 months e) Had no manic episodes within the previous 12 months	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(3) Depressive disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no suicide attempts within the previous 12 months	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(4) Posttraumatic stress disorder (PTSD)	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use, dissociative disorders, or sleep disorders d) Had no suicide attempts within the previous 12 months	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(5) Delusional disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no psychotic symptoms within the previous 12 months e) Had no suicide attempts within the previous 12 months	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

(continues)

Table 13.21 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
(6) Brief psychotic disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no psychotic symptoms within the previous 12 months e) Had no suicide attempts within the previous 12 months	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(7) Schizophreniform disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no psychotic symptoms within the previous 12 months e) Had no suicide attempts within the previous 12 months f) If required by the fire department physician, has a signed statement from a mental health professional indicating that the individual meets the provisions in (a) through (e) and can safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(8) Schizophrenia	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no psychotic symptoms within the previous 12 months e) Had no suicide attempts within the previous 12 months f) If required by the fire department physician, has a signed statement from a mental health professional indicating that the individual meets the provisions in (a) through (e) and can safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15
(9) Schizoaffective disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

(continues)

Table 13.21 *Continued*

Condition	Special Criteria for Restriction	Special Provisions for No Restriction	Affected Essential Job Task(s)
		c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no psychotic symptoms within the previous 12 months e) Had no manic episodes within the previous 12 months f) Had no suicide attempts within the previous 12 months g) If required by the fire department physician, has a signed statement from a mental health professional indicating that the individual meets the provisions in (a) through (f) and can safely and effectively perform the essential job tasks	
(10)* Substance-use disorder	—	Is able to safely and effectively perform the essential job tasks and meets the following provisions annually: a) Complies with treatment, if indicated b) Has no disqualifying side effects from treatment c) Is being treated for any comorbidities, including substance use or sleep disorders d) Had no substance use within the previous 3 months e) Complies with random testing in accordance with department guidelines f) If required by the fire department physician, has a signed statement from a mental health professional indicating that the individual meets the provisions in (a) through (e) and can safely and effectively perform the essential job tasks	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

*Additional information is provided in A.13.21.

Chapter 14 Fitness: Organization (NFPA 1583)

14.1 Administration.

14.1.1* Scope. Chapters 14 through 19 establish the minimum requirements for the development, implementation, and management of a health-related fitness program (HRFP) for members of the fire department involved in emergency operations.

14.1.2 Purpose.

14.1.2.1 The purpose of Chapters 14 through 19 is to provide the minimum requirements for a health-related fitness program for fire department members that enhances the members' ability to perform occupational activities efficiently and safely; reduces the risk of musculoskeletal injuries, chronic disease, premature death; and improves overall well-being.

14.1.2.2* Chapters 14 through 19 are intended to help fire departments develop a health-related fitness program for fire department members that requires mandatory participation but is non-punitive.

14.1.2.3 Chapters 14 through 19 are not intended to establish physical performance criteria.

14.1.3 Application.

14.1.3.1 The requirements of Chapters 14 through 19 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.

14.1.3.2 Chapters 14 through 19 do not apply to industrial fire brigades that might also be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.

14.2 Program Overview.

14.2.1* The fire department shall establish and provide a health-related fitness program (HRFP) that enables members to develop and maintain a level of health and fitness to safely perform their assigned functions.

14.2.2 The fire chief shall have the ultimate responsibility for the fire department's health-related fitness program as required by NFPA 1550.

14.2.3 When this standard is adopted by a jurisdiction, the authority having jurisdiction shall set a date or dates for achieving compliance with the requirements of this standard and shall be permitted to establish a phase-in schedule for compliance with specific requirements of this standard.

14.2.4 Nothing in this standard shall restrict any jurisdiction from exceeding the requirements set forth herein.

14.2.5 The fire department shall incorporate the requirements of this standard in its risk management plan.

14.3 Program Components. The health-related fitness program shall include the following components:

- (1) A qualified program coordinator and an implementation team
- (2) A non-punitive annual fitness assessment for all members
- (3) A series of exercise training options that are available to all members

- (4) Education and counseling-related resources that promote health and wellness for all members
- (5) An implementation plan that includes processes to evaluate program and member outcomes

14.4 Roles and Responsibilities.

14.4.1 Each member of the fire department shall cooperate with, participate in, and comply with the provisions of the health-related fitness program.

14.4.2 The fire department shall require the structured participation of all members in the health-related fitness program.

14.5 Logistics.

14.5.1 The fire department shall be responsible for providing the opportunity and means for implementation of the health-related fitness program.

14.5.2* The fire department shall provide the opportunity and means for regular exercise training.

14.5.2.1* Fire departments with assigned work shifts shall allow members to participate during scheduled work times.

14.5.2.2 Fire departments without assigned work shifts shall provide members with the opportunity to participate at times that do not conflict with other commitments.

14.5.3 The fire department shall provide the opportunity and means for health and wellness related education to be included in the training curriculum.

14.6 Program Referrals.

14.6.1 The fire department shall be responsible for providing educational resources and professional referrals as needed.

14.6.2 The fire department shall be financially responsible for fees associated with referrals only to the extent departmental policy, procedures, standard guidelines, or statutory obligations dictate.

Chapter 15 Fitness: Health and Fitness Coordinator and Peer Fitness Trainers (NFPA 1583)

15.1 Assignment.

15.1.1 The fire chief shall appoint a health and fitness coordinator (HFC).

15.1.2* The health and fitness coordinator shall be either a member of the fire department or a qualified outside agent.

15.1.3* The health and fitness coordinator shall have access to the fire department physician and other subject matter experts for consultation.

15.1.4 The health and fitness coordinator shall oversee the administration of all components of the health-related fitness program.

15.1.5* The health and fitness coordinator shall act as a direct liaison between the fire department physician or other subject matter expert and the fire department.

15.1.6* The health and fitness coordinator shall act as a direct liaison to the fire department's health and safety officer.

15.1.7 In consultation with the fire chief, the health and fitness coordinator shall form a health and fitness committee to

oversee the planning and implementation of the health-related fitness program.

15.1.7.1 The members of the health and fitness committee shall be members of the department who represent the interests, needs, demographics of all members.

15.2* Qualifications for Health and Fitness Coordinator.

15.2.1* The health and fitness coordinator shall possess all of the following:

- (1) A health and fitness-related certification/designation from a professional organization
- (2) Exercise and wellness-related professional/practical experience
- (3) Awareness-level behavioral health training
- (4) Knowledge of locally available peer support resources

15.2.2 The health and fitness coordinator shall have access to both of the following:

- (1) Resources related to the delivery of exercise programs for members
- (2) Resources related to the delivery of health and wellness-related educational materials for members
- (3) Resources related to continuing education and training in the areas of wellness, fitness, and program implementation

15.2.3 The health and fitness coordinator shall maintain the continuing education requirements dictated by the coordinator's certifying body or as described in the fire department's job description, whichever sets forth the higher standard.

15.3 Peer Fitness Trainers.

15.3.1 Peer fitness trainers shall work under the direction of the health and fitness coordinator to oversee safe participation in the health-related fitness program.

15.3.2 Peer fitness trainers shall oversee the delivery of the exercise programming for academy recruits, in conjunction with academy instructors, as directed by the department health and fitness coordinator.

15.3.2.1* Peer fitness trainers shall be provided training on the risks and signs of rhabdomyolysis.

15.3.3* Peer fitness trainers shall have the level of training and certification required by the fire department and shall maintain their recertification requirements as prescribed by the certifying organization.

Chapter 16 Fitness: Assessment (NFPA 1583)

16.1 General.

16.1.1 All members shall participate in a non-punitive annual fitness assessment that is overseen by the fire department health and fitness coordinator.

16.1.1.1 Members shall discuss any physical limitations or concerns regarding the annual fitness assessment with the department physician, the health and fitness coordinator, or their peer fitness trainer prior to participation.

16.1.1.2 Any medical condition that can limit a member's ability to safely participate in the annual fitness assessment should

be addressed by the fire department physician or the member's treating physician, as appropriate.

16.1.1.3 The member's medical confidentiality shall be respected by the health and fitness coordinator and their peer fitness trainer.

16.1.2 The fitness assessment shall be conducted at least annually.

16.2 Fitness Assessment.

16.2.1 All members shall be cleared annually for participation in the fitness assessment by the fire department physician as directed by this standard.

16.2.2* If a member has an acute medical problem or a newly acquired chronic medical condition, the fitness assessment shall be postponed until that person has recovered from this condition and is cleared as required by 16.2.1.

16.3 Preassessment Questionnaire. All members shall complete a preassessment questionnaire that seeks to identify contraindications for participation in the fitness assessment and department exercise training program.

16.4* Fitness Assessment Components. The annual fitness assessment shall consist of the following components:

- (1) Body composition
- (2) Aerobic capacity and recovery
- (3) Speed and power
- (4) Muscular strength
- (5) Muscle and endurance
- (6) Mobility and flexibility

Chapter 17 Fitness: Exercise Training Program (NFPA 1583)

17.1* Program Components. The fire department's exercise and fitness training program, administered by the department health and fitness coordinator and their peer fitness trainer, shall consist of the following components at a minimum:

- (1) Educational workshops to highlight the potential benefits of exercise on job performance and quality of life, and tips to personalize the exercise options that are provided by the department
- (2) Personalized exercise recommendations based on current interests, lifestyle constraints, and fitness assessment results
- (3) Guidelines to assist with the delivery and execution of relevant warm-up and cool-down options
- (4) Exercise programming to assist with the promotion of improved physical activity habits and regular engagement in physical activity
- (5) Exercise programming to improve or maintain aerobic and anaerobic fitness and recovery
- (6) Exercise programming to improve or maintain speed and power
- (7) Exercise programming to improve or maintain muscular strength and endurance
- (8) Exercise programming to improve or maintain mobility and flexibility
- (9) Exercise programming to minimize the risk of musculoskeletal injury with focus on the back, knees, and shoulders

17.2 Program Participation.

17.2.1 The fire department physician shall clear all members for participation in the exercise and fitness training program as outlined in Section 17.2.

17.2.2 Prior to returning to full duty following an extended leave from an injury, illness, or other condition, a member shall be assessed by a peer fitness trainer or the health and fitness coordinator to determine the need for an exercise program to ensure a safe transition back to work.

17.2.2.1 If the assessment indicates that an exercise program is needed, a peer fitness trainer or the health and fitness coordinator shall design a personalized exercise program for the member.

17.2.3 While on restricted duty, a member shall be assessed by a peer fitness trainer or the health and fitness coordinator to determine if there is a need for a personalized exercise and fitness training program.

17.2.3.1 If the assessment indicates that an exercise program is needed, a peer fitness trainer or the health and fitness coordinator shall design a personalized exercise program for the member on restricted duty.

17.2.3.2 The personalized exercise and fitness training program shall be under direction of the department physician or other attending health care professional, to assist in maintaining the member's fitness while on restricted duty.

17.3* Program Implementation. The health and fitness coordinator, in collaboration with the fire chief and the wellness and fitness committee, shall develop a comprehensive implementation plan to accommodate the unique needs of the department and the diverse interests of all members.

Chapter 18 Fitness: Health and Wellness Education (NFPA 1583)

18.1* General Requirements. The fire department shall provide health and wellness promotion education to members as an integral part of the health-related fitness program.

18.1.1* The fire department shall provide members with access to health and wellness education in the following areas:

- (1) Physical activity and exercise
- (2) Dietary habits and hydration
- (3) Sleep hygiene and recovery
- (4) Reproductive health
- (5) Behavioral health
- (6) Mindfulness and meditation
- (7) Social relationships
- (8) Lifestyle modifications
- (9) Fitness and performance
- (10) Lowering the risk of cardiovascular disease, cancer, and diabetes
- (11) Prevention of musculoskeletal injury and chronic illness

18.1.2* The fire department, under the direction of the fire department physician, the health and fitness coordinator, and the wellness and fitness committee, shall provide education regarding all of the topics in 18.1.1.

18.1.3 Materials on the matters in 18.1.1 shall be made available to all members on an ongoing basis, with resource materials updated annually to ensure current information.

18.1.4 The fire department shall provide education and guidance regarding access to the department's member assistance program (MAP) as required by NFPA 1550.

18.1.5 The fire department shall encourage all members to obtain ongoing health care from their primary care providers.

Chapter 19 Fitness: Data Collection (NFPA 1583)

19.1* General. The overall success and effectiveness of the health-related fitness program shall be measured via implementation outcomes, service outcomes, and health outcomes.

19.2 Implementation Outcomes. The specific results or effects that occur during the process of implementing the health-related fitness program shall be documented by collecting the following information:

- (1) Acceptability or satisfaction with various aspects of the program
- (2) Adoption or uptake of the initial implementation
- (3) Appropriateness or perceived fit by relevant stakeholders
- (4) Feasibility or utility of the program
- (5) Fidelity or the extent to which the program was delivered as intended
- (6) Implementation cost or the cost-benefit
- (7) Penetration or the degree to which the program has been institutionalized
- (8) Sustainability or the degree to which progress is maintained over time

19.3 Service Outcomes. The quality and effectiveness of the services delivered during the health-related fitness program shall be documented by collecting the following information:

- (1) Quality of exercise programs and education
- (2) Accessibility of exercise programs and education
- (3) Inclusivity of diverse needs and interests among members
- (4) Active participation rates of members
- (5) Injury rates and compensation costs

19.4* Health Outcomes. The direct impact or changes experienced by members as a result of participation in the health-related fitness program shall be documented by collecting the following information:

- (1) Changes in physical fitness outcomes or activity habits
- (2) Changes in health outcomes or their risk factors
- (3) Changes in dietary habits or sleep behaviors
- (4) Changes in psychological or social well-being
- (5) Type and severity of musculoskeletal injuries
- (6) Job performance

Chapter 20 Rehabilitation: Preparedness (NFPA 1584)

20.1 Administration.

20.1.1 Scope. Chapters 20 through 23 establish the minimum criteria for developing and implementing processes for member prehabilitation, contamination control, rehabilitation, and recovery from incident scene operations and training exercises.

20.1.2 Purpose. Chapters 20 through 23 describe the prerehabilitation, contamination control, rehabilitation, and post-incident recovery processes for members prior to, during, and after incident scene operations, training, and exercises.

20.1.3 Application.

20.1.3.1 Chapters 20 through 23 apply to organizations providing rescue, fire suppression, emergency medical services, hazardous materials mitigation, special operations, wildland and wildland urban interface firefighting, and other emergency services, including public, military, private, and industrial fire departments.

20.1.3.2 Chapters 20 through 23 do not apply to facility fire brigades that might also be known as emergency brigades, emergency response teams, fire teams, plant emergency organizations, or mine emergency response teams.

20.2 Preparedness.

20.2.1 General.

20.2.1.1 Standard Operating Procedures/Guidelines.

20.2.1.1.1* The fire department shall develop standard operating procedures/guidelines (SOP/Gs) that outline a systematic approach for the rehabilitation of members operating at incidents and training exercises.

20.2.1.1.2* These SOP/Gs shall, at a minimum, address the following:

- (1) Relief from climatic conditions
- (2) Processes for contamination reduction prior to rehabilitation
- (3) Active and/or passive cooling or warming as needed for incident type and climate conditions
- (4) Rehydration (fluid replacement)
- (5) Calorie and electrolyte replacement
- (6) Medical assessment
- (7) Emergency medical services (EMS) treatment in accordance with local protocol
- (8) Member accountability
- (9) Member release disposition from rehabilitation (reassignment, EMS evaluation, or post-incident recovery)

20.2.1.1.3* Crews shall be rotated as necessary to allow for rehabilitation.

20.2.1.2 Protocols and procedures guiding fire department and other emergency services personnel who care for ill or injured members during emergency operations shall be developed by the EMS medical director in collaboration with the fire department physician and fire chief.

20.2.1.3 Procedures shall be in place to ensure that contamination control, rehabilitation, and recovery efforts commence whenever emergency operations or training activities pose the

risk of members becoming exposed to contaminants and/or exceeding a safe level of physical or mental endurance.

20.2.1.4* The fire department shall develop SOP/Gs that outline a systematic approach to contamination control and post-incident recovery in order to return a member to where they can safely perform additional emergency tasks, be reassigned, or be released from duty.

20.2.1.4.1 These SOP/Gs shall include, but are not limited to, the following:

- (1) On-scene contamination reduction
- (2) Criteria for release to post-incident recovery
- (3) Post-incident requirements to return to service
- (4) Mental and physical rest periods
- (5) Post-incident hydration and nutrition
- (6) Sleep deprivation recognition and prevention
- (7) Recognition and response to potentially traumatic events

20.3 Recognition of Heat/Cold Stress.

20.3.1 All members shall be provided with information on how the body regulates core temperature, how to recognize the signs and symptoms, and how to utilize controls for heat and cold stress. (*See Annex J.*)

20.3.2 Education shall be provided on wind chill and heat index considerations.

20.3.3 Education shall be provided on the impact of improper hydration, nutrition, and rest as related to heat and cold stress.

20.4 Member Prehabilitation.

20.4.1* Members shall maintain proper hydration, nutrition, and rest to maintain normal body function.

20.4.2* Members shall maintain a physical fitness regime in accordance with this standard as a prehabilitation strategy for the physical demands of incident response.

20.4.3* Members assigned to incident response duties shall not engage in strenuous physical fitness activities to the extent that compromises their ability to safely perform the essential job tasks.

20.4.4 Members engaged in nonincident strenuous physical activities shall be allowed recovery time prior to returning to in-service status for incident response.

20.4.5 When a physically demanding event is scheduled (training/drill), members shall engage in pre-event warm-up activities to help prevent injuries.

20.4.6* Members engaged in physical activities and/or heat exposure shall be alert to the risks, signs, symptoms, and prevention strategies for rhabdomyolysis.

20.4.7* The department shall develop and implement SOP/G's to provide strategies to manage the effects of acute and chronic sleep and circadian rhythm disruption that lead to sleep deprivation, fatigue, and other adverse health effects.

Chapter 21 Rehabilitation: Preliminary Exposure Reduction (NFPA 1584)

21.1 Implementation.

21.1.1* Preliminary exposure reduction activities shall be implemented when members are exposed to contaminants that pose a potential safety or health risk to members.

21.1.1.1 Life safety, rescue, fire control, and patient care shall take priority over preliminary exposure reduction.

21.1.1.2 Preliminary exposure reduction activities shall be completed prior to rehabilitation or demobilization from the incident.

21.2 Hazard Control Zones.

21.2.1 Hazard control zones shall be established in accordance with NFPA 1550 whenever the potential for contamination exists.

21.2.2 The perimeters of the hazard control zones shall be designated and communicated by the incident commander and marked when possible.

21.2.3 The incident commander shall ensure that the protective clothing and equipment requirements of each control zone are commensurate with the hazards in the zone.

21.2.3.1 All officers and members shall ensure the use of personal protective equipment is appropriate for the risks encountered in each zone.

21.2.4 The process of utilizing hazard control zones shall continue until the incident hazards have been mitigated or the incident is over.

21.2.5* A no-entry zone is an area at an incident scene that no person(s) shall be permitted to enter due to imminent hazard(s), dangerous conditions, or the need to protect evidence.

21.2.6* The hot zone is the area presenting the greatest risk of contamination to members.

21.2.6.1 All members shall wear appropriate PPE for the risks that might be encountered while in the hot zone.

21.2.7* The warm zone shall serve as a limited access area where contamination reduction activities are implemented if the threat of cross-contamination persists.

21.2.7.1 Preliminary exposure reduction shall be conducted in the warm zone.

21.2.8* A cold zone shall be established outside the area where contamination is being mitigated.

21.3 Contamination Reduction.

21.3.1* When protective clothing or equipment has become soiled or contaminated, members shall carry out preliminary exposure reduction followed by advanced or specialized cleaning in accordance with NFPA 1851.

21.3.1.1* Dry or wet mitigation techniques shall be conducted prior to the removal of any ensemble or ensemble elements.

21.3.2* Members shall remain on supplied air or other appropriate respiratory protection during preliminary exposure reduction.

21.3.2.1 Members assisting with preliminary exposure reduction shall use appropriate protective clothing, including respiratory protection.

21.3.3 Incidents where known hazardous materials, industrial chemicals, or asbestos are involved shall require a decontamination or disposal process for the hazards encountered.

21.3.4 Preliminary exposure reduction of proximity firefighting ensembles and ensemble elements shall comply with the requirements in NFPA 1851.

21.3.5 Personnel shall doff contaminated protective clothing prior to entering the cold zone.

21.3.6* Following mitigation, contaminated items shall be isolated prior to entering the cold zone or being transported away from the scene.

21.4 On-Scene Personal Hygiene.

21.4.1* Immediately after doffing contaminated protective equipment, and prior to entering the cold zone, personnel shall wipe all exposed skin areas with soap and water or an appropriate skin wipe if soap and water are not available.

Chapter 22 Rehabilitation: Incident Scene and Training (NFPA 1584)

22.1 Criteria for Implementation. Rehabilitation shall be provided in accordance with fire department standard SOP/Gs, NFPA 1550.

22.1.1 Rehabilitation shall commence whenever the physical or mental demands of an incident operation or training exercise poses a potential safety or health risk to members.

22.1.1.1* Rehabilitation at small-scale and routine incidents shall be crew-based, also known as self-rehab.

22.1.1.2* Rehabilitation shall be formalized into a rehabilitation group based on the incident size, scope, duration, or complexity.

22.1.2 Members shall be assigned to rehabilitation as prescribed by departmental SOP/Gs.

22.1.3* Emergency medical services (EMS) practitioners assigned to rehabilitation shall have the authority, as delegated by the incident commander, to use their professional judgment to keep members in rehabilitation or to transport them for further medical evaluation or treatment.

22.1.4* Members shall undergo rehabilitation following the use of a single self-contained breathing apparatus (SCBA) cylinder with intensive work or after 40 minutes of intensive work without SCBA.

22.1.4.1 A supervisor shall be permitted to adjust the requirements in 22.1.4 in order to address incident-related life safety, rescue, and patient care.

22.1.4.2* Crews shall be rotated as necessary to allow for rehabilitation.

22.1.4.3 For incidents, training, and exercises involving training fires, crew rotation shall be in accordance with NFPA 1403.

22.2 Responsibilities of the Incident Commander.

22.2.1 The incident commander (IC) shall ensure that a rehabilitation group is established when indicated.

22.2.2 The IC shall assume the responsibilities of the rehabilitation manager if this position is not delegated.

22.2.3 The IC shall consider the circumstances of each incident and make adequate provisions early in the incident for the rest and rehabilitation of all members operating at the scene.

22.3 Responsibilities of the Supervisor.

22.3.1 Supervisors shall maintain an awareness of the physical and mental conditions of each member operating within their span of control and ensure adequate steps are taken to provide for each member's safety and health.

22.3.2* Supervisors shall ensure that members remain hydrated and that potable fluids are available.

22.3.3 Supervisors shall continuously assess their crew members to determine their need for rehabilitation.

22.3.4 Supervisors shall assess incident demobilization and post-incident recovery processes and ensure their members are ready to return to service.

22.4 Responsibilities of the Rehabilitation Manager.

22.4.1 When formal rehabilitation is established, the rehabilitation manager shall be responsible for all rehabilitation activities.

22.4.2 The rehabilitation manager shall designate responder rehabilitation location(s) and have the location(s) communicated to incident personnel.

22.4.2.1 Prior to entry into the rehabilitation area, the rehabilitation manager shall ensure that contamination reduction as identified in Chapter 21 has occurred.

22.4.3* The IC or rehabilitation manager shall identify those resources that might be needed at the rehabilitation location.

22.4.4 The rehabilitation manager shall request necessary medical personnel to evaluate symptomatic members being rehabilitated.

22.4.4.1 EMS personnel shall be alerted for members with any of the following:

- (1)* Chest pain, dizziness, shortness of breath, weakness, nausea, or headache
- (2) General complaints, such as cramps, aches, and pains
- (3) Symptoms of heat- or cold-related stress (*see Annex J*)
- (4) Changes in gait, balance, coordination, speech, or behavior
- (5) Alertness and orientation to person, place, and time of members

22.4.4.2 The list of symptoms in 22.4.4.1 shall not replace good judgment, experience, and training.

22.4.5 The rehabilitation manager shall release personnel for reassignment or for demobilization following rest and recovery in the rehabilitation area.

22.4.6 The rehabilitation manager shall release those individuals needing additional medical care to EMS.

22.4.7 The rehabilitation manager shall maintain the accountability of all personnel in the rehabilitation location.

22.4.8 The rehabilitation manager shall maintain appropriate records and documentation.

22.5 Responsibilities of the Member.

22.5.1 Members shall participate in rehabilitation activities when assigned.

22.5.2* Members shall maintain their hydration.

22.5.3 Members shall advise their supervisor when they believe their level of fatigue or exposure to heat or cold is approaching a level that could negatively affect them, their crew, or the operation in which they are involved.

22.5.4 Members shall remain alert to signs of physical and emotional distress of other members and advise a supervisor.

22.6 Formal Rehabilitation Location Characteristics.

22.6.1* Formal rehabilitation shall be located in the cold (clean) zone.

22.6.2* The location shall provide protection from the prevailing environmental conditions.

22.6.2.1 For hot environments, the location shall include shade and/or air-conditioning and a place to sit.

22.6.2.2 For cold or wet environments, the location shall provide dry, protected areas out of the wind, heated areas, and a place to sit.

22.6.3 The location shall be free of exhaust fumes from apparatus, vehicles, or equipment.

22.6.4 The location shall be large enough to accommodate multiple crews and rehabilitation personnel, based on the size of the incident.

22.6.5 The location shall allow access for EMS to transport members to a medical treatment facility when necessary.

22.6.6 When the size of the operation or geographic barriers limit members' access to the rehabilitation area, the incident commander shall establish more than one rehabilitation area.

22.6.7* Each rehabilitation area shall be given a geographic name consistent with its location at the incident site.

22.7 Rehabilitation Efforts. Rehabilitation efforts shall include providing the following:

- (1) Relief from climatic conditions
- (2) Rest and recovery
- (3) Active and/or passive cooling or warming as needed for incident type and climate conditions
- (4) Rehydration (fluid replacement)
- (5) Calorie and electrolyte replacement, as appropriate, for longer duration incidents (*see 22.8.4*)
- (6) Medical treatment when indicated
- (7) Member accountability
- (8) Member release disposition from rehab (reassignment, EMS evaluation, or post-incident recovery)

22.7.1 Rest and Recovery Criteria.

22.7.1.1* Members shall rest for a minimum of 20 minutes following the use of a single SCBA cylinder with intensive work or after 40 minutes of intensive work without SCBA.

22.7.1.2 An incident commander or designee shall be permitted to adjust the requirements in 22.7.1.1 to address incident priorities.

22.7.1.3 The member shall not return to operations in the following situations:

- (1) If the member does not feel adequately recovered
- (2) If EMS or supervisory staff present see evidence of medical, psychological, or emotional distress
- (3) If the member appears otherwise unable to safely perform his or her duties

22.8 Cooling and Warming.

22.8.1* Members who feel warm or hot shall remove protective clothing, drink fluids, and apply active and/or passive cooling as needed for the incident type and climate conditions.

22.8.2 Members with cold-related stress shall be moved to a warm environment, remove any wet or damp clothing, and add additional warming layers, blankets, or use other methods to regain normal body temperature.

22.8.3* Members entering rehabilitation shall consume fluids, regardless of thirst, during rehabilitation and be encouraged to continue hydrating after the incident.

22.8.3.1* Members shall avoid overhydration, which can lead to hyponatremia.

22.8.4* Departments shall ensure that appropriate calorie and electrolyte replacements are available.

22.9* Emergency Medical Care.

22.9.1 During incident scene operations and training, the highest level pre-hospital care, transport-capable, AED-equipped EMS shall be available on-site as part of the incident scene rehabilitation for the evaluation and treatment of symptomatic members.

22.9.1.1 For live fire training in acquired structures, emergency medical services with transport capabilities shall be available in accordance with NFPA 1403.

22.9.1.2 For all other training activities, the instructor-in-charge shall evaluate the need for on-site transport capabilities based on a risk assessment of the training activity.

22.9.2 EMS personnel shall evaluate members with symptoms suggestive of a health and/or safety concern.

22.9.3 Members with abnormal signs or symptoms shall be removed from active duty until cleared by the appropriate medical personnel.

22.9.3.1 Symptomatic members shall be treated and transported in accordance with local EMS protocol.

22.9.3.2* Symptomatic members exposed to fire smoke shall be assessed for carbon monoxide poisoning.

22.9.4 EMS personnel shall be alert for the following:

- (1)* Personnel complaining of chest pain, dizziness, shortness of breath, weakness, nausea, or headache
- (2) General complaints, such as cramps, aches, and pains
- (3) Symptoms of heat- or cold-related stress (*see Annex J*)
- (4) Changes in gait, speech, or behavior
- (5)* Alertness and orientation to person, place, and time of members

- (6) Psychological or emotional distress resulting from exposure to potentially traumatic events

22.10 Rehabilitation Disposition.

22.10.1 The rehabilitation manager or their designee shall determine the status of a member or company as follows:

- (1) Cleared for further incident assignment or demobilization
- (2) Maintained in rehabilitation for further rest and recovery
- (3) Transported for more definitive medical evaluation/treatment

22.10.2 The rehabilitation manager shall be notified when crews or members are entering or released from rehabilitation.

22.11 Documentation.

22.11.1* A rehabilitation documentation report shall be created and include the following information:

- (1) Company or unit identification
- (2) Member name
- (3) Time-in/time-out for members/crews entering or leaving the rehabilitation area
- (4) If the member is referred for medical evaluation
- (5) Disposition following rehabilitation

22.11.2 When emergency medical care is provided, the incident commander and the health and safety officer shall be notified.

Chapter 23 Rehabilitation: Post-Incident Recovery (NFPA 1584)

23.1 Demobilization. Personnel and crews released from the incident shall follow a demobilization process that includes the following:

- (1) Communication of post-incident status
- (2) Time for post-incident personal hygiene
- (3) A plan for station, apparatus, protective clothing, and equipment decontamination
- (4) Identification of potentially traumatic events
- (5) Completion of exposure reporting

23.2 Post-Incident Status.

23.2.1 Crews released from an incident scene for post-incident recovery shall be deemed one of the following:

- (1) In service
- (2)* Limited availability
- (3) Out of service

23.2.2* Post-incident recovery shall include, as needed, the following:

- (1) Personal hygiene
- (2) Rest
- (3) Hydration
- (4) Nourishment
- (5) Obtaining clean personal protective clothing
- (6) Changing into clean clothing
- (7) Addressing behavioral health needs, as appropriate
- (8) Returning the apparatus to service

23.2.3 Company officers shall determine when post-incident recovery has been completed prior to returning the company to service.

23.3* Post-Incident Personal Hygiene.

23.3.1 Members exposed to fireground contamination shall take a warm (not hot) shower using a mild soap as soon as possible upon return to quarters.

23.3.2 Members shall dress in clean clothing after a shower.

23.3.3 Soiled or contaminated clothing shall be handled with nitrile examination gloves before laundering.

23.3.3.1* Cleaning of clothing worn during incidents where members were exposed to contaminants shall be laundered separately from nonexposed clothing.

23.4 Station, Apparatus, Protective Clothing, and Equipment Decontamination.

23.4.1 Personal protective equipment exposed to fireground contamination shall be cleaned and inspected before being returned to service in accordance with NFPA standards and manufacturer recommendations.

23.4.2* Soiled or contaminated equipment shall not be cleaned, disinfected, and stored in green zones.

23.4.3* Cleaning and decontamination of apparatus and equipment shall be done wearing nitrile examination gloves.

23.5 Potentially Traumatic Events.

23.5.1 Supervisors and members shall monitor members for signs of post-incident stress.

23.5.1.1 Following occupational exposure to potentially traumatic events or signs of post-incident stress, assistance or intervention shall be offered in accordance with department policies and Chapter 15 of NFPA 1550.

23.5.2 If a crew member(s) is seriously injured or killed during the incident, all members of the crew and those directly involved in the rescue and recovery shall be relieved from operational responsibilities as soon as possible.

23.5.2.1* Personnel shall be relieved of response-related activities until appropriate behavioral health interventions and clearance are achieved.

23.5.2.2 Behavioral health services shall be made available to all members of the department.

23.6 Exposure Reporting. Following a possible exposure to toxic substances or harmful biological, chemical, or physical agents, the appropriate exposure report(s) shall be completed.

23.6.1 Members that experience symptoms associated with occupational exposure to toxic substances or harmful biological, chemical, or physical agents shall request medical evaluation and report the exposure to their supervisor for appropriate exposure report documentation.

23.6.2* An incident exposure report shall be utilized to document the possible exposure to toxic substances or harmful biological, chemical, or physical agents during an incident or response.

23.6.2.1 The incident exposure report shall be completed as part of an electronic incident reporting system where responding members are linked with the incident response record.

23.6.3 A personal exposure report shall be utilized by the member to document an exposure or an injury related to expo-

sure to toxic substances or harmful biological, chemical, or physical agents.

23.6.3.1* A personal exposure report shall be completed by the member following an exposure to toxic substances or harmful biological, chemical, or physical agents during a training exercise or an incident or response.

23.6.3.2 Following a training event or other non-incident-related exposure where toxic substances or harmful biological, chemical, or physical agents are present, a personal exposure report shall be completed by the member.

23.7 Exposure Report Retention and Access.

23.7.1* Exposure reports shall be retained by the fire department for 30 years.

23.7.2 The fire department shall provide current and former members, and their estates, access to their exposure records.

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.1.3 Beginning with the publication of NFPA 1580, new editions of NFPA 1581, NFPA 1582, NFPA 1583, and NFPA 1584 will not be published as separate, standalone standards. Where an authority having jurisdiction wants to reference the latest edition of one or more of the previous standards, the referencing language should refer to NFPA 1580 or the specific chapters of NFPA 1580, as identified in Section 1.3. The numbers found in parentheses at the end of each chapter title refer to the former standalone documents and are intended to help users navigate between this standard and the former standalone documents.

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 or 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 standards in a broad manner because 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.3.3.4 Basic Life Support (BLS). Basic life support could also include expediting the safe and timely transport of the patient to a hospital emergency department for definitive medical care. Basic life support generally does not include the use of drugs or invasive skills.

A.3.3.5 Biological Sex. Biological sex refers to the physiological characteristics that categorize individuals as male or female. These characteristics include reproductive anatomy (such as genitalia, gonads, and internal reproductive structures), chromosomal makeup (XX for females and XY for males in most cases), and hormonal profiles (such as levels of testosterone and estrogen). Biological sex is typically assigned at birth based on observable physical traits, but it's important to note that variations and complexities exist, including intersex individuals who may have characteristics of both sexes or do not fit strictly into traditional male or female categories based on biological criteria alone.

A.3.3.17 Core Body Temperature. There is no single core temperature, as temperature varies from one site to another, but valid measures of core body temperature approximate the temperature of the central blood. Clinically measured sites to approximate core body temperature include the rectum, gastrointestinal tract, and bladder. Accurate measurement of core body temperature is not possible on the fireground. Commonly used sites for determining body temperature include the oral cavity and tympanic membrane. However, the temperatures taken from these sites may differ considerably from actual core temperature. See Sawka and Pandolf, "Physical Exercise in Hot Climates: Physiology, Performance, and Biomedical Issues."

A.3.3.21 Disinfection. Disinfection is not the same as sterilization.

A.3.3.27 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.3.3.36 Fire Department. The term *fire department* can include any public, governmental, private, industrial, or military organization engaging in this type of activity. [1010, 2024]

A.3.3.37 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.3.3.40 Fire Suppression. Fire suppression includes all activities performed at the scene of a fire incident or training exercise that expose fire department members to the dangers of heat, flame, smoke, and other products of combustion, explosion, or structural collapse. [1550, 2024]

A.3.3.46 Hazard. Hazards include the characteristics of facilities, equipment, systems, property, hardware, or other objects and the actions and inactions of people that create such hazards.

A.3.3.49 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.3.3.52 Health-Related Fitness Program (HRFP). The health-related fitness program includes fitness assessment, exercise training, and health promotion activities.

A.3.3.55 Hydration. Dehydration is the loss of body fluid, or a negative fluid balance. The magnitude of dehydration can vary tremendously following strenuous activity in the heat. Dehydration can cause impairment of thermoregulation, decreased physical performance, increased cardiovascular strain, and a disruption of blood chemistry.

A.3.3.59 Incident Management System (IMS). The system is also referred to as an incident command system (ICS).

A.3.3.63 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.3.3.65 Kitchen. Cleaning and washing of food service equipment and utensils also occur in this area.

A.3.3.70 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.3.3.72 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. [1550, 2024]

A.3.3.74 Mental Health Professional. Additional recommended qualities of a qualified mental health professional selected by the department include the following:

- (1) Demonstrated knowledge of essential job tasks defined in Chapter 10
- (2) Prior experience conducting candidate or fitness for duty evaluations of public safety personnel
- (3) Any additional training deemed essential by the fire department related to daily operations, norms, or culture (e.g., ride alongs, peer support training, experiential fire service training, Fire Ops)

For complicated symptom presentations, such as those that include psychosis or are complicated by other comorbidities, including but not limited to multiple psychiatric conditions, co-occurring substance use disorders, acute or chronic medical

problems, or traumatic brain injury, the mental health professional should be a specialist at the doctoral level, such as a clinical psychologist or psychiatrist, or have the ability to consult with or refer to such a specialist when clinically indicated or where required by the fire department physician.

A.3.3.75 Morbidity. Morbidity refers to the number of sick persons or cases of disease in relationship to a specific population.

A.3.3.82 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.3.3.82.2 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 (*Yersinia pestis*)
- (6) Rubella (German measles; rubella virus)
- (7) SARS-CoV

A.3.3.82.3 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 US Department of Health and Human Services (HHS) and the US 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.

A.3.3.82.4 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.3.3.85 Peer Support. Peer supporters are trained to help their peers deal with issues that they themselves might have experienced.

A.3.3.86 Personal Protective Equipment (PPE). Personal protective equipment for cleaning and disinfecting includes splash-resistant eyewear, cleaning gloves, and fluid-resistant clothing.

A.3.3.92 Preliminary Exposure Reduction. This term describes the exposure reduction process that is utilized for regular exposure in day-to-day operations and training. This is not designed for the increased exposure at a hazardous materials incident.

A.3.3.94 Protective Ensemble. The elements of the protective ensemble include, but are not limited to, garments, helmets, hoods, gloves, and footwear.

A.3.3.99 Rehabilitation. Rehabilitation efforts should include providing relief from extreme climate and/or incident conditions, rest and recovery, rehydration, replacement of calories and electrolytes (as needed for scheduled activities of moderate to high intensity and lasting 1 hour or longer), active and/or passive cooling as needed for incident type and climatic conditions, and member accountability and medical treatment, if indicated.

A.3.3.108 Standard Operating Procedure. The intent of standard operating procedures is to establish directives that must be followed. Standard operating guidelines allow flexibility in application. [1550, 2024]

A.3.3.109 Sterilization. This procedure typically is not performed at fire department facilities or by members.

A.3.3.112 Symptom-Limiting Exercise Stress Test with Imaging. Specifically, in the absence of the conditions listed in 3.3.112, the test should not be discontinued upon reaching 85 percent predicted maximum heart rate, as is frequently done when the evaluation is for ischemic heart disease.

A.3.3.113 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.4.1.4.1 “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.4.2.3(6) See NFPA 1550 and NFPA 1900 for additional design and cleaning requirements.

A.4.3 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.4.3.1 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.4.4.1 For infectious disease training guidelines, the following should be consulted:

- (1) *Infection Control for Emergency Response Personnel: The Supervisor's Role (Student Manual)*, US 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*, US 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.4.4.3 Table A.4.4.3 summarizes information on the specific diseases/infections that are of greatest concern.

A.4.5.3 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.4.6.2.1 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.4.6.2.1(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.

Table A.4.4.3 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: <i>Campylobacter</i> , <i>Salmonella</i> , <i>Shigella</i> , <i>E. Coli</i>	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

(continues)

Table A.4.4.3 *Continued*

Disease/Infection	Mode of Transmission	Is Vaccine Available?	Signs and Symptoms
Meningitis	Many different causes	No	Fever, severe headache, stiff neck, sore throat
Methicillin-resistant <i>Staphylococcus aureus</i> (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 Multidrug-Resistant Organisms in Healthcare Settings*.

A.4.6.2.1(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. 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.4.6.2.5 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.4.7.4 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.4.7.5 Recordkeeping should be in accordance with the requirements of 29 CFR 1910.1030, "Bloodborne Pathogens." Figure A.4.7.5 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.

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.5.1.1.1 Eliminating the number of times members touch fixtures reduces the chances of contamination. Members or the public should not have to use door hardware, grasp sink faucets, or operate flush valves when touchless options exist. If touchless hardware or fixtures are not available, knee- or foot-operated controls should be used. Touchless fixtures come with their own issues, which should be considered when making fixture selections. User comfort is important because if touchless systems are not comfortable for the user, the user will find a way to bypass the touchless system.

A.5.1.2.2 Soap and water are best for removing fireground or nonbiological contaminants. It is important to wash for at least 20 seconds with soap. Contamination is different from germs. Over-the-counter antibacterial soaps, while popular, are no more effective at killing germs than regular soap. However, any soap, including antibacterial soap, is key to removing contaminants. While hand-sanitizing products are useful for infection control, they can be counterproductive in addressing fireground contamination. Hand sanitizers, including those that are alcohol based or contain aloe that do not require water, are acceptable for disinfecting but are not effective at removing contaminants. Such products can increase the penetration of contaminants. The Centers for Disease Control has up-to-date instruction for hand washing and hand sanitizing. For example, a study conducted by A. J. Pickering, J. Davis, and A. B. Boehm (2011) describes the efficacy of alcohol-based hand sanitizer on hands soiled with dirt and cooking oil. The conclusion of the study is that alcohol-based hand sanitizer is not recommended when hands are visibly soiled. Hand sanitizer should never be in the shower and should never be used before showering. Hand sanitizer is designed to be a leave-on product, and while it kills some germs, it does not remove dirt or fireground contamination. When considering contamination control efforts, firefighters should focus on using soap and water to remove contamination from the skin. Alcohol-based hand sanitizer can be used to address germs when soap and water are not available but should never be used to address contamination, dirt, or sweat.

A.5.2.3 Every department has to determine its own needs and capacity, but for emergency responder health and wellness, double-basin sinks or two sinks are required. Many departments use their facilities for fundraising activities, and this often includes meal preparation, serving, and clean up. For facility kitchens used to serve the general public — whether for paid or unpaid food service functions — the FDA Food Code requires 3-compartment sinks. The third basin is meant for

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.4.7.5 Sample Exposure Report Form.

sanitation, so the department's hot water system must accommodate code requirements relating to water temperature.

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.5.5.1 The intent of this storage requirement is to ensure that emergency medical supplies are located in an area sepa-

rate from other functional areas to minimize contamination. Temperature-sensitive materials should be stored in accordance with manufacturer's recommendations.

A.5.5.4.4 For isolation of PPE, airtight protective containers or bags should be used to minimize cross contamination. Examples include disposable, heavy-duty polyethylene bags or sealable plastic cases that are cleanable. If a plastic bag is used, it is recommended that the bag be clear to ensure that the contents of the bag can be readily identified. Plastic bags at least 2 mils in thickness are recommended to resist punctures. To reduce further exposure of personnel and reduce cross contamination, PPE should not be transported from the incident scene in the passenger areas of emergency vehicles or personal vehicles.

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.6.2.3 The requirements of 6.2.3 are consistent with NFPA 1900 and the requirements of 3.13.4 of GSA Federal Specification KKK-A-1822F.

A.6.2.4 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.6.2.4 provides recommendations from the CDC for the number of air changes per hour (ACH) for TB airborne infection isolation.

A.6.2.5 The requirements of 6.2.5 are consistent with the requirements of NFPA 1900 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.3.3.82*), 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.

A.7.2.7 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.

Table A.6.2.4 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.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 US 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) *Guidelines 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

A.9.1.1.1 Some of the medical requirements in Chapters 9 through 13 are not applicable to candidates and members whose duties within the fire department are not described in NFPA 1010, NFPA 1006, NFPA 1021, and NFPA 1140. However, particular attention must be paid to the essential job tasks of individual candidates or members when applying Chapters 9 through 13 (for example, administrative staff personnel, some EMS personnel, fire/police, and others who do not have responsibility for structural firefighting and are not required to wear personal protective ensembles and use SCBA). Medical requirements should reflect essential job tasks, and all might not be specifically addressed in Chapters 9 through 13. (*See also Chapter 10.*)

A.9.1.1.3 The requirements in Chapters 9 through 13 do not apply to candidates, members, or organizations who are exclusively providing emergency medical services.

A.9.1.2.1(3) It is the responsibility of the department physician to utilize outside resources as needed, including specialty providers (e.g., behavioral health clinicians, medical specialists, and so forth).

A.9.1.2.2 A direct relationship exists between the medical requirements and the job description of members. The job description should include all essential job functions of members, both emergency and nonemergency. Members perform a variety of emergency operations including firefighting, emergency medical care, hazardous materials mitigation, driving/operating fire apparatus, and special operations. Non-emergency duties can include, but are not limited to, training, station and vehicle maintenance, and physical fitness. Each fire department needs to identify and develop a written job description for members.

A.9.1.3.2 The specific determination of the AHJ depends on the mechanism under which Chapters 9 through 13 are adopted and enforced. Where Chapters 9 through 13 are adopted voluntarily by a particular fire department for its own use, the AHJ should be the fire chief or the political entity that is responsible for the operation of the fire department. Where Chapters 9 through 13 are legally adopted and enforced by a body having regulatory authority over a fire department, such as federal, state, or local government or political subdivision, this body is responsible for making those determinations as the AHJ. The compliance program should take into account the services the fire department is required to provide, the financial resources available to the fire department, the availability of personnel, the availability of trainers, and such other factors as will affect the fire department's ability to achieve compliance.

A.9.1.3.3 The most vital resource of any fire department is its members. Chapters 9 through 13 are to be implemented in a process aimed at improving member health and wellness. Due to the hazardous nature of the occupation, methods to reduce the risk of occupational injury, illness, and exposures to communicable diseases are warranted. Annual reports repeatedly indicate over 100 line-of-duty deaths and 100,000 occupational injuries and illnesses among career and volunteer firefighters. Another concern is the firefighters who experience disabling injuries or develop occupational diseases and condi-

tions, which often have debilitating or fatal results, forcing them to leave their fire service activities. There is an increased risk of respiratory and heart disease in firefighters and strong evidence of a link to some cancers and other conditions related to occupational exposures to carcinogens, toxic products of combustion, and hazardous materials.

Safety and health are two of the many components of the risk management process. The intent of Chapters 9 through 13 is to reduce the risk and burden of fire service occupational morbidity and mortality while improving the welfare of firefighters. By implementing the medical requirements of Chapters 9 through 13, a fire department commits to a process that evaluates and enhances the health and fitness for duty of members.

A.9.2.2.1 Fire departments can require candidates to provide some form of medical clearance for candidate participation in pre-employment physical strength and agility tests. When there is such a requirement, the medical clearance forms should enumerate the tasks that the candidate will be asked to safely perform during the test.

A.9.2.4 The physician plays a central role in all medical aspects of the Wellness Fitness Initiative (WFI). The following parameters should be considered in selecting a physician for this program:

- (1) The provider has experience in occupational medicine, including wellness and fitness health components related to firefighting.
- (2) The provider is board-eligible or board-certified in a relevant specialty, such as emergency, family, internal, or occupational medicine.
- (3) The provider has experience in coordinating referrals to a variety of medical specialties for care of occupational injuries, cancer, cardiac and pulmonary issues, behavioral issues, and other health problems affecting firefighters.
- (4) The provider should also be familiar with data collection, risk management, and environmental conditions relevant to Labor/Management Wellness Fitness Initiatives.

This standard contains a number of options that fire departments can implement to increase physician knowledge regarding firefighter occupational hazards and their management. These include, but are not limited to, the following:

- (1) Providing the physician with an overview of all firefighter essential job tasks and current job descriptions, as well as an outline of the types and levels of service provided by the department
- (2) Allow opportunities (e.g., participation in a ride along, presence at fire scenes) for the physician to better understand the physiological and psychological demands of firefighters, their work conditions and environments, and their PPE requirements, though this might be difficult if the position is contracted out to a health care company
- (3) Ensuring that the physician has a thorough working knowledge of this standard and is actively engaged in the health and safety, behavioral health, rehabilitation, and wellness and fitness programs in their fire department
- (4) Ensuring that the physician remains current in the medical literature pertaining to the fire service and consensus clinical practice with relevant Continuing Medical Education (CME) credits

A.9.2.5 This physician should also have experience with running an occupational medicine program for public safety workers, preferably firefighters.

A.9.2.6 The fire department should provide the fire department physician with a representative list of essential job tasks for members of fire departments who wear personal protective ensembles and SCBA to conduct firefighting operations. The tasks on this list should be verified by the fire department to be essential to the job under consideration for each individual candidate or member. A sample list based on NFPA 1010, NFPA 1006, NFPA 1021, and NFPA 1140 is provided in 10.1.1 and Section 13.3. An effective way to transmit this information to the physician is to use the list with checkboxes in front of each essential job task. This list is taken by a candidate or member to the medical provider at the time of medical evaluation. A check in the box indicates that there is no medical reason an individual cannot safely perform that particular essential job task.

A.9.2.13.1 Suggested fields (data points) include but are not necessarily limited to the following:

- (1) Medical history including the following:
 - (a) Date of exam
 - (b) Medical history
 - (c) Smoking history
 - (d) Tobacco (smokeless) use
 - (e) Smoking in the past year
 - (f) Tobacco cessation program participation
 - (g) Alcohol use
 - (h) Family history of heart disease or cancer
 - (i) Personal history of past disease, disorders, or cancer
 - (j) Exercise history
- (2) Current medical and fitness results including the following:
 - (a) Blood pressure and heart rate
 - (b) ICD10 codes for physician assessment
 - (c) Height and weight
 - (d) Body composition (local recording only)
 - (e) Blood analysis results
 - (f) Urinalysis results
 - (g) Vision
 - (h) Hearing
 - (i) Spirometry
 - (j) Chest x-ray
 - (k) Resting electrocardiogram
 - (l) Cancer screening results
 - (m) Immunizations
 - (n) Aerobic capacity results
 - (o) Muscle strength results
 - (p) Muscle endurance results
 - (q) Flexibility results

A.9.3.6 Incident scene rehabilitation is an important component of incident scene management that protects the health and safety of fire department members. NFPA 1550 requires the establishment of “rehab” during incident scene operations. A significant component of member rehabilitation is ongoing medical evaluation. The standard does not require the fire department physician to be at every incident but does require that the physician coordinate with the EMS medical director to provide protocols for medical evaluation and management of members in emergency incident rehab. This medical planning process ensures optimal medical support for members at the

scene and should include criteria for transportation to a medical facility for additional evaluation and treatment. Fire departments can develop specific standard operating procedures establishing conditions under which fire department physician(s) are dispatched to emergency incidents. (*See Chapters 20 through 23.*)

A.9.5.1 Confidentiality of all medical data is critical to the success of the program. Members need to feel assured that the information provided to the physician will not be inappropriately shared.

A.10.1.1(1) A member, while wearing full protective clothing (i.e., turnout coat and pants, helmet, boots, and gloves) and SCBA, is required to safely perform a variety of firefighting tasks that require upper body strength and aerobic capacity. For those not familiar with fire suppression, the following specific details inherent to the activities in essential job task 1 are offered:

- (1) Lifting and carrying tools and equipment (e.g., axe, Halligan tool, pike pole, chain saw, circular saw, rabbit tool, high-rise pack, and hose) that weigh between 7 lb and 20 lb (3.2 kg and 9 kg) and are used in a chopping motion over the head, extended in front of the body, or in a push/pull motion.
- (2) Advancing a 1¼ in. (45 mm) or a 2½ in. (65 mm) diameter hose line, which requires lifting, carrying, and pulling the hose at grade, below or above grade, or up ladders. In addition to the weight of the hose itself, a 50 ft (15 m) section of charged 1¼ in. (45 mm) hose contains approximately 90 lb (41 kg) of water, and a 50 ft (15 m) section of 2½ in. (65 mm) hose holds approximately 130 lb (59 kg) of water.
- (3) Performing forcible entry while utilizing tools and equipment (e.g., axe, Halligan tool, chain saw, circular saw, or rabbit tool) that requires chopping, pulling, or operating these items to open doors, windows, or other barriers to gain access to victims or possible victims or to initiate firefighting operations.
- (4) Performing horizontal or vertical ventilation utilizing tools and equipment (e.g., axe, circular saw, chain saw, pike pole) while operating on a flat or pitched roof or operating off a ground or aerial ladder. This task requires the firefighter to chop or push tools through roofs, walls, or windows.

Other tasks that could be performed can include search and rescue operations and other emergency response actions under stressful conditions, including working in extremely hot and cold environments for prolonged time periods.

A.11.1.3 A department should set protocols regarding length of time absent from duty and/or medical conditions that require the department physician to evaluate a member. Physical therapy, strength training, work hardening, functional capacity evaluations, and alternate duty are all activities that can be helpful.

A.11.2.2(5) Universal agreement exists that wellness, fitness, and risk reduction for cardiovascular disease, pulmonary disease, and cancer can be reduced by tobacco abstinence, regular exercise, and control of weight, hypertension, cholesterol, and blood sugar. The annual medical evaluation should serve as one of many opportunities in the fire department to modify these risk factors. Clearly, risk reduction is easier if there is early intervention and if the department promotes

wellness and fitness. Tobacco cessation programs should be available to the member, and all fire department facilities should be tobacco-free zones. Control of weight, hypertension, cholesterol, and blood sugar are all improved with dietary education and regular exercise.

A.11.5.1 The Genetic Information Nondiscrimination Act (GINA) prohibits discrimination on the basis of genetic information (including family medical history). The Equal Opportunity Employment Commission (EEOC) has stated that collection of genetic information is only permitted in very limited circumstances, including voluntary wellness programs, and even then only with specific informed consent. Voluntary means that participation is not required and that employees will not be penalized for non-participation. For instance, if an employer requires an employee to submit family medical history to a medical provider, even if that provider will not in turn give that information to the employer, the disclosure is not voluntary and is considered a violation of GINA.

Even though it might prove to be useful to medical providers screening for potential medical conditions, firefighters are not required to provide family medical history under this law. When collected, family medical history must only be utilized as part of a voluntary wellness and fitness program. Specifically, it cannot be used in employment decisions. In cases where such history is collected, the employee must sign a statement confirming that the information is being voluntarily disclosed. Additionally, the health care provider must maintain the individual's confidentiality and only report such information in aggregate terms so that it cannot be tracked back to the individual.

A.11.6(12) Studies have found increased risk for both melanoma and non-melanoma skin cancer in firefighters. Comprehensive inspection of the skin, especially in sun-exposed areas, is recommended. Any suspicious lesions should be referred for dermatological assessment.

A.11.7.1 If performing these tests as part of an automated panel that includes additional tests is more cost-effective, it is acceptable to do so.

A.11.7.3 Baseline and annual audiometry is performed on each firefighter. This should be done in accordance with 29 CFR 1910.95, "Occupational Noise Exposure." The basics of this standard include the following:

- (1) The first audiogram done (for members this will probably be done during their preplacement exam) becomes the baseline audiogram.
- (2) If subsequent audiograms are better than the baseline, then the best one becomes the baseline. All audiograms should be done with no exposure to industrial noise for 14 hours.
- (3) Each subsequent audiogram is compared to the baseline audiogram (not to the previous year's) to determine if there is a threshold shift, which is an average loss of 10 dB or more at 2000 Hz, 3000 Hz, and 4000 Hz in either ear. This number should be corrected for presbycusis by age tables [*see Table A.11.7.3(a) and Table A.11.7.3(b)*]. Thus, for each of the three frequencies the baseline reading is subtracted from the current reading, and the presbycusis correction is subtracted from this result. The results from the three frequencies are averaged, and if this number is 10 or greater, then there is a threshold shift.

- (4) If there is a threshold shift, the AHJ must be notified. AHJs are responsible for initiating evaluation of personal protective equipment (PPE) and engineering controls.
- (5) If there is a threshold shift, the member should be advised in writing and referral to an audiologist and/or an otolaryngologist should be made.
- (6) If the threshold shift is determined to be permanent, then this audiogram becomes the “revised baseline.”

A.11.7.4.1 Pulmonary spirometry is an essential part of the annual medical evaluation of firefighters wearing personal protective clothing and SCBA. Spirometric measures include the forced vital capacity (FVC), the forced expiratory volume in the first second of expiration (FEV₁), and the absolute FEV₁/FVC ratio calculated by dividing the FEV₁ by the FVC in liters. Other spirometric measures of small airway flow limitations [e.g., forced expiratory flow (FEF) 25 percent to 75 percent] should not be used for screening evaluations. For spirometric measurements to be properly interpreted, they need to be performed according to American Thoracic Society recommendations. Modern spirometry uses computer-assisted quality control of both calibration and testing procedures. FEV₁ and FVC results are expressed not only as absolute values (liters) but also as percent predicted adjusted for gender, age, height, and ethnicity. Currently, the preferred method uses NHANES III normative equations with the acceptable threshold being 80 percent predicted. When percent predicted FEV₁ or FVC values are minimally below threshold (typically 74 percent to 79 percent of predicted), the LLN for the appropriate population can, at the discretion of the physician, be used instead of the 80 percent predicted threshold value. For example, the LLN may be more appropriate for taller and older individuals. (*See references in K.2.6.*) However, because these norms are population-based, it is possible for individuals to be normal just below these thresholds or to have minimal but potentially significant abnormalities just above these thresholds. In asymptomatic individuals with minimal reductions in spirometry measures (FEV₁, FVC, or the absolute FEV₁/FVC ratio), further evaluation (complete pulmonary function tests, exercise testing, or challenge testing) can be necessary to determine if essential tasks can be performed safely. Such tests are not screening tests and therefore should be performed in a laboratory setting by an experienced specialist.

A.11.7.4.3 When the FVC or FEV₁ is reduced below 70 percent of predicted, substantial dysfunction is present. Moderate chronic obstructive pulmonary disease is considered to be present when the absolute FEV₁/FVC ratio is equal to or less than 0.70 and the FEV₁ is less than 70 percent predicted. Severe chronic obstructive pulmonary disease is considered to be present when the absolute FEV₁/FVC ratio is less than 0.70 and the FEV₁ is less than 30 percent predicted. Moderate to severe restriction is considered when the FVC is less than 60 percent predicted with an absolute FEV₁/FVC ratio greater than 0.90. Again, in certain cases, additional pulmonary function testing can be required, such as pre- and post-spirometry, lung volumes, diffusing capacity, exercise testing, and/or challenge testing. Because these tests are for diagnostic purposes, they should be performed in a laboratory setting by an experienced specialist. [Hankinson 1999]. For most individuals, the definition of an abnormal FEV₁ or FVC is less than 80 percent predicted adjusted for gender, age, height, and ethnicity using NHANES III. However, because these norms are population-

Table A.11.7.3(a) Age Correction Values in Decibels for Males

Years	Audiometric Test Frequency (Hz)				
	1000	2000	3000	4000	6000
≤20	5	3	4	5	8
21	5	3	4	5	8
22	5	3	4	5	8
23	5	3	4	6	9
24	5	3	5	6	9
25	5	3	5	7	10
26	5	4	5	7	10
27	5	4	6	7	11
28	6	4	6	8	11
29	6	4	6	8	11
30	6	4	6	9	12
31	6	4	7	9	13
32	6	5	7	10	14
33	6	5	7	10	14
34	6	5	8	11	15
35	7	5	8	11	15
36	7	5	9	12	16
37	7	6	9	12	17
38	7	6	9	13	17
39	7	6	10	14	18
40	7	6	10	14	19
41	7	6	10	14	20
42	8	7	11	16	20
43	8	7	12	16	21
44	8	7	12	17	22
45	8	7	13	18	23
46	8	8	13	19	24
47	8	8	14	19	24
48	9	8	14	20	25
49	9	9	15	21	26
50	9	9	16	22	27
51	9	9	16	23	28
52	9	10	17	24	29
53	9	10	18	25	30
54	10	10	18	26	31
55	10	11	19	27	32
56	10	11	20	28	34
57	10	11	21	29	35
58	10	12	22	31	36
59	11	12	22	32	37
≥60	11	13	23	33	38

Source: 29 CFR 1910.95.

Table A.11.7.3(b) Age Correction Values in Decibels for Females

Years	Audiometric Test Frequency (Hz)				
	1000	2000	3000	4000	6000
≤20	7	4	3	3	6
21	7	4	4	3	6
22	7	4	4	4	6
23	7	5	4	4	7
24	7	5	4	4	7
25	8	5	4	4	7
26	8	5	5	4	8
27	8	5	5	5	8
28	8	5	5	5	8
29	8	5	5	5	9
30	8	6	5	5	9
31	8	6	6	5	9
32	9	6	6	6	10
33	9	6	6	6	10
34	9	6	6	6	10
35	9	6	7	7	11
36	9	7	7	7	11
37	9	7	7	7	12
38	10	7	7	7	12
39	10	7	8	8	12
40	10	7	8	8	13
41	10	8	8	8	13
42	11	8	9	9	13
43	11	8	9	9	14
44	11	8	9	9	14
45	11	8	10	10	15
46	11	9	10	10	15
47	11	9	10	11	16
48	12	9	11	11	16
49	12	9	11	11	16
50	12	10	11	12	17
51	12	10	12	12	17
52	12	10	12	13	18
53	13	10	13	13	18
54	13	11	13	14	19
55	13	11	14	14	19
56	13	11	14	15	20
57	13	11	15	15	20
58	14	12	15	16	21
59	14	12	16	16	21
≥60	14	12	16	17	22

Source: 29 CFR 1910.95.

based, it is possible for individuals to be normal just below these thresholds or to have minimal but potentially significant abnormalities just above these thresholds. When percent predicted FEV₁ or FVC values are just below threshold (typically 74 percent to 79 percent of predicted), the LLN for the appropriate population can, at the discretion of the physician, be used. For example, the LLN might be more appropriate for taller and older individuals. In asymptomatic individuals with minimal reductions in FEV₁ or FVC values (70 to 79 percent predicted) and a normal FEV₁/FVC ratio (0.71 to 0.90), further evaluation (complete pulmonary function tests, exercise testing, or challenge testing) might be necessary to determine if essential tasks can be performed safely (*see* K.2.6).

A.11.7.7.3.1.1 An exercise stress test (EST) provides valuable diagnostic, prognostic, and exercise tolerance (i.e., aerobic capacity) information. The EST should be conducted according to the American College of Cardiology/American Heart Association (ACC/AHA) protocol. Although the EST is frequently ended when the patient reaches 90 percent of the target heart rate [e.g., 90 percent × (220 – age)], the ACC/AHA recommends a symptom-limiting end point. The test must be completed to at least the adjusted minimum threshold level of aerobic capacity (in METs) corresponding to the 35th percentile of cardiorespiratory fitness for the general population, based on age and biological sex, [*see Table A.12.2.2.4(a) and Table A.12.2.2.4(b)*] to ensure this level of cardiac work will not precipitate a sudden cardiac event. Individuals with a negative (i.e., normal) EST should be retested every 2 to 5 years based on individual clinical assessment and ASCVD risk scores.

Imaging with an EST increases the sensitivity and specificity of the test, but also significantly increases the costs. Stress echocardiography is the preferred imaging test for individuals with an abnormal resting ECG (e.g., left bundle branch block), left ventricular hypertrophy, or long-standing hypertension. Stress myocardial perfusion imaging might be indicated for asymptomatic individuals with diabetes mellitus or a strong family history of congenital heart defect (CHD).

There is increasing evidence that a coronary artery calcium (CAC) score can provide important clinical and prognostic information. A CAC score provides a structural assessment of coronary artery obstruction. When negative, the screening test provides a high level of assurance that no obstructing lesions in the coronary arteries are present (i.e., greater than 90 percent predictive value negative). A positive test prompts referral to a cardiologist for further evaluation and treatment, which typically includes an EST with imaging or cardiac catheterization. There is insufficient evidence to determine the frequency for a repeat CAC, but not less than 5 years would appear reasonable.

Defining the criteria for a positive or negative EST is beyond the scope of this document.

A.11.7.9(1) An annual TB program should include the following:

- (1) Documentation of a two-step purified protein derivative (PPD) tuberculin skin test prior to this PPD, a 0 mm PPD within the past year, or a negative TB blood test for interferon gamma release assay within the past year. [*MMRW, No. RR-15, December 16, 2005, and this standard*]

- (2) If the TB skin test (PPD) is used, the following steps should be implemented:
 - (a) Placement of the PPD and subsequent reading by a trained, designated reader within 48 to 72 hours of placement. Members with a history of positive PPD should instead fill out a questionnaire and might be required to have a chest radiograph.
 - (b) PPD results should be documented in millimeters (mm). A test with no skin reaction should be recorded as 0 mm. PPD measurement should not include erythema and should include only induration in the axis perpendicular to the forearm.
 - (c) A PPD skin test will be considered positive if the following conditions are present:
 - i. Five mm or greater in a member who is immunosuppressed, who has a household contact with active tuberculosis, or who has an abnormal chest radiograph consistent with prior tuberculosis
 - ii. Ten mm or greater in a member with a normal immune system who has an increased probability of recent infection or has other clinical conditions that increase the risk for progression to active TB. This includes all members, because firefighters are considered health care workers if they perform EMS or rescue activities.
 - iii. Five mm increase from previous reading occurring within last 2 years.
- (3) TB blood tests are now readily available. Their cost effectiveness must be judged by considering the fact that false positives from atypical mycobacterium or BCG vaccination do not occur and that this test requires only one visit for blood drawing, thus eliminating a return visit for PPD skin test reading. False positives and false negatives can occur if the blood specimens are not properly obtained, handled, and processed prior to and after arrival in the laboratory.
- (4) If the PPD or the tuberculin skin test is positive (i.e., conversion), the following steps should be taken:
 - (a) Member fills out questionnaire.
 - (b) Member obtains chest x-ray.
 - (c) Member is evaluated for active disease.
 - (d) Member is evaluated for preventative therapy.
- (5) If active disease is suspected, the member should be removed from any duty until he or she has been determined to be noninfectious. This will occur when the diagnosis of tuberculosis is ruled out or, if confirmed, when adequate therapy has been instituted, the cough has resolved, and three consecutive sputum smears for acid-fast bacillus (AFB) on different days are negative.

In the event of an exposure to TB, the following steps should be taken:

- (1) Member without a PPD in the last 6 months should receive a PPD, tuberculin skin test, or TB blood test within 14 days of exposure. Members with a history of positive PPD, tuberculin skin test, or TB blood test, should fill out a TB questionnaire.
- (2) Another PPD, tuberculin skin test, or TB blood test and the questionnaire should be repeated 6 to 12 weeks after the first PPD.
- (3) If the PPD skin test or TB blood test turns positive (i.e., conversion) or the questionnaire is positive, proceed as described in A.11.7.9(1)(5).
 - A.11.7.9(4)** The Tdap vaccine should not be administered for 2 years following a Td dose.
 - A.11.7.9(5)** Women who receive the MMR vaccine should not become pregnant for three months after the vaccination is administered.
 - A.11.7.9.2** For further guidelines and requirements, refer to local and state departments of health and the Centers for Disease Control (CDC); also see the references in K.2.9.
 - A.11.7.10.2** The BBP protocol should include the following elements:
 - (1) Fact sheet that explains in lay language the risks of infection, the various prophylactic and therapeutic options, the testing and follow-up that will be needed, and recommendations for personal behavior (safe sex, blood donation, etc.) following an exposure
 - (2) Classification table to determine the exposure type and recommendation for prophylaxis
 - (3) Current recommendations of the US Department of Health and Human Services, Centers for Disease Control and Prevention, and Public Health Services
 - (4) List of tests to be done on exposed member, including the following:
 - (a) HIV
 - (b) Hepatitis B surface antibody (HBsAb), if not previously known to be positive
 - (c) Hepatitis B surface antigen (HBsAg), if not previously known to be positive HBsAb
 - (d) Hepatitis C antibody (HCAb)
 - (e) If HIV prophylaxis is to be given, the following tests:
 - i. CBC
 - ii. Glucose, renal, and hepatic chemical function
 - iii. Pregnancy test for females
 - (5) List of tests to be done on source patient, including the following:
 - (a) HIV
 - (b) HBsAg
 - (c) HCAb
 - (6) If source is available, interview for HIV, hepatitis B, and hepatitis C risk/status
 - (7) Determination of risk and need for post-exposure prophylaxis (PEP)
 - (8) Member counseling regarding PEP medication(s) and side effects of treatment; a printed fact sheet for the member to review
 - (9) PEP, if appropriate, given as soon as possible after the incident, preferably within 2 hours
 - (10) Follow-up of members on prophylaxis for the duration of their treatment
 - (11) Assessment of tetanus status and administration of dT booster, if appropriate
 - (12) Assessment of hepatitis B status as follows:
 - (a) If previously immunized with a positive post-immunization titer, no further treatment is needed.

- (b) If previously immunized, titer was negative, and source is HBsAg positive or high risk, give hepatitis B immune globulin (HBIG) as soon as possible, preferably within 24 hours, and give a dose of hepatitis B vaccine.
 - (c) If previously immunized and titer is unknown, draw titer and proceed as follows:
 - i. If titer is positive, no further treatment is needed.
 - ii. If titer is negative and source is HBsAg positive or high risk, then give HBIG as soon as possible, preferably within 24 hours, and give a dose of hepatitis B vaccine.
 - iii. If previously immunized with negative titer and revaccinated with a negative titer, give HBIG immediately and a second dose 1 month later.
 - iv. If never immunized, give HBIG and begin hepatitis B vaccine series.
- (13) Follow-up instructions should include the following information:
- (a) Adverse events and side effects of PEP
 - (b) Signs and symptoms of retroviral illness (fever, adenopathy, rash)
 - (c) Appointments for follow-up blood work, including the following:
 - i. HIV at 6 weeks, 3 months, 6 months, and 9 months
 - ii. HBsAb and/or HCAb at 6 weeks, 3 months, and 6 months, if source is hepatitis B and/or hepatitis C positive
 - iii. Every other week CBC, renal, and liver function, if receiving PEP

A.11.7.13.1 Recommended ancillary testing is based on guidance from the US Preventive Services Task Force (USPSTF) and the American Cancer Society (ACS) and modified to reflect risk in firefighters. Unvalidated tests, many of which are being marketed to firefighters, are not recommended.

A.11.7.13.2 Fire department members are exposed to a variety of particulate materials, chemicals, and asbestos, which can increase the risk for colon cancer. Current research suggests that firefighters are at increased risk of colorectal cancer. Health care providers should discuss the possible increased risk of colorectal cancer resulting from occupational exposures along with the risks and benefits of initiating screening at age 40 in firefighters. If the firefighter decides to start screening at age 40, stool-based testing is the method recommended for use as it has the lowest risk for adverse patient events and is the most cost effective.

The USPSTF and ACS websites provide information on the recommended screening tests available for colorectal cancer.

Fecal occult blood testing uses stool specimens applied to guaiac cards by the patient at home that are sent to a laboratory for later analysis. Multiple different stool samples, usually three, from different days can increase the sensitivity of this colorectal cancer screening test. Diet restrictions apply to this test.

Colonoscopy is used to examine the full lining of the colon and rectum. During the colonoscopy, polyp removal or excising a small piece of tissue for biopsy may be performed if indicated.

Colonoscopy should start at an earlier age (e.g., 40 years) or be conducted more frequently if clinically indicated. A colonoscopy should also be performed, regardless of age or schedule, when FOBT results are positive or where there is a consistent change in bowel habits.

A.11.7.14 Screening for prostate cancer in asymptomatic men using the PSA test is controversial. A PSA test might detect cancers that would never become life threatening as well as the minority of those that would become life threatening. It is unclear whether the benefits of PSA screenings outweigh the risks of follow-up cancer tests and cancer treatments. However, recent PSA research indicates additional benefits from PSA testing and active surveillance for low-risk prostate cancer is increasingly used, which reduces treatment risks. Furthermore, studies suggest that firefighters have increased rates of prostate cancer. Therefore, discussion of prostate screening using the PSA is indicated. Several noncancerous conditions might result in an elevated PSA level, including benign prostatic hypertrophy (BPH) and other conditions related to acute or chronic inflammation. When testing reveals an elevated PSA level, it is important that the benefits and risks of prostate diagnostic procedures and treatment be discussed with the member. Active surveillance and other conservative approaches are increasingly being used for low-risk cancers.

A.11.7.22.2 Firefighters with a high index of suspicion for sleep disorders should be referred to a specialist for diagnostic sleep studies. See Table 13.5(14) for guidance regarding obstructive sleep apnea.

A.11.7.23 The following information should be included in an annual program designed to educate firefighters regarding reduction of risk for occupational cancer and cardiovascular disease:

- (1) Evidence of increased occupational risk
- (2) Lifestyle and occupational risk factors for cancer and cardiovascular disease
- (3) Strategies to reduce both occupational and lifestyle risk factors for cancer and cardiovascular disease, including, but not limited to, equipment cleaning, hygiene, and lifestyle modifications
- (4) Evidence-based medical screening for cancer and cardiovascular disease

Research has supported an increased risk for cardiovascular events and for many types of cancer in firefighters. Risk reduction methods for prevention of both cardiovascular disease and cancer are similar and include the following:

- (1) Reduction of occupational exposure to carcinogens and particulates through hygiene methods
- (2) Proper use and maintenance of personal protective equipment
- (3) Elimination of nonoccupational exposure to carcinogens including, but not limited to, tobacco use
- (4) Optimization of health through lifestyle modification including, but not limited to, use of sunscreen and maintenance of optimal physical fitness and body weight

Awareness of the appropriate use of evidence-based screening tests is important for early detection of both cardiovascular disease and cancer.

The fire department physician should ensure the quality, accuracy, currency, and content of educational materials. This information can be disseminated using a variety of teaching

methods including, but not limited to, in-person didactic classroom sessions, discussions, videotaped materials, or web-based modules. This should be supplemented with take-home written and/or web-based resources to ensure effective communication.

Examples of available resources for this information include, but are not limited to, the IAFF cancer awareness and prevention training course, which was developed in conjunction with the Firefighter Cancer Support Network, American Cancer Society, American Heart Association, American Lung Association, and IAFF/IAFC *The Fire Service Joint Labor Management Wellness-Fitness Initiative*.

A.11.7.26.1 Some recommended behavioral health screening citations include the following:

- (1) Addiction Research Foundation, Drug Abuse Screening Test (DAST-10), 1982.
http://www.bu.edu/bniart/files/2012/04/DAST-10_Institute.pdf.
- (2) Brown, CAGE-AID Questionnaire, 1995.
- (3) Columbia Lighthouse Project, Columbia-Suicide Severity Rating Scale Screen with Triage for Primary Care (CSSRS), 2016.
<http://cssrs.columbia.edu/documents/c-srs-screener-triage-primary-care/>.
- (4) Pfizer Inc., Primary Care Evaluation of Mental Disorders Patient Health Questionnaire (PHQ-2 & PHQ-9), 1999.
http://www.cqaimh.org/pdf/tool_phq2.pdf and
http://www.cqaimh.org/pdf/tool_phq9.pdf.
- (5) Prins, A., Bovin, M. J., Kimerling, R., Kaloupek, D. G., Marx, B. P., Pless Kaiser, A., & Schnurr, P. P., Primary Care PTSD Screen for DSM-5 (PC-PTSD-5), 2015.
<https://www.ptsd.va.gov/professional/assessment/documents/pc-ptsd5-screen.pdf>.
- (6) Weathers, F.W., Litz, B.T., Keane, T.M., Palmieri, P.A., Marx, B.P., & Schnurr, P.P., The PTSD Checklist for DSM-5 (PCL-5), 2013.
- (7) World Health Organization, Alcohol Use Disorders Identification Test (AUDIT), 1982.
<https://www.drugabuse.gov/sites/default/files/files/AUDIT.pdf>.

A.11.7.26.5 A qualified behavioral health care provider is a board-certified psychiatrist, a psychiatric nurse practitioner, clinical psychologist, professional counselor, or clinical social worker independently licensed in their state of practice and in good standing with their state licensure board.

A.12.1.1 Besides the methods of determination of body fat mentioned in 12.1.2, other, cruder methods have been used. Insurance companies have used height-weight tables to estimate risk of mortality. These tables of “ideal” weight for a given height simply reflect the norm for the US population without consideration of relationship of the norm to health or fitness. Another means of determining obesity that has more scientific basis is the measurement of body mass index (BMI) or the Quetelet index. This is defined as body weight in kilograms divided by height in meters squared. Studies have shown that the Quetelet index correlates rather well ($r = 0.70$) with actual measurement of body fat from hydrostatic weighing — better than do height-weight tables. BMI also correlates with risks associated with obesity. Some experts feel that the major limitation of the BMI is that it is difficult to interpret to patients and to use in counseling about weight loss. It does have the advantage of being more precise than weight tables and of permitting

comparison of populations. However, skinfold measurements correlate more highly with data from hydrostatic weighing, measuring percent body fat, and are thus more accurate for fat-related classification than the Quetelet index. Researchers from the Panel on Energy, Obesity, and Body Weight Standards have recommended that Table A.12.1.1 be used when using the Quetelet index for obesity classification.

The health risks associated with obesity begin in the range of 25 kg/m² to 30 kg/m². For example, someone with a large fat-free mass (e.g., a bodybuilder) would be classified by the Quetelet index as obese, though not to the same extent as he/she would be with relative weight or the height-weight tables. Another example of exception to this standard would be members of the Phoenix Fire Department, whose average BMI is 28. This would place the members in the mildly obese range, yet on their fitness evaluations they score in the excellent range.

A.12.1.2(1) A number of researchers have found that the ratio of waist-to-hip circumference (WHR) and the following circumference measurements are an accurate and convenient method of determining the type of obesity present:

- (1) Abdomen I (males) over the umbilicus
- (2) Abdomen II (females) just below the umbilicus, at the narrowest portion of the waistline below the ribs and above hips with the abdomen relaxed

The guide for measurement is as follows:

- (1) Hips at the widest part below the waist; landmark is the greater trochanter, feet together
- (2) Neck just below the larynx perpendicular to the long axis of the neck

Equations for body fat prediction from circumferences and height measured in inches are as follows:

Males ($N = 592$; $R = 90$; S.E. meas = 3.52 percent fat) percent fat = + [85.20969 × log (abdomen I circumference – neck circumference)] – [69.73016 × log (height)] + 37.26673

Females = + [161.27327 × log (abdomen II circumference + hip-neck circumference)] – [100.81032 × log (height)] – 69.55016

A.12.1.2(3) The most widely used method for determining obesity is based on the thickness of skinfolds. The measures, when performed correctly, have a high correlation ($r = 0.80+$) with body density from underwater weighing.

Many researchers in the United States (including those performing the large national surveys of the US population that form the basis for normative data worldwide) take skinfold measurements on the right side of the body. U.K. and European investigators, on the other hand, tend to take measurements on the left side of the body. Most research, however, reveals that it matters little on which side measurements are taken.

Table A.12.1.1 Quetelet Index for Obesity

BMI (kg/m ²)	Classifications
20–24.9	Desirable range for men and women
25–29.9	Grade 1 obesity
30–40	Grade 2 obesity
Greater than 40	Grade 3 obesity (morbid obesity)

A suggested way to conduct measurements is as follows:

- (1) As a general rule, those with little experience in skinfold measurement should mark the site to be measured with a black felt pen. A flexible steel tape can be used with sites when it is necessary to locate a bodily midpoint. With experience, however, the sites can be located without marking.
- (2) The measurer should feel the site prior to measurement, to familiarize himself and the person being measured with the area where the skinfold will be taken.
- (3) The skinfold should be firmly grasped by the thumb and index finger of the left hand and pulled away from the body. While this is usually easy with thin people, it is much harder with the obese and can be somewhat uncomfortable for the person being tested. The amount of tissue pinched up must be enough to form a fold with approximately parallel sides. The thicker the fat layer under the skin, the wider the necessary fold (and the more separation needed between thumb and index finger).
- (4) The caliper is held in the right hand, perpendicular to the skinfold and with the skinfold dial facing up and easily readable. The caliper heads should be placed $\frac{1}{4}$ in. to $\frac{1}{2}$ in. away from the fingers holding the skinfold, so that the pressure of the caliper will not be affected.
- (5) The skinfold caliper should not be placed too deep into the skinfold or too far away on the tip of the skinfold. Try to visualize where a true double fold of skin thickness is and place the caliper heads there. It is good practice to position the caliper arms one at a time, first the fixed arm on one side and then the lever arm on the other.
- (6) The dial is read approximately 4 seconds after the pressure from your hand has been released on the lever arm of the caliper jaw.
- (7) A minimum of two measurements should be taken at each site. Measurements should be at least 15 seconds apart to allow the skinfold site to return to normal. If consecutive measurements vary by more than 1 mm, more should be taken until there is consistency.
- (8) Maintain the pressure with the thumb and forefinger throughout each measurement.
- (9) When measuring the obese, it can be impossible to elevate a skinfold with parallel sides, particularly over the abdomen. In this situation, try using both hands to pull the skinfold away while a partner attempts to measure the width. If the skinfold is too wide for the calipers, underwater weighing or another technique will have to be used.
- (10) Measurements should not be taken when the skin is moist because there is a tendency to grasp extra skin, obtaining inaccurately large values. Also measurements should not be taken immediately after exercise or when the person being measured is overheated, because the shift of body fluid to the skin will inflate normal skinfold size.
- (11) It takes practice to be able to grasp the same amount of skinfold consistently at the same location every time. Accuracy can be tested by having several technicians take the same measurements and comparing results. It can take up to 20 to 50 practice sessions to become proficient. Calipers should be accurately calibrated and have constant pressure of 10 g/mm² throughout the full measurement range. The accuracy of skinfold measure-

ments can be reduced by many factors, including measurement at the wrong sites, inconsistencies among different calipers and testers, and the use of inconsistent equations. However, when testers practice together and take care to standardize their testing procedures, inconsistencies among testers can usually be held under 1 percent.

A.12.2.1.3 Cardiorespiratory fitness equal to the 50th percentile of the general population standardized for age and biological sex is an appropriate target level.

A.12.2.2 There is extensive medical literature demonstrating that for firefighters to perform their essential job tasks safely and effectively, they must meet a minimum level of cardiorespiratory fitness. The 35th percentile cardiorespiratory fitness standard for anyone without a compromising medical condition was chosen as a defensible level of fitness that is consistent with the literature, along with input from the many experts on the committee, including physicians, exercise physiologists, and firefighters/officers. Doing so minimizes the possibility of legal challenge based on age or sex discrimination. The FEMA Office of Equal Rights (OER) reviewed this approach and indicated that it had no civil rights concerns with this approach. The FEMA OER also provided updates to Annex D to indicate that the text is compliant with the Americans with Disabilities Act (ADA) and other federal civil rights employment laws.

Federal civil rights laws allow for qualification standards that tend to screen out a protected group if the qualification standards have been shown to be job-related and consistent with business necessity, and, with respect to individuals with disabilities, such performance cannot be accomplished by reasonable accommodation. Qualification standards can include a requirement that an individual with a medical condition shall not pose a direct threat, meaning a significant risk of substantial harm to the health or safety of the individual or others, that cannot be eliminated or reduced by reasonable accommodation. The determination that an individual poses a direct threat must be based on an individualized assessment of the individual's present ability to safely perform the essential functions of the job. This assessment must be based on a reasonable medical judgment that relies on the most current medical knowledge and the best available objective evidence.

In the context of this standard, all candidates and incumbents are individually evaluated to determine their ability to perform the essential job tasks of a firefighter safely and efficiently, without substantially increasing the potential of placing the individual at risk for sudden life-threatening incapacitation. A minimum threshold for cardiorespiratory fitness was identified to be the 35th percentile of age and biological sex norms. However, candidates or incumbents with certain illnesses or injuries require additional tests to complete the medical evaluation, including the need for more stringent medical requirements if their risk is greater than those without such injuries or illnesses.

The committee cited literature demonstrating that when performing their essential job tasks, cardiovascular events are the number one cause of firefighter fatalities, that respiratory disease limits the ability to operate safely while wearing SCBA and increases the likelihood of acute life-threatening cardiopulmonary events, and that diabetes increases the likelihood of life-threatening cardiovascular events. Therefore, it was the consensus of the committee that if individual evaluation confirmed a history of cardiopulmonary disease, it was appro-

appropriate to require a higher level of cardiorespiratory fitness for their safety, as well as the safety of their coworkers and any civilians that may depend upon them. The FEMA OER indicated that it had no civil rights concerns with this approach.

The rationale for including cardiorespiratory fitness in the medical evaluation is that it is a validated measure of health that reflects the functioning of the cardiovascular and respiratory systems under high workloads. It is predictive of cardiovascular disease and is one of the best measures of overall health (Blair et al., 1989; Ross et al., 2016). Cardiorespiratory fitness is also a foundational personal attribute that is essential to being able to perform strenuous work, such as firefighting (Smith, 2011; Ras et al., 2022), and to do so without undue risk of injury (Poplin et al., 2014). Substantial literature exists on the oxygen cost of firefighting and the fitness characteristics of firefighters. An abbreviated list of such research that was reviewed by the working group and discussed with the technical committee can be found at the end of this annex material.

The purpose of measuring cardiorespiratory fitness for the demanding job of firefighting is to determine a person's capacity to perform essential job tasks. The role of the physician is to determine the individual's level of cardiorespiratory fitness. It is not within the responsibility or role of a physician to assess an individual's functional job skills. This responsibility belongs to the fire department. However, cardiorespiratory fitness is a validated health measure, and it is the responsibility of the physician to ensure that the individual possesses adequate cardiorespiratory fitness (an integrated measure of the respiratory and cardiovascular systems to support heavy work) to perform the job's essential tasks safely and effectively.

Cardiorespiratory fitness is a powerful measure of health (Ross et al., 2016) and is foundational for safe and effective firefighting (Dreger and Petersen, 2007; Siddall et al., 2016; Smith, 2011). Research shows cardiorespiratory fitness is correlated with performance time on occupational tasks (Ras et al., 2022), is related to risk of injury (Poplin et al., 2014), and is related to cardiac health (i.e., firefighters with low fitness have increased ECG abnormalities, etc.) (Baur et al., 2012). Clearly, cardiorespiratory fitness is not the only thing that determines performance of job tasks (strength, coordination, and skill are also important), and cardiorespiratory fitness is not the same thing as a work performance evaluation. However, cardiorespiratory fitness is a validated health parameter that predicts occupational performance and cardiovascular disease risk, and it is an attribute of a firefighter that is rightly assessed during a medical evaluation. There is substantial firefighting-specific research to support the development of a cardiorespiratory fitness standard. Much of the confusion appears to be around properly differentiating between a work performance task that measures an individual's "ability to do the job" and a cardiorespiratory fitness test which is a health measure that assesses the functional capacity of the heart and lungs. It is associated with the ability to do the job and do it without risk of injury or incapacitation. Work evaluation or skill testing is the responsibility of the fire department. The assessment of cardiorespiratory fitness is rightly a component of the medical evaluation.

The cardiorespiratory fitness requirements have been revised to demonstrate equal requirements for all individuals (candidates and incumbents) regardless of age or sex. The 35th percentile for fitness is consistent with both the literature and with what subject matter experts in this field believe to be reasonable. The concept of using individual work performance

tests as an alternative to validated cardiorespiratory fitness and aerobic capacity evaluation was not practical, as it would require that each fire department create and validate such a test. NFPA 1580 is a medical standard, not a work performance standard. To the best of the committee's knowledge, most fire departments in the United States do not have validated work performance evaluations. Validated measures of cardiopulmonary fitness are far superior to unvalidated and potentially subjective work performance tests and eliminate the legal vulnerability for a fire department that might attempt to use a non-validated work performance test.

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A.12.2.2.1 For additional information and pre-evaluation procedure, see *The Fire Service Joint Labor Management Wellness-Fitness Initiative*.

A.12.2.2.2 See *ACSM's Guidelines for Exercise Testing and Prescription*.

Bicycle ergometry is appropriate as a measurement of aerobic capacity if it directly measures oxygen uptake (VO₂). An exercise stress test using bicycle ergometry is a maximal symptom-limited study performed on an electromagnetically-braked bicycle ergometer using a customized linear ramp protocol. The protocol consists of pedaling against a customized continuously increasing work rate in a ramp pattern to elicit fatigue within 8 to 12 minutes of exercise initiation. A 12-lead electrocardiogram is continuously monitored, and blood pressure is manually assessed every 2 minutes. All responses are monitored throughout rest, exercise, and recovery and graphically displayed. The study is performed by a trained exercise physiologist or technician under the supervision of a physician.

Refer to *The Fire Service Joint Labor Management Wellness-Fitness Initiative* or other authoritative resources for alternative validated aerobic capacity protocols, including stair mill tests, step tests, and run tests.

A.12.2.2.3 A reasonable aerobic cardiorespiratory fitness threshold for the safe and effective performance of physically demanding firefighting activities is at least the 50th percentile for the general population, based on the selected exercise protocol and the individual's biological sex and age. Standardized threshold levels of aerobic capacity (in METs) correspond to the 50th percentile of cardiorespiratory fitness for the general population, based on age and biological sex, [see Table A.12.2.2.3(a) and Table A.12.2.2.3(b)] and are categorized as "fair" cardiorespiratory fitness levels. See *ACSM's Guidelines for Exercise Testing and Prescription*, 11th edition.

The prescribed cardiorespiratory (aerobic) fitness program would be developed for the individual in consultation with the

individual's personal doctor and/or the AHJ's health and wellness team. The individual would meet at a frequency identified during this consultation for appropriate follow-up and possible adjustment of the cardiorespiratory fitness program.

A.12.2.2.4 The minimum acceptable aerobic cardiorespiratory fitness threshold for the safe and effective performance of physically demanding firefighting activities is at least the 35th percentile for the general population, based on the selected exercise protocol and the individual's biological sex and age. Adjusted minimum threshold levels of aerobic capacity (in METs) correspond to the 35th percentile of cardiorespiratory fitness for the general population, based on age and biological sex, [see Table A.12.2.2.4(a) and Table A.12.2.2.4(b)] and are categorized as "poor" cardiorespiratory fitness levels. See *ACSM's Guidelines for Exercise Testing and Prescription*, 11th edition.

The prescribed cardiorespiratory (aerobic) fitness program would be developed for the individual in consultation with the individual's personal doctor and/or the AHJ's health and wellness team. The individual would meet at a frequency identified during this consultation for appropriate follow-up and possible adjustment of the cardiorespiratory fitness program.

A.12.2.3 Evaluation protocols can be found in *The Fire Service Joint Labor Management Wellness-Fitness Initiative*.

A.13.1.1 Individuals should be evaluated as to their ability to safely and effectively perform the essential job tasks in Chapter 10. The medical history should include the individual's known health problems, such as major illnesses, surgeries, medication use, and allergies. Symptom review is also important for detecting early signs of illness. A medical history should also include a personal health history, a health habit history, an immunization history, and a reproductive history.

Table A.12.2.2.3(a) Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (50th Percentile), Using a Treadmill

Age	METs	
	Male	Female
20–29	13.7	10.7
30–39	12.1	8.6
40–49	10.8	7.6
50–59	9.3	6.7
60–69	8.1	5.7

Table A.12.2.2.3(b) Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (50th Percentile), Using a Cycle Ergometer

Age	METs	
	Male	Female
20–29	12.0	8.9
30–39	8.6	6.2
40–49	7.7	5.5
50–59	7.1	4.9
60–69	6.4	4.6

An occupational history should be obtained to collect information about the person's past and current occupational and environmental exposures.

An individual, while wearing full protective clothing (i.e., turnout coat and pants, helmet, boots, and gloves) and SCBA, is required to safely and effectively perform a variety of essential job tasks that require strength, endurance, aerobic capacity, cognitive skills, and communication skills. For those not familiar with the essential job tasks, see Chapter 10. Following are the specific activities inherent in essential job task 1:

- (1) Lifting and carrying tools and equipment (e.g., axe, Halligan tool, pike pole, chain saw, circular saw, rabbit tool, high-rise pack, and hose) that weigh between 7 lb and 20 lb (3.2 kg and 9 kg) and are used in a chopping motion over the head, extended in front of the body, or in a push/pull motion.
- (2) Advancing a 1¼ in. (45 mm) or a 2½ in. (65 mm) diameter hose line, which requires lifting, carrying, and pulling the hose at grade, below or above grade, or up ladders. In addition to the weight of the hose itself, a 50 ft (15 m) section of charged 1¼ in. (45 mm) hose contains approximately 90 lb (41 kg) of water, and a 50 ft (15 m) section of 2½ in. (65 mm) hose holds approximately 130 lb (59 kg) of water.
- (3) Performing forcible entry while using tools and equipment (e.g., axe, Halligan tool, chain saw, circular saw, or rabbit tool) that requires chopping, pulling, or operating these items to open doors, windows, or other barriers to gain access to victims and possible victims, or to initiate firefighting operations.
- (4) Performing ventilation (horizontal or vertical) using tools and equipment (e.g., axe, circular saw, chain saw, pike

pole) while operating on a flat or pitched roof or operating off a ground or aerial ladder. This task requires the firefighter to chop or push tools through roofs, walls, or windows.

Other essential job tasks that could be performed can include search and rescue operations and other emergency response actions under stressful conditions, including working in extremely hot and cold environments for prolonged time periods.

A.13.1.2 The physical examination should include the following:

- (1) Checking vital signs [e.g., temperature, pulse, respiratory rate, and blood pressure (BP)]
- (2) Head, eyes, ears, nose, and throat exams
- (3) Neck exam
- (4) Cardiovascular exam
- (5) Pulmonary exam
- (6) Breast exam, conducted by the fire department physician or the individual's own physician
- (7) Gastrointestinal exam (includes rectal exam, conducted by the fire department physician or the individual's own physician, for masses or occult blood)
- (8) Genitourinary exam, conducted by the fire department physician or the individual's own physician (includes pap smear, testicular exam, rectal exam for prostate mass)
- (9) Checking for hernias
- (10) Lymphatic exam of palpable lymph nodes
- (11) Neurological exam
- (12) Musculoskeletal exam
- (13) Checking the skin (includes screening for skin cancers)
- (14) Vision testing

The individual is permitted to choose which physician conducts the breast exam in A.13.1.2(6), the rectal exam(s) in A.13.1.2(7) and A.13.1.2(8), and the genitourinary exam in A.13.1.2(8).

Blood pressure should be measured according to the seven recommendations of the *Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure* (JNC 7). Blood pressure should be measured with a properly calibrated and validated instrument. Patients should be seated quietly in a chair for at least 5 minutes, with their feet on the floor and the arm supported at heart level. An appropriately sized cuff (i.e., cuff bladder encircling at least 80 percent of the arm) should be used to ensure accuracy, and at least two measurements should be made. Systolic blood pressure is the point at which the first of two or more sounds is heard (phase 1), and diastolic blood pressure is the point before the disappearance of sounds (phase 5).

Laboratory tests on individuals should include the following:

- (1) Blood tests, including the following:
 - (a) CBC with differential, RBC indices and morphology, and platelet count
 - (b) Electrolytes (Na, K, Cl, HCO₃, or CO₂)
 - (c) Renal function (BUN, creatinine)
 - (d) Glucose
 - (e) Liver function tests (ALT, AST, direct and indirect bilirubin, alkaline phosphatase)

Table A.12.2.2.4(a) Minimum Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (35th Percentile), Using a Treadmill

Age	METs	
	Male	Female
20–29	12.4	9.6
30–39	11.0	7.8
40–49	9.9	6.9
50–59	8.4	6.1
60–69	7.3	5.3

Table A.12.2.2.4(b) Minimum Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (35th Percentile), Using a Cycle Ergometer

Age	METs	
	Male	Female
20–29	10.7	7.6
30–39	7.9	5.6
40–49	7.1	5.1
50–59	6.6	4.6
60–69	6.0	4.3

- (f) Total cholesterol, HDL, LDL, clinically useful lipid ratios (e.g., total cholesterol to HDL cholesterol ratio), and triglycerides
- (2) Urinalysis, with a dipstick test for glucose, ketones, leukocyte esterase, protein, blood, and bilirubin.
- (3) Audiometric exam to assess hearing in each ear at each of the following frequencies: 500 Hz, 1000 Hz, 2000 Hz, 3000 Hz, 4000 Hz, 6000 Hz, and 8000 Hz. Comparison to prior results should be corrected for age as permitted by OSHA. Baseline audiometry is performed in accordance with 29 CFR 1910.95, "Occupational Noise Exposure." The basics of this standard include the following:
 - (a) The first audiogram (this will probably be done during the individual's preplacement exam) is the baseline audiogram.
 - (b) If a subsequent audiogram shows improved auditory acuity over the baseline, then the subsequent audiogram becomes the new baseline. All audiograms should be done with no exposure to industrial noise for the preceding 14 hours.
- (4) Pulmonary function testing (i.e., spirometry) is conducted to measure the individual's forced vital capacity (FVC), forced expiratory volume in 1 second (FEV₁), and the absolute FEV₁/FVC ratio. FEV₁ and FVC results will be expressed as the absolute value (liters or milliliters) and as a percent of predicted based on age, height, sex, and race/ethnicity using NHANES III normative equations, with the acceptable threshold being 80 percent of predicted or greater. FEV₁/FVC ratio results are expressed as the absolute FEV₁ value divided by the absolute FVC value, with 0.70 as the acceptable threshold value. However, because these norms are population-based, it is possible for individuals to be normal just below these thresholds or to have minimal but potentially significant abnormalities just above these thresholds. When percent of predicted FEV₁ or FVC values are minimally below threshold (typically 74 percent to 79 percent of predicted), the lower limits of normal (LLN) for the appropriate population can, at the discretion of the physician, be used instead of the 80 percent of predicted threshold value. For example, the LLN might be more appropriate for taller and older individuals. (See K.2.6.)
- (5) Chest radiography (chest x-ray, posterior-anterior and lateral views).
- (6) A resting 12-lead electrocardiogram (ECG).
- (7) Immunizations and infectious disease screening for the following:
 - (a) Tuberculosis screen, purified protein derivative (PPD) tuberculin skin test, or an equivalent blood test
 - (b) Hepatitis C virus screen (baseline)
 - (c) Hepatitis B virus vaccinations and antibody titers, if appropriate
 - (d) Tetanus, diphtheria, pertussis (TDAP) vaccine (booster every 10 years)
 - (e) Measles, mumps, rubella (MMR) vaccine or antibody titers
 - (f) Polio vaccine offered to uniformed personnel if vaccination, effective antibody titer, or disease is not documented
 - (g) Hepatitis A vaccine due to contaminated water exposures during normal firefighting activities, not just hazmat/rescue activities
 - (h) Varicella vaccine, offered to all nonimmune personnel
 - (i) Influenza vaccine, seasonal and novel, offered to all personnel
 - (j) COVID-19 vaccination

A.13.3.3.1 Evaluation for specialized essential job tasks and PPE would only pertain to an individual's evaluation if, in their jurisdiction, their job requires them to perform these specialized duties, such as hazardous materials units, dive teams, technical rescue teams, EMS teams, or units supporting tactical law enforcement operations.

A.13.3.4 Certain medical conditions can place an individual at higher risk for sudden cardiorespiratory incapacitation and therefore require higher cardiorespiratory fitness to safely and effectively perform the essential job tasks for firefighting.

A.13.3.4.1 Adjusted threshold levels of aerobic capacity (in METs) correspond to the 50th percentile for the general population, based on age and biological sex, [see Table A.13.3.4.1(a) and Table A.13.3.4.1(b)] and are categorized as "fair" cardiorespiratory fitness levels. See *ACSM Guidelines for Exercise Testing and Prescription*, 11th edition.

The prescribed cardiorespiratory (aerobic) fitness program would be developed for the individual in consultation with the individual's personal doctor and/or the AHJ's health and wellness team. The individual would meet at a frequency identified during this consultation for appropriate follow-up and possible adjustment of the cardiorespiratory fitness program.

A.13.4 Chapter 13 provides medical guidance to fire department physicians for determining an individual's ability to safely and effectively perform the essential job tasks using an individual medical assessment for the conditions listed.

Table A.13.3.4.1(a) Minimum Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (50th Percentile), Using a Treadmill

Age	METs	
	Male	Female
20–29	13.7	10.7
30–39	12.1	8.6
40–49	10.8	7.6
50–59	9.3	6.7
60–69	8.1	5.7

Table A.13.3.4.1(b) Minimum Cardiorespiratory Fitness and Aerobic Capacity Standard for Firefighters, Adjusted for Age and Biological Sex of the Individual (50th Percentile), Using a Cycle Ergometer

Age	METs	
	Male	Female
20–29	12.0	8.9
30–39	8.6	6.2
40–49	7.7	5.5
50–59	7.1	4.9
60–69	6.4	4.6

A.13.4.7 Possible accommodations to provide qualified individuals with disabilities include reasonable modifications or adjustments to the work environment or the manner or circumstances under which the essential job tasks are customarily performed. These can include, but are not limited to, changes in assignment, provision of special devices to assist the individual in accommodating the medical disability, revision of standard operating procedures, and allowance of special techniques.

A.13.5 The following information pertains to the conditions marked with an asterisk in Table 13.5.

Disorders of the Eyes or Vision.

Diseases of the eye such as retinal detachment, progressive retinopathy, optic neuritis (severe or progressive), macular degeneration, cataracts, and glaucoma can result in the failure to read placards and street signs or to see and respond to imminently hazardous situations. For certain conditions, evaluation of visual acuity and visual fields with consultation by an ophthalmologist is suggested.

Ophthalmological procedures such as radial keratotomy and repair of retinal detachment require sufficient time (approximately 2 weeks for radial keratotomy and Lasik-type surgery and 3 months for retinal detachment) to allow stabilization of visual acuity and to ensure that there are no postsurgical complications. Individuals should be cleared for duty by the ophthalmologic surgeon who understands the essential job tasks associated with firefighting. These ophthalmological procedures can result in the failure to be able to read placards and street signs or to see and respond to imminently hazardous situations.

The fire service physician should also consider any color vision deficiency of the individual in view of the color vision requirements of the individual's essential job tasks in a given fire department.

(1) *Loss of far visual acuity.* Inadequate far visual acuity can result in the failure to be able to read placards and street signs or to see and respond to imminently hazardous situations.

(2) *Loss of color vision.* Monochromatic vision does not refer to abnormal color perception such as red/green color blindness. Persons with severe color vision loss will likely fail the acuity requirement. However, it is felt that within most cases this condition will not affect the ability to safely and effectively perform the essential job tasks. The fire service physician should consider the color vision deficiency of the individual and consider the color vision requirements of the individual's job and reach an individual determination.

(3) *Surgery and treatment.* Sufficient time (approximately 2 weeks for radial keratotomy and Lasik-type surgeries, and 3 months for retinal detachment) must have passed to allow stabilization of visual acuity and to ensure that there are no postsurgical complications. These ophthalmological procedures can result in the failure to be able to read placards and street signs or to see and respond to imminently hazardous situations.

(4) *Loss of depth perception.* Most persons with monocular vision, after a 6-month accommodation period, are able to function well. There is some loss of depth perception and peripheral vision. The loss of depth perception has not been shown to be of a type that will affect an individual's ability to

safely and effectively perform essential job tasks. Some very specialized tasks can be difficult to safely perform, and the fire service physician should consider the depth of field deficiency of the individual and consider the depth of field requirements of the individual's job to reach an individual determination. It should be noted that the FAA will award all classes of pilot's licenses to monocular pilots. The loss of peripheral vision is compensated for by increased scanning and head movements. There are studies that show some detriment of driving function in the driving lab. In view of this and the increased dependence on visual cues when driving emergency vehicles, monocular firefighters should be restricted from driving fire apparatus and other emergency vehicles.

A DOT/CDL exemption for monocular vision can be obtained after passing a special test. But this exemption is not applicable to firefighters because it specifically excludes the driving of vehicles with passengers (e.g., fire trucks) and does not apply to emergency response driving.

Disorders of the Ears or Hearing.

Firefighters should have adequate hearing to hear a victim cry for help, to hear a PASS alarm, to hear noises associated with imminent collapse, or to hear noise associated with changes in the fire pattern. Hearing and the ability to localize sounds is crucial in a firefighting environment where smoke often minimizes visual cues and there is a high degree of background noise and stress-related distractions. Firefighters should be able to hear fire department portable and vehicle radio communications. They should be able to hear, discriminate, and localize safety-related acoustic cues, such as air horns; sirens; screams; collapsing walls, beams, or timbers; or gas leaks, to safely and effectively perform the essential job tasks required for fire suppression and fire rescue activities.

These essential job tasks need to be safely and effectively performed under conditions of extreme background noise and SCBA noise as typically found at the incident scene. The inability to hear sounds of low intensity or to distinguish voice from background noise can lead to failure to respond to imminently hazardous situations and thus lead to life-threatening sudden incapacitation to the individual or others that depend on the individual.

Currently, no hearing tests will allow the fire department physician to accurately predict whether the firefighter will be able to safely and effectively perform essential job tasks. Job-specific hearing tests should be individualized for each department and its specific job functions. The following list of hearing-specific tasks can assist to direct development of hearing protocols:

- (1) Understanding spoken commands, both over the radio and while wearing SCBA
- (2) Hearing alarm signals, including building evacuation, low air alarm on the SCBA, and PASS alarms
- (3) Hearing and locating the source of calls for assistance from victims or other firefighters

All of these tasks need to be safely and effectively performed with simulated incident scene background noise and SCBA noise. The inability to hear sounds of low intensity or to distinguish voice from background noise can lead to failure to respond to imminently hazardous situations. (*See 10.1.1.*)

(7) *Hearing loss.* Audiometric pure-tone threshold testing includes the frequencies 500 Hz, 1000 Hz, 2000 Hz, 3000 Hz,

4000 Hz, and 6000 Hz. Tests are performed using audiometric instrumentation calibrated to ANSI/ASA S3.6, *Specification for Audiometers*.

There are several reasons that the use of hearing assistive devices might not be appropriate for the hearing-impaired individual, including the following:

- (1) Hearing assistive devices do not restore normal hearing.
- (2) Hearing assistive devices cannot compensate for asymmetrical hearing loss and thus will not totally resolve the difficulty in sound localization of those with asymmetric hearing loss.
- (3) Hearing assistive devices will improve hearing in noise (e.g., fire scene, rescue scene, traffic), but this noise will always be the most challenging environment for a hearing-impaired individual.
- (4) It is unknown if hearing assistive devices will continue to function normally when exposed to the heat, moisture, and smoke of the fire scene.

Understanding these limitations, hearing assistive devices will improve a hearing-impaired individual's hearing functioning. Thus, it is the consensus of the technical committee that individuals should be allowed to use hearing assistive devices if their unaided average hearing loss in the unaided better ear is better than 40 decibels (dB) at 500 Hz, 1000 Hz, 2000 Hz, and 3000 Hz. If the device fails, the individual will still have sufficient hearing acuity to meet the minimum hearing standard.

(8) *Asymmetric (unequal) hearing loss.* Unequal hearing can result in the inability to localize sounds, leading to failure to safely and effectively perform search and rescue and other localization tasks. There is no validated data to determine at what point sound localization is impaired to the point that a firefighter will not be able to safely and effectively perform search and rescue tasks or other sound localization tasks. Thus, a simulation of these tasks should be performed if there is any question of inadequacy.

(9)(b) *External otitis, recurrent.* Severe external otitis — that is, recurrent loss of hearing — can result in the inability to hear sounds of low intensity or to distinguish voice from background noise, leading to failure to respond to imminently hazardous situations.

(9)(c) *Agenesis or traumatic deformity of the auricle.* Severe agenesis or traumatic deformity of the auricle can result in the inability to properly wear protective equipment and the inability to hear sounds of low intensity or to distinguish voice from background noise, leading to failure to respond to imminently hazardous situations.

(9)(d) *Mastoiditis or surgical deformity of the mastoid.* Severe mastoiditis or surgical deformity of the mastoid can result in the inability to properly wear protective equipment and the inability to hear sounds of low intensity or to distinguish voice from background noise, leading to failure to respond to imminently hazardous situations.

(9)(e) *Ménière's disease, labyrinthitis, or tinnitus.* Ménière's syndrome or severe labyrinthitis can result in the potential for sudden incapacitation and the inability to safely and effectively perform job functions due to balance limitations.

(9)(f) *Otitis media, recurrent or chronic.* Otitis media (chronic) can result in frequent episodes of pain and the inability to hear sounds of low intensity or to distinguish voice from background

noise, leading to failure to respond to imminently hazardous situations.

(10) *Vertigo, ataxia, or disturbance of gait or balance.* Intact gait and balance are required to safely and effectively perform essential job tasks such as climbing stairs, carrying heavy items (e.g., tools, equipment, victims, stretchers), climbing ladders, and walking on narrow/elevated/inclined areas (e.g., roofs). A firefighter's balance can be further stressed by the need to safely and effectively perform these essential job tasks while wearing personal protective clothing and SCBA.

Any symptomatic balance disturbance, vertigo, change of gait and coordination, or history of these that has not resolved completely should be fully investigated. Examples include, but are not limited to, Ménière's syndrome, severe labyrinthitis, and cerebellar syndromes. Current use of medications needs careful evaluation to be certain that the condition is completely controlled and that the side effects of the medication do not impose additional unacceptable risks for the safe and effective performance of essential job tasks.

Disorders of the Nose, Mouth, or Throat.

(11) *Deformity of nose, mouth, or jaw.* A congenital or acquired deformity can result in the inability to pass a respirator fit test or the inability to safely and effectively wear personal protective equipment.

The firefighter works in hazardous environments, both on the fireground and during other emergency operations. Heavy debris can fall on the firefighter. The helmet offers some protection when it fits well and is worn properly. The firefighter with a defect in the skull is more vulnerable to head trauma and life-threatening sudden incapacitation.

The firefighter is also exposed to biological aerosols, particulates, smoke, and hazardous materials. The face, nasal, oropharyngeal, and dental structures should be of sufficient structure and function to allow the proper use and fit-testing of required respiratory protection for the jurisdiction (N-95, P-100, SCBA, and so forth) and other protective clothing and gear.

Orthodontic and certain other maxillofacial appliances or prostheses can preclude safe and effective use of protective equipment and compromise nutritional or hydration status or ability to communicate.

Pharyngeal or laryngeal stenosis, mass, or accessory tissues can interfere with speech, communication, or respiration, which will not permit the safe and effective performance of essential tasks on the fireground and during emergency operations, especially when wearing a respirator.

(13)(a) *Allergic rhinitis.* Allergic rhinitis can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks due to limitations of endurance and the inability to wear SCBA from facial pain, sinus congestion, or coughing.

(13)(b) *Epistaxis, recurrent.* Severe and recurrent epistaxis can prevent safe and effective performance of essential job tasks due to the inability to wear SCBA on the fireground.

(13)(c) *Sinusitis, recurrent.* Recurrent sinusitis, if severe or requiring repeated hospitalizations or repeat surgery, can interfere with the safe and effective performance of essential job

tasks due to the inability to effectively wear SCBA or limitations of pain, endurance, or respiration.

(13)(d) *Dysphonia*. Severe dysphonia can result in the inability to communicate effectively due to oropharyngeal dysfunction.

(13)(e) *Anosmia*. Anosmia (i.e., loss of smell) can interfere with the ability to safely and effectively perform essential job tasks on the fireground. Evaluation of anosmia is difficult, as objective testing is not available in most medical settings.

(14) *Obstructive sleep apnea*. Untreated obstructive sleep apnea is associated with fatigue, cognitive defects, pulmonary hypertension, hypertrophic heart disease, arrhythmias, and early onset dementia. These issues can reduce the ability to safely and effectively perform essential job tasks. Risk factors for developing obstructive sleep apnea include male gender, increased body mass index (BMI), short/wide neck, or narrow throat. Screening questionnaires, such as the Berlin Questionnaire (assessing snoring, fatigue, obesity, and hypertension) can be used to determine those who require formal sleep testing. In those with obstructive sleep apnea, additional testing is required to determine the level of positive pressure (via CPAP or BIPAP) required to overcome the obstruction. When treatment is prescribed, compliance can be assessed using home monitoring devices attached to the CPAP or BIPAP machine. Target organ damage can be screened for by cardiac echo for evidence of pulmonary hypertension or right ventricular hypertrophy.

Mild obstructive sleep apnea (i.e., apnea hypopnea index of less than 15, without clinically significant oxygen desaturation and without toxic arrhythmias) might not require treatment if asymptomatic.

A.13.6 Respiratory insufficiency, no matter the cause, has the potential for toxic arrhythmias, cardiac ischemia (i.e., oxygen delivery), decreased respiratory and cardiac function (i.e., oxygen delivery to tissues), acidosis, and life-threatening sudden incapacitation. The following information pertains to the conditions marked with an asterisk in Table 13.6.

(2) *Chronic cough (productive or nonproductive with or without hemoptysis)*. The cause of chronic cough or hemoptysis needs to be evaluated, as the underlying conditions can also produce increased work of breathing, gas exchange abnormalities, or airway hyperreactivity. An SCBA respirator can be an irritant due its air supply being cold and dry.

(3) *Asthma*. Asthma, defined as reversible bronchospasm, can be temporary or chronic. “Temporary asthma,” more accurately referred to as acute bronchitis with wheezing, is a brief episode, lasting days to months, usually following allergic or infectious exposure. When this occurs without prior history, it most likely will resolve over the next few weeks or months. Such temporary incidents, once resolved, do not compromise the individual’s ability to safely and effectively perform essential job tasks. In contrast, true asthma is a chronic condition with a clinical history of recurrent reversible bronchospasm or long-standing, persistent reversible bronchospasm. For asthmatics, exposure to smoke or other irritants on the fireground, a hazardous materials environment, or cold, dry air from SCBA has a high probability of causing acute asthma attacks and can also worsen the progression of the underlying obstructive inflammatory disease. If this occurs in an environment that is immediately dangerous to life and health (e.g., interior fire suppression or certain hazardous materials operations), it can have potentially

devastating consequences for the firefighter, the team, or the mission. There are no studies that support or deny that asthma in this environment can be prevented or adequately controlled by anti-inflammatory medications (e.g., inhaled corticosteroids, cromolyn, leukotriene modifiers). It is not acceptable to use or rely on bronchodilator medications for this purpose because in a hazardous environment, SCBA cannot be removed to use a rescue inhaler. There are no studies that support or deny that the use of such medications is preventive or effective in a fire/smoke environment, and several studies have implicated the use of beta-agonists (i.e., short- and long-acting bronchodilators) as an independent risk for sudden death and myocardial infarction in the United States, Canada, Britain, New Zealand, and Australia.

Identifying asthmatics who are not only stable in a normal environment but also do not have asthmatic attacks in a fire or irritant environment is difficult. Because the clinical definition of asthma is reversible bronchospasm, spirometry or pulmonary function testing performed in the absence of a clinical attack is expected to be normal and might not even show a bronchodilator response. Only if performed during an attack will spirometry or other pulmonary function tests show obstructive airway flow limitations with a positive bronchodilator response (i.e., greater than 12 percent and 200 mL increase in FEV₁). Therefore, in these firefighters who report good control without asthma exacerbations on the fireground, spirometry should show adequate reserve (e.g., FVC and FEV₁ greater than or equal to 80 percent of predicted), without significant bronchodilator response when performed off bronchodilators on the day of testing. For population studies, pulmonary function is considered normal when greater than or equal to 80 percent of predicted, but for an individual with a history of asthmatic bronchospasm who is being considered for job tasks performed in a potentially irritant environment, it is reasonable diligence to require pulmonary function with a greater specificity for demonstrating adequate reserve (i.e., greater than or equal to 80 percent of predicted). The first time this individual is evaluated for asthma control, challenge testing should be performed to demonstrate no evidence for clinically significant airway hyperreactivity [i.e., to be normal or negative there should be less than 20 percent decline in FEV₁ with provocative challenge testing to cold air, exercise, or a methacholine (PC₂₀ greater than 8 mg/ml is considered normal, as response at doses greater than 8 mg/ml might not be clinically significant)]. Challenge testing should be performed off bronchodilators the day of testing. If the individual reports good control only when taking prescribed control medications (e.g., inhaled corticosteroids, cromolyn, or leukotriene modifiers), then consideration should be given to continuing these medications during the testing. The individual should not use bronchodilators (short- or long-acting bronchodilators) the day of testing because these medications could undermine the purpose of this test — that is, demonstrating normal pulmonary function without clinically significant bronchodilator response or airway hyperreactivity. Challenge testing should be performed only by an experienced specialist. Testing should not be performed on individuals without a history suggestive of asthma since there is no indication for testing. It should never be performed on individuals with moderate to severe pulmonary dysfunction, as these individuals have already demonstrated that they cannot safely perform essential job tasks, and further testing might induce life-threatening bronchospasm. Challenge testing should not be performed annually and should be repeated only if clinically indicated.

The physician should consider the following when evaluating the individual's ability to safely and effectively perform the essential job tasks:

- (1) Exposures to exertion, temperature extremes, cold dry air from SCBA, combustion by-products, irritants, and particulate matter are all potent provokers of asthma attacks.
- (2) Bronchodilator medications are not maintenance therapy to control symptoms in the irritant environment of the fireground or hazardous materials incident scene because their use has not been approved by the FDA for use on the fireground or hazardous materials incident scene and because several studies in the United States, Canada, Britain, New Zealand, and Australia have implicated the frequent use of beta-agonists (i.e., short- and long-acting bronchodilators) as an independent predictor or risk for sudden death and myocardial infarction.
- (3) There is a high probability that acute hyperreactivity in this environment can induce immediate or progressive clinical asthma (i.e., bronchospasm and wheeze) that can lead to sudden incapacitation from status asthmaticus or cardiac ischemia.
- (4) The individual's work history, as well as clinical findings on annual evaluation, should be used as an assessment of the individual's practical ability to safely and effectively perform essential job tasks 1, 2, 3, 4, 5, 6, 7, 9, 13, and 15.

(4) *Allergic lower respiratory disorders.* An individual with current or recent history of allergic-induced, reversible bronchospasm is no different from a nonallergic asthmatic in his/her ability to safely perform the essential job tasks associated with nonallergic irritant exposures, as the majority will remain hyperreactive for 4 to 8 weeks after allergic-induced bronchospasm. Two caveats exist. First, some individuals could have a distant history of allergic asthma, are unlikely to be exposed to this allergen again, or have successfully been desensitized by an allergist. These individuals, if asymptomatic off asthma medications for 2 months, can perform all essential job tasks with reasonable safety. If asthma is still suspected, then the individual should be evaluated accordingly. Provocative challenge testing should only be to general irritants (e.g., cold air, exercise, or methacholine). Specific allergen challenge testing should not be performed, as the risk for life-threatening asthma outweighs the benefit. Second, individuals can have allergic rhinitis, sinus, or skin conditions without a history or suspicion of clinical asthma. These individuals do not need specialized pulmonary testing.

(5) *Chronic obstructive pulmonary disease (COPD).* Chronic obstructive pulmonary disease is characterized by postbronchodilator spirometry demonstrating an FEV₁/FVC ratio of less than 0.70 (absolute ratio rather than percent of predicted) and an FEV₁ less than 70 percent of predicted (based on age, height, sex, and race/ethnicity). Moderate to severe chronic obstructive pulmonary disease is characterized by postbronchodilator spirometry demonstrating an FEV₁/FVC ratio of less than 0.70 (absolute ratio rather than percent of predicted) and an FEV₁ less than 60 percent of predicted (based on age, height, sex, and race/ethnicity). Additional tests that can be of value are lung volumes, gas exchange parameters [e.g., diffusing capacity (DLCO), oxygen saturation, arterial blood gases], chest radiograph, and chest CT scan. With moderate to severe chronic obstructive pulmonary disease, elevated respiratory workload and lack of respiratory reserve will not provide adequate gas exchange for the safe performance of essential

job tasks. Working in this environment has the potential for increasing carbon monoxide levels, decreasing oxygen levels, and reducing oxygen delivery, and the extent of this reduction and resulting risk is directly related to the degree of dysfunctional gas exchange already present prior to the performance of essential job tasks. It also has the likely potential for acutely aggravating preexisting airway hyperreactivity commonly found in patients with moderate to severe chronic obstructive pulmonary diseases (e.g., bronchitis), which in this environment can induce sudden incapacitation from respiratory insufficiency or cardiac ischemia. In contrast, individuals with chronic obstructive pulmonary disease (e.g., postbronchodilator spirometry demonstrating an absolute FEV₁/FVC ratio less than 0.70 and an FEV₁ between 60 and 70 percent of predicted) and without airway hyperreactivity might be able to safely and effectively perform essential job tasks if they meet all of the special provisions for no restriction in Table 13.6.

(6) *Hypoxemic disorders, moderate to severe, and (7) Exertional-related oxygen desaturation.* The physician should consider the following when evaluating the individual's ability to safely and effectively perform the essential job tasks:

- (1) A resting oxygen saturation of 90 percent to 94 percent corrected to sea level requires measurement at a minimum workload to determine if desaturation (i.e., decrease in oxygen saturation by greater than or equal to 4 percent from baseline or to less than 90 percent) occurs at baseline and annually.
- (2) Hypoxia can be the result of central regulatory disturbances, obstructive sleep apnea, asthma, chronic obstructive airways diseases, interstitial lung disease, pulmonary hypertension, chronic pulmonary embolism, and so forth.
- (3) Under firefighting conditions, gas exchange abnormalities and respiratory insufficiency, no matter the cause, have the potential for life-threatening sudden incapacitation from cardiopulmonary insufficiency.

(8) *Hypercapnic disorders.* Hypercapnia can be the result of central regulatory disturbance, medications, obstructive sleep apnea, severe asthma, end-stage chronic obstructive airways diseases, or end-stage interstitial lung disease. In this environment, gas exchange abnormalities and respiratory insufficiency no matter the cause have the potential for life-threatening sudden incapacitation from cardiopulmonary insufficiency.

(9) *Pulmonary hypertension.* Pulmonary hypertension can be the result of medications, obstructive sleep apnea, end-stage chronic obstructive airways diseases, end-stage interstitial lung disease, thromboembolic disease, or heart disease.

(12) *Spontaneous pneumothorax.* Individuals who are otherwise not restricted can safely resume firefighting duties as long as they have recovered from their pneumothorax (with or without surgery), and their pulmonary function has returned to acceptable limits. Most patients with spontaneous pneumothorax have cysts or bullous disease from congenital or infectious etiology. Some have bullous disease due to chronic pulmonary disease. Usually, those with congenital or infectious cause will have pulmonary function tests that are compatible with the safe use of SCBA while those with chronic pulmonary disease can have pulmonary function tests that are not compatible with the safe performance of essential job tasks 1, 2, 3, 4, 5, and 7. Regardless of cause, many (10 percent to 20 percent) will have a recurrence on the same side unless surgically corrected. After the pneumothorax has resolved, surgical correction of underlying

ing cystic/bullous disease is not a prerequisite for returning to firefighting duty as long as pulmonary function allows for the safe use of SCBA.

(14) *Pleural effusion(s)*. Significant pleural effusions should be referred for diagnostic tests, as new or increasing effusions can be a sign of cardiac, liver, or renal disease, pneumonia, empyema, tuberculosis, or cancer. When these illnesses are severe enough to cause pleural effusions, they compromise the ability to safely perform essential job tasks due to limitations of endurance or inability to safely wear SCBA. Regardless of the cause for the pleural effusion, pulmonary function tests should be assessed. An FVC between 60 percent and 69 percent of predicted compromises the member's ability to safely perform essential job tasks unless a more complete evaluation of gas exchange and exercise capacity shows the ability to exercise without evidence of hypoxia or exercise desaturation. An FVC less than 60 percent of predicted compromises the individual's ability to safely perform essential job tasks.

(17) *Sarcoidosis*. Sarcoidosis is an autoimmune disease that can affect any organ in the body. In most cases, it can spontaneously resolve or remain quiescent without any resulting impairment of organ function. In some cases, however, sarcoidosis can result in moderate or severe pulmonary dysfunction, significant visual impairment, cardiac dysfunction (e.g., cardiomyopathy or arrhythmia) at rest or exercise, or other moderate to severe end-organ dysfunction. Such cases typically require life-long treatment with systemic corticosteroids or other immunosuppressive agents, such as methotrexate, adalimumab, or infliximab.

The physician should consider the following when evaluating the individual's ability to safely and effectively perform the essential job tasks:

- (1) Most patients with sarcoidosis are asymptomatic with abnormal chest imaging studies but normal function. Nearly 40 percent of patients resolve spontaneously.
- (2) If functional assessment by individual examination, pulmonary function tests, ECG, Holter ECG, and echocardiogram are normal, the candidate is capable of performing essential job tasks.
- (3) Moderate to severe restriction or hypoxia compromises the candidate's ability to safely and effectively perform essential job tasks unless a more complete evaluation of gas exchange and exercise capacity shows the ability to exercise at a minimum workload without evidence of exercise hemoglobin oxygen desaturation.
- (4) Cardiac function should be formally assessed with echocardiography, Holter ECG, and ECG. If results are indeterminate, cardiac consultations and additional testing (e.g., cardiac MRI with GAD contrast, PET scan, electrophysiologic studies) should be obtained. Cardiomyopathy or toxic cardiac arrhythmias will cause the candidate to be unqualified to safely and effectively perform the essential job tasks.
- (5) For individuals with persistent active disease, evaluation of end-organ function is critical if life-threatening sudden incapacitation is to be avoided.

(18) *Pulmonary embolism*. Most patients, after suffering a pulmonary embolism, return to normal cardiopulmonary function.

A.13.7 Firefighting activities have a high static component (i.e., inducing predominantly an increase in blood pressure)

and a moderate to high dynamic component (i.e., inducing predominantly an increase in heart rate). Sports with a similar set of demands include wrestling, body building, and boxing. Recommendations made by the task force with respect to athletic activities that have these physical demands (high static, moderate dynamic) have been followed in this document.

Performance of the aerobic and anaerobic essential job tasks in a stressful, noxious fire or rescue environment with low oxygen, high carbon monoxide, and numerous toxic gases has significant risk for acutely aggravating pre-existing arrhythmias and cardiac ischemia (oxygen delivery) and decreasing cardiac valve or muscle function (oxygen supply). To protect from this environment requires that the firefighter wear personal protective equipment (PPE) and SCBA. The PPE provides a thermal barrier at the cost of added weight, encapsulation, dehydration, and increased metabolic cost for a given workload. The SCBA is a positive-pressure demand valve respirator that provides a barrier against the inhalation of noxious/toxic gases and particulate matter but at increased metabolic cost due to its weight and increased respiratory workload. The high static component and moderate to high dynamic component of firefighting activities increase physiologic stress and cardiac demand and can precipitate acute cardiac collapse, heart attack, syncope (blackout), or sudden death. In the absence of sudden death, the fact that the firefighter was operating in an isolated, dangerous environment when a cardiac event occurred would make the subsequent risk for such an event leading to death unacceptably high for that firefighter, for victims that depend upon that firefighter, or for other firefighters who not only depend on that firefighter but can also be called on to rescue that firefighter.

The following information pertains to the conditions marked with an asterisk in Table 13.7.

(1) *Coronary artery disease*. Following a myocardial infarction or a coronary revascularization procedure, a radionuclide stress test should be performed to evaluate exercise tolerance and the presence of exercise-induced myocardial ischemia or ventricular arrhythmias. For detection of ischemia, imaging with radionuclide, when available, is superior to imaging by echo.

(5) *Acute pericarditis, acute endocarditis, and acute myocarditis*. In nearly all cases, the individual will require medical leave early on until the condition stabilizes.

(7) *Hypertrophic obstructive cardiomyopathy*. Those without any of the risk factors in special provisions (a) through (d) have a less than 1 percent risk of sudden death.

(8) *Recurrent syncope*. A first episode of syncope must be fully evaluated to determine that the underlying cause does not compromise a firefighter's ability to safely and effectively perform essential job tasks. Underlying neurologic, cardiovascular, circulatory, or endocrine disturbance must be ruled out. If after evaluation there is no evidence for underlying disease, exam is normal, and there has been no recurrence, then the individual need not be restricted from performing essential job tasks. If underlying disease is present and not reversible, then the individual's ability to safely and effectively perform the essential job tasks is compromised due to risk for life-threatening sudden incapacitation. (For additional recommendations, see the section relevant to the underlying disease.) If recurrent and no underlying disease, then the individual's ability to safely

and effectively perform the essential job tasks might be compromised.

(9) *Pacemaker or automatic implantable defibrillator.* This technology has not been FDA approved for operating effectively under conditions commonly found on the fireground (electromagnetic interference). In addition, the requirement for pacemaker or implantable defibrillator defines the underlying cardiac condition as life-threatening. Many pacemakers do not have the ability to automatically increase heart rate on demand during the essential job tasks performed on the fireground.

(10) *Mitral valve stenosis is defined by the American College of Cardiology/American Heart Association.* This staging is determined by symptoms, valve anatomy, valve hemodynamics, and hemodynamic consequences. For guidance, the *2020 ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease* should be used.

(11) *Mitral valve insufficiency.* Mitral valve prolapse only interferes with safe performance of critical job tasks if associated with arrhythmias or if moderate to severe mitral regurgitation is present. This staging is determined by symptoms, valve anatomy, valve hemodynamics, and hemodynamic consequences. For guidance, the *2020 ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease* should be used.

(12) See Essayagh, et al., 2020, and Sabbag, et al., 2022.

(13) *Aortic valve stenosis.* This staging is determined by symptoms, valve anatomy, valve hemodynamics, and hemodynamic consequences. For guidance, the *2020 ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease* should be used.

(14) *Aortic valve insufficiency.* This staging is determined by symptoms, valve anatomy, valve hemodynamics, and hemodynamic consequences. For guidance, the *2020 ACC/AHA Guideline for the Management of Patients with Valvular Heart Disease* should be used.

(16) *Wolff-Parkinson-White (WPW) syndrome.* Evaluation with ECG, Holter monitor, loop recorder, or stress test should be further supplemented with electrophysiology study (EPS), when appropriate. If rapid supraventricular tachycardia is inducible and surgical ablation is successful, there is no medical reason to restrict the individual from performing essential job task 13.

(17) *Toxic arrhythmias.* Toxic arrhythmias include supraventricular arrhythmias, atrial fibrillation, atrial flutter, paroxysmal tachycardias, ventricular tachycardia, and ventricular fibrillation. Even if rate controlled (with or without medication), the added catecholamine stress and dehydration produced when performing essential job tasks on the fireground makes the potential for life-threatening sudden incapacitation associated with this rhythm disturbance too great a risk. If persistent or recurrent, these arrhythmias, even if rate controlled, can result in embolic events, which prevent the safe and effective performance of essential job tasks on the fireground or during emergency responses.

Paroxysmal atrial tachycardia can sometimes be resolved with modification of diet or treatment of other underlying noncardiac conditions.

(19, 20) *Hypertension, moderate to severe; mild.* Individuals with prehypertension (systolic 120–139 mm Hg or diastolic 80–89 mm Hg), mild hypertension (systolic 140 to 159 mm Hg or

diastolic 90 to 99 mm Hg), or moderate to severe hypertension (systolic 160 mm Hg or greater or diastolic 100 mm Hg or greater) should be referred to their primary care physician for evaluation, lifestyle modification, and treatment.

Individuals with mild hypertension whose blood pressure returns to either prehypertension or normal with lifestyle modification or approved medications can return to an annual medical evaluation without restrictions.

Moderate to severe hypertension can damage the eye (e.g., retinopathy), the kidneys (e.g., nephropathy), the vascular system (e.g., stroke, transient ischemic attack, peripheral artery disease), and the heart (e.g., left ventricular hypertrophy, heart failure). These hypertension complications are known as end-organ damage. The cardiovascular complications are associated with an increased risk of sudden incapacitation and sudden death (Koren et al. 1991). When the systolic blood pressure is 160 mm Hg or higher or the diastolic blood pressure is 100 mm Hg or higher, there is a high risk for cardiovascular diseases such as myocardial infarction or stroke and for end-organ damage. Increased risk for atherosclerotic cardiovascular disease (ASCVD) is defined as a 10 percent or greater risk of ASCVD over the next 10 years, as determined using the 10-year ACC/AHA heart risk calculator, understanding that, as with any algorithm, limitations can exist when applied to groups different from those used for the validation. For example, the 10-year ACC/AHA algorithm has not been validated in younger adults (i.e., below age 40) where the prevalence of atherosclerotic heart disease is much lower. In younger adults, application of this algorithm might be reasonable for disease prevention, but its use for work restriction is unproven and should be considered only as part of an individual evaluation. Furthermore, cardiac complications are frequently asymptomatic, and valid screening tests are not fast or inexpensive. Therefore, determining which individuals to screen for cardiac complications [such as echocardiogram for left ventricular hypertrophy or for measurement of left ventricular ejection fraction (heart failure) or stress imaging for ACSVD] should be based on the severity and the duration of hypertension and the presence of other comorbidities.

For individuals with long-standing hypertension whose blood pressure has not been controlled, additional evaluation for possible end-organ damage should be considered, including all the following:

- (1) Complete patient history for symptoms of heart failure (e.g., shortness of breath upon exertion) or transient ischemic attacks (TIAs)
- (2) Dilated eye examination for retinopathy
- (3) Blood creatinine measurement for nephropathy
- (4) Tests for left ventricular hypertrophy [Use of the resting ECG to detect left ventricular hypertrophy is insensitive (e.g., 5 percent sensitivity), so echocardiogram is the currently accepted test for diagnosing left ventricular hypertrophy.]

The cardiac and vascular complications of hypertension are associated with an increased risk of sudden incapacitation and sudden cardiac death (Koren et al. 1991). With proper evaluation, lifestyle modification, or treatment, these complications can be avoided. Lifestyle modification includes weight reduction, dietary plan, reduction in dietary sodium, an increase in aerobic physical activity, and moderation in alcohol consumption [Chobanian et al. 2003].

Because of the high risk of a sudden cardiovascular event (e.g., due to undiagnosed cardiac disease), individuals with moderate to severe hypertension or with end-organ damage should be restricted until their blood pressure can be brought under control and end-organ damage can be assessed (*see section for the organ damage involved*).

(21) *Metabolic syndrome*. Metabolic syndrome includes three or more of the following components:

- (1) Abdominal obesity, defined as a waist circumference greater than 40 in. (102 cm) in men or greater than 35 in. (88 cm) in women
- (2) High triglyceride levels of more than 150 mg/dl
- (3) HDL cholesterol level of less than 40 mg/dl for men, less than 50 mg/dl for women
- (4) Systolic blood pressure greater than 130 mmHg or a diastolic blood pressure greater than 80 mmHg
- (5) Fasting blood glucose levels greater than 100 mg/dl

Metabolic syndrome is associated with reduced aerobic capacity that interferes with the ability to train to be a firefighter and to safely and effectively perform essential job tasks.

A body mass index (BMI) of 30 or greater has a high predictive value for the metabolic syndrome. BMI adjusts body weight based on a person's height but cannot differentiate between muscle mass and fat burden.

Individuals with metabolic syndrome are at increased risk for cardiovascular ischemic disease, diabetes, and accelerated hypertension that could result in sudden incapacitation from myocardial infarction or stroke.

Individuals with metabolic syndrome should receive a cardiac stress test. Individuals should be counseled as to lifestyle adjustments, receive an exercise prescription, and be referred to their personal physician for treatment of their elevated cholesterol, triglycerides, insulin-resistant hyperglycemia, or hypertension.

Vascular Disorders.

Vascular disorders include any disorder of the vascular (i.e., arterial or venous) system, including, but not limited to, aneurysm, peripheral vascular insufficiency, and thromboembolic disease. Heart rate, blood pressure, and shear forces on vessel walls are increased when performing many of the essential job tasks, thereby increasing the risk of acute dissection, rupture, or embolic phenomena that can result in life-threatening sudden incapacitation.

(26) *Carotid artery disease*. Carotid endarterectomy and carotid artery stenting are effective long-term stroke prevention strategies in symptomatic patients with flow obstruction greater than 70 percent. However, uncertainty remains regarding the optimal technique for long-term prevention of vascular events in asymptomatic patients with flow obstruction greater than 70 percent and whether either is sufficiently better than medical therapy.

A.13.8 All disorders of the hypothalamic-pituitary-adrenal axis can potentially affect firefighters because these hormonal systems play an essential role in maintaining homeostasis when exposed to physiologic and emotional stress while performing essential job tasks on the fireground or during emergency operations. Homeostatic regulation is further impaired under conditions of extreme temperature and dehydration, both of which are common when performing the essential job tasks of

firefighting while wearing personal protective clothing on the fireground.

Without treatment, the risk of life-threatening dehydration, extreme alterations in body temperature, electrolyte disturbances, and muscle weakness while operating at a fire scene is unacceptably high. Mineralocorticoid deficiency also increases the risk of life-threatening hypotension and/or arrhythmias associated with exertion and dehydration. For this reason, untreated or uncorrected hypothalamic, hypopituitarism, hypothyroidism, hyperthyroidism, thyroid storm, hypoadrenalism, hyperadrenalism, parathyroidism, and other disorders of thyroid and adrenal function threaten an individual's ability to safely perform essential job tasks.

The following information pertains to the conditions marked with an asterisk in Table 13.8.

(1,2,3) Diabetes.

Type 1 diabetes was previously called insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes. Type 1 diabetes develops when the body's immune system destroys pancreatic beta cells, the only cells in the body that make the hormone insulin, which regulates blood glucose. This form of diabetes usually strikes children and young adults, although disease onset can occur at any age. Type 1 diabetes can account for 5 percent to 10 percent of all diagnosed cases of diabetes. To survive, people with Type 1 diabetes must have insulin delivered by a pump or injections.

Type 2 diabetes was previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes. Type 2 diabetes can account for about 90 percent to 95 percent of all diagnosed cases of diabetes. It usually begins as insulin resistance, a disorder in which the cells do not use insulin properly. As the need for insulin rises, the pancreas gradually loses its ability to produce insulin. Type 2 diabetes is associated with older age, obesity, family history of diabetes, prior history of gestational diabetes, impaired glucose tolerance, physical inactivity, and race/ethnicity. Type 2 diabetes is increasingly being diagnosed in children and adolescents. Many people with Type 2 diabetes can control their blood glucose by following a careful diet and exercise program, losing excess weight, and taking oral medication. Among adults with diagnosed diabetes, about 12 percent take both insulin and oral medications, 19 percent take insulin only, 53 percent take oral medications only, and 15 percent do not take either insulin or oral medications.

Diabetic individuals should be carefully monitored for control of blood sugar because lack of glycemic control increases the risk for dehydration, hypotension, and target organ damage (e.g., myocardial infarction), which can result in life-threatening sudden incapacitation during performance of essential job tasks. Such individuals should be monitored at regular intervals to ascertain that blood glucose and blood hemoglobin A1C levels remain under control. According to the American Diabetes Association 2010 guidelines, lowering hemoglobin A1C to below or around 7 percent has been shown to reduce microvascular and neuropathic complications of Type 1 and Type 2 diabetes. The recommendation for microvascular disease prevention in nonpregnant adults in general is for a hemoglobin A1C level of less than 7 percent. Exceptions to this 7 percent level would be any condition that exists in addition to diabetes that is responsible for the hemoglobin A1C not accurately reflecting average glucose levels (e.g., hemoglobinopathies such as sickle cell disease). Additional

exceptions to this 7 percent level would occur in individuals already not meeting NFPA 1580 requirements (e.g., history of severe hypoglycemia or end-organ complications).

With medical control of diabetes, the risk of hypoglycemia (i.e., low blood sugar) becomes a major concern in regard to those with diabetes being or becoming firefighters. This risk is greatest in those with Type 1 diabetes.

In general, individuals treated with oral diabetes medications are at little risk of significant hypoglycemia. Individuals treated with metformin, alpha-glucosidase inhibitors, or thiazolidinediones alone or in combination with each other are at no risk of hypoglycemia, as these classes of drugs do not increase insulin levels. Individuals treated with sulfonylureas and related drugs have a risk of severe hypoglycemia less than 1 percent of the risk associated with insulin treatment. Individuals treated with diet and exercise alone (i.e., no oral diabetes medications or insulin) are at no risk of hypoglycemia.

Firefighting entails a unique set of conditions that need to be considered in regard to those with diabetes and the risks of hypoglycemia. Unpredictable meal schedules, periods of physical exertion, adrenergic stimulation, and sleep deprivation all present challenges to firefighters with diabetes. There are occasions when there is no safe access to food or other forms of oral glucose while wearing respiratory protection in a hazardous environment, and the typical symptoms of hypoglycemia might not be recognized as easily in the midst of fighting a fire. As well, it is not always possible to exit a hazard zone rapidly enough to treat hypoglycemic symptoms when detected. Individuals engaged in fire suppression are at greater risk than those engaged in other emergency activities (e.g., EMS, law enforcement) for this reason.

A review of current published data suggests that with careful individualized assessment it is possible to identify those with diabetes who can function fully as firefighters and who do not present a significant risk to themselves, their fellow firefighters, or to those they serve. Members that develop diabetes during their tenure can have difficulty adjusting or transitioning to normal duties.

The individualized assessment process and criteria included in Chapter 13 were set up to ensure that only those who are managing their diabetes conscientiously using the most up-to-date approaches would be eligible to be a firefighter. In addition, certain patients have a greater tendency for significant hypoglycemia despite the quality of their diabetes management. Such individuals would not be good candidates to be firefighters and, accordingly, are excluded from service under the criteria in this standard.

This individualized assessment is possible in large part because a great deal of change has occurred in the treatment of diabetes in recent years. Previously, patients used insulins that were somewhat unpredictable in the time course of their action and generally took two injections per day. Today, there are insulins that are far more predictable and are either very long acting and essentially treat only endogenous glucose production (and therefore do not depend on a patient eating on a regular schedule) or are very rapid and therefore can be administered directly before, during, or even shortly after one eats, significantly decreasing the chance of insulin being taken and then the meal being interrupted due to firefighting duties.

Regimens now referred to as “basal bolus” are composed of a very long-acting basal (or background) insulin, which controls glucose levels overnight and in the absence of glucose intake and rapid-acting (bolus) insulins that are dosed just prior to, during, or even after meals based on blood glucose levels at that time, the amount of carbohydrate that the person expects to consume, and any anticipated change in physical activity patterns over the next number of hours.

These regimens have resulted in improved overall blood glucose control with significantly less risk of hypoglycemia for many patients.

Additional major advances in the size, speed, and sophistication of blood glucose meters provide for easy, accurate, and rapid assessment of blood glucose levels. Continuous glucose monitoring with electronic recordkeeping is readily available. Such monitoring techniques, as well as the generally increased self-awareness that accompanies consistent self-monitoring, enable the motivated firefighter with diabetes to assess blood glucose levels and ingest a safety net of carbohydrates before entering a hazardous environment. Similarly, major advances in insulin delivery systems have greatly increased the ability of the motivated individual with diabetes to achieve a level of diabetes self-management consistent with the duties of firefighting.

To get maximum effect from these medical advances, and to minimize the risk of hypoglycemia, individuals with diabetes must check their blood glucose level frequently (as recommended based on factors such as type of therapy and glycemic history), review these results on a regular basis, and see their diabetes care provider regularly for discussion in regard to any necessary changes in treatment. Evaluation of an individual needs to look for any of the known risk factors for serious hypoglycemia or evidence of any of the known microvascular (e.g., eye disease, kidney disease, or nerve disease) or macrovascular (e.g., cardiovascular disease, peripheral arterial disease) complications of diabetes. A stress test to a minimum workload is required because myocardial infarction remains the major cause of line-of-duty fatalities, and diabetes (Type 1 and Type 2) is not only a risk factor for myocardial ischemia but also for silent myocardial ischemia.

The individualized assessment demands a very close and good working relationship between the individual and the diabetes care provider. The experience of those who care for current firefighters with diabetes is that this works for a highly motivated individual who will do whatever it takes to perform his/her job at a high level and in a safe manner.

Recognizing that there is variability in the relationship between the hemoglobin A1C and the 3-month average blood glucose, we recommend that hemoglobin A1C levels greater than the 8 percent threshold be confirmed by a second determination before action is taken.

The physician evaluating an individual with a hemoglobin A1C greater than 8 percent should consider a discordance between the A1C and the 3-month average glucose if any of the following conditions exists:

- (1) A repeated value is below the threshold.
- (2) A single A1C determination is discordant with prior or subsequent determinations with no other evidence of deterioration in glycemic control.

- (3) The patient's reported capillary blood glucose determinations or venous glucose determinations in the physician's office are significantly lower than those reflected by the estimated average glucose (eAG) (eAG calculator available at <http://professional.diabetes.org/glucosecalculator.aspx>).
- (4) The patient has a personal or family history or other evidence of a hemoglobinopathy.
- (5) The patient is a member of an ethnic group with increased risk of hemoglobinopathy.

If the evaluating physician suspects that the A1C overestimates average blood glucose, further evaluation can include the following:

- (1) A repeat HbA1C
- (2) Prior HbA1C values
- (3) Serum fructosamine determination
- (4) Downloaded reports from a memory glucometer
- (5) Downloaded reports from a 72-hour continuous glucose monitor
- (6) Downloaded reports from a personal continuous glucose monitoring device

Possible explanations for discordance between the eAG based on A1C and the patient's true average glucose include the following:

- (1) *Assay Precision.* The American College of Pathology accepts variation within 7 percent in A1C assays. Thus, a person with an A1C of 8 percent might have a value between 7.5 percent and 8.5 percent on repeat testing of the same sample. [Cohen et al. 2010]
- (2) *Hemoglobinopathies.* According to the National Diabetes Information Clearinghouse (NDIC): "With some assay methods, A1C tests in patients with hemoglobinopathies result in falsely high outcomes, overestimating actual average blood glucose levels for the previous 2 to 3 months. Physicians may then prescribe more aggressive treatments, resulting in increased episodes of hypoglycemia. Some assay methods used with some hemoglobinopathies may result in falsely low outcomes, leading to under-treatment of diabetes." Also, according to the NDIC: "About one in 12 African Americans has sickle cell trait. About 14.7 percent of African Americans aged 20 years or older have diabetes. Therefore, many African Americans have both diabetes and sickle cell trait. People of Southeast Asian descent are at risk for having hemoglobin E (HbE), another hemoglobin variant."
- (3) *Interindividual Variation.*
- (4) *Clinical Studies.* A comparison of HbA1C with average glucose derived from 2 days of continuous monitoring and 3 months of 7-point glucose profiles at least three times a week. The confidence interval for average glucose with an A1C of 8 percent was 147–217 mg/dL. [Nathan et al. 2008]
- (5) *RBC Lifespan:* Hemoglobin A1C levels are a "snapshot" of what is truly a rolling average. Subclinical variation in RBC lifespan can have a significant effect on the relationship between mean glucose and A1C, with increases in average RBC lifespan increasing net glycosylation and decreases (as in some hemoglobinopathies or in recovery from hemorrhage or anemia) decreasing net glycosylation. [Herman and Cohen 2010, Cohen et al. 2008]
- (6) *RBC Glucose Transport.* Variations in transport across the RBC membrane result in different intracellular and extracellular glucose levels, thus affecting intracellular

hemoglobin exposure to glucose and resultant glycosylation. [Khera et al. 2008]

- (7) *Variations in Glycosylation Rates.* Patients vary in activity of the glycosylation reaction; genetically determined "high" and "low" rates of glycosylation have been described in a number of studies, explaining about one-third of interindividual variation in A1C levels. [Hudson et al. 1999, Snieder et al. 2001, Hempe et al. 2002, Cohen et al. 2006, Soranzo et al. 2010]
- (8) *Interethnic Variation.* Numerous studies have identified the effect of ethnicity on the relationship between average glucose and A1C. In general, Caucasians have significantly lower A1C levels at comparable glucose. [Herman et al. 2007, Cohen 2007, Viberti et al. 2006, Herman et al. 2009, Ziemer et al. 2010, Kirk et al. 2006]. This variability is independent of the effect of hemoglobinopathies noted in (2).

(5) *Diseases of the adrenal gland, pituitary gland, parathyroid gland, or thyroid gland.* The individual should be evaluated for absence of orthostatic hypotension, electrolyte disorders, ability to maintain hydration during exercise under extreme environmental conditions, and normal thyroxine levels with supplementation.

A.13.9 The following information pertains to the conditions marked with an asterisk in Table 13.9.

(1) *Gastrointestinal disorders.*

Cholecystitis (that which causes frequent pain due to stones or infection) can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks.

Gastritis (that which causes recurrent pain and impairment) can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks.

GI bleeding can cause fatigue or hemodynamic instability resulting in the inability to safely and effectively perform essential job tasks.

Inflammatory bowel disease (that which causes disabling pain or diarrhea) can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks. It is a progressive illness leading to functional impairment.

Intestinal obstruction (that is, recent obstruction with impairment) can result in frequent episodes of pain, the inability to safely and effectively perform essential job tasks, and the potential for sudden incapacitation.

Pancreatitis (chronic or recurrent) can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks.

Cirrhosis, hepatic or biliary (that which is symptomatic or in danger of bleeding), can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks.

A gastrointestinal ulcer (where symptoms are uncontrolled by drugs or surgery) can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks.

(2) *Gastrointestinal surgery (e.g., cholecystectomy, appendectomy, splenectomy), excluding transplant.* To prevent infections, a pneu-

mococcal vaccination regimen is recommended at regular intervals.

A history of gastrointestinal surgery or bowel resection (if frequent diarrhea precludes performance of duty) can result in frequent episodes of pain and the inability to safely and effectively perform essential job tasks.

(3) *Abdominal wall, inguinal, or femoral hernia.* The individual should be evaluated for persistent abnormality causing increased risk of infection or strangulation.

A.13.10 Firefighters with active, ongoing, or recurrent spinal disorders can have difficulty due to reduced motor strength, sensation, and flexibility as well as problems with fatigue, coordination, gait, and equilibrium. The personal protective ensemble and SCBA can place the firefighter's spine at a biomechanical disadvantage due to added weight and altered center of gravity. Certain medications (e.g., narcotics and muscle relaxants) used to treat spinal conditions can frequently produce or worsen somnolence, discoordination, and disequilibrium. Neurologic dysfunction, regardless of cause, can produce sudden incapacitation, which when working in dangerous environments can result in life-threatening injuries.

The following information pertains to the conditions marked with an asterisk in Table 13.10.

(5) *Spine structural abnormality, fracture, or dislocation that causes progressive or recurrent impairment.* Spinal structural abnormality, a fracture, or a dislocation can also result in ligament instability, increasing the risk for future dislocation and neurologic compromise.

A.13.11 Firefighters with active, ongoing, or recurrent orthopedic disorders can have difficulty due to reduced motor strength, sensation, and flexibility as well as problems with fatigue, coordination, gait, and equilibrium. These physical abilities are required to safely perform the essential job tasks. The protective uniform and SCBA can place the firefighter's involved extremity (upper or lower) at a biomechanical disadvantage due to added weight and altered center of gravity. Certain medications (e.g., narcotics and muscle relaxants) used to treat orthopedic conditions can produce or worsen somnolence, discoordination, and disequilibrium.

The following information pertains to the conditions marked with an asterisk in Table 13.11.

(6) *Single dislocation of a major joint.* Successful surgery for shoulder dislocation, if range of motion and strength were intact, would not interfere with the safe performance of essential job tasks.

(7) *Recurrent dislocation of a major joint.* Unrepaired, repeated joint dislocations indicate an unstable shoulder or hip, which can dislocate, leading to sudden incapacitation, placing the firefighter or the person depending on the firefighter at life-threatening risk. Postsurgical repair, the individual can perform essential job tasks if joint exam shows full functional motion, strength, and stability.

(8) *Ligament or meniscus knee disease.* Ligament or meniscus knee disease can lead to sudden incapacitation, placing the firefighter or the person depending on the firefighter at life-threatening risk. Symptoms of locking, buckling, or giving way or physical exam findings of joint instability, poor range of motion, significant swelling or tenderness might compromise the individual's ability to safely and effectively perform the

essential job tasks. Postsurgical repair, the individual can perform essential job tasks if joint exam shows full functional motion, strength, and stability.

(13) *Appliances (e.g., screws, pins, or metal plates).* If the appliance is superficial, it could lead to perforation of the skin under the normal abrasive conditions of firefighting.

If the underlying condition has healed, surgical consultation is advised to determine the risk-benefit analysis for removing the appliance, as not all appliances need to be removed. If the appliance is removed, evidence of bone healing should be assessed with a radiograph and physician's examination approximately 6 months postremoval before the individual is allowed to perform the essential job tasks.

A.13.12 Firefighters with active, ongoing, or recurrent neurologic disorders can have difficulty following orders, communicating information, and working in a coordinated manner with workers, victims, and the public (essential job tasks 11, 12, and 13). Firefighters with neurologic disturbances can also have difficulty with fatigue, somnolence, cognitive function, motor strength, sensation, coordination, gait, and equilibrium, all required to safely perform essential job tasks. The firefighter often is exposed to considerable stress (e.g., temperature, physical exertion, and psychological) during emergency operations. Stress conditions can exacerbate or highlight neurologic deficiencies when the firefighter is performing essential job tasks rapidly during an emergency operation where there is little room for error and where such errors can have life-threatening consequences for the firefighter, colleagues, or victims. Removing oneself from the scene, even temporarily, can significantly impact on the success of the operation. Medications used to treat neurologic conditions can frequently produce or worsen somnolence, discoordination, or disequilibrium.

The following information pertains to the conditions marked with an asterisk in Table 13.12.

(1) *Epilepsy.* Epilepsy is defined as the presence of "unprovoked, recurrent seizures — paroxysmal disorders of the central nervous system characterized by an abnormal cerebral neuronal discharge with or without loss of consciousness." Generalized, complex, partial, simple epilepsy, or recurrent seizures, even those that do not impair consciousness, prevent safe performance of the essential job tasks because of the uncertainty regarding how much of the brain could be involved and the risk of propagation to other regions of the brain, particularly in the highly epileptogenic environment of the fireground.

Treatment of patients with epilepsy is only variably successful, with roughly 40 percent of patients attaining remission on anticonvulsant therapy. Remission is defined as 5 years without recurrence of seizure activity. Further complicating the fitness-for-duty issue is the fact that only 50 percent of patients who achieve remission do so without toxic side effects of the anticonvulsant drug.

As much as 10 percent of the population will experience at least one seizure in a lifetime, whereas less than 1 percent of the population qualifies for a diagnosis of epilepsy.

Many conditions producing seizures in the pediatric age group are known to remit prior to adulthood, and many adults sustain a reactive seizure that can be attributed to a reversible, underlying precipitant. These circumstances do not necessarily

represent an ongoing risk of sudden, unpredictable incapacitation of an individual.

(5)(i) *Myasthenia gravis*. Myasthenia gravis could compromise an individual's ability to safely perform the essential job tasks. In considering performance of essential job tasks, the impact of the operational environment (e.g., heat, stress, activity, duration, variable night shifts) on exacerbations should be considered and specifically addressed by a knowledgeable neurological specialist and the fire department physician. The neurologist must indicate that the individual's cognitive function and neurological exam are normal, and the individual is off all drug treatment. The individual cannot safely perform essential job tasks if there is evidence of respiratory muscle weakness or prior episode of respiratory muscle weakness in the last 3 years. The individual cannot safely perform essential job tasks if on drug treatment for myasthenia gravis, including corticosteroids, cytotoxic drugs (e.g., azathioprine), or plasmapheresis; these treatments indicate that disease is still active and the likelihood for exacerbation and life-threatening sudden incapacitation exists during emergency operations.

(7) *Cerebrovascular disease*. Cerebrovascular insufficiency includes the spectrum of syndromes from transient ischemic attack (TIA) to stroke, and its cause should be investigated. If due to arteriovenous malformation, cerebral aneurysm, or bleeding, see specific recommendations. If due to hypertension, this is evidence of end-organ disease. Stroke does not permit safe performance of the essential job tasks since the physiological stress associated with strenuous physical exertion can increase the likelihood for new strokes leading to life-threatening sudden incapacitation. Cerebral vascular insufficiency can affect control of respiration, cognitive abilities, communication, motor strength, sensation, coordination, and equilibrium. If stroke is due to embolic disease, risk factors (e.g., hypercoagulable state, collagen vascular disease, carotid vascular disease, patent foramen ovale, cardiac disease) need to be evaluated. Ability to safely and effectively perform essential job tasks is based on an evaluation of current neurologic status, treatment, and any contributory underlying conditions. (For example, Warfarin and other anticoagulant treatment regimens do not allow the safe performance of essential job task 8.)

(8) *Cerebrovascular bleed*. The cause of cerebrovascular bleed needs to be determined. If due to hypertensive bleed, this is evidence for target organ disease. Hypertension with target organ disease does not permit safe performance of the essential job tasks, as the hypertension and stress associated with strenuous physical exertion can increase the likelihood for new bleeds and strokes leading to life-threatening sudden incapacitation due to central nervous system instability affecting control of respiration, cognitive abilities, communication, motor skills, sensory abilities, coordination, and equilibrium.

Arteriovenous malformation or cerebral aneurysm does not allow for the safe performance of the essential job tasks since hypertension and stress associated with strenuous physical exertion can increase the likelihood for acute rupture and stroke leading to life-threatening sudden incapacitation.

A.13.13 The following information pertains to the medications marked with an asterisk in Table 13.13. Trademarks used herein are trademarks of their respective owners.

(1) *Anticoagulation medications (full- or low-dose) or any drugs that prolong prothrombin time, partial thromboplastin time, or international normalized ratio (INR)*. Examples of anticoagulation medi-

cations include antithrombin (ATryn®), apixaban (Eliquis®), argatroban, bivalirudin (Angiomax®), dabigatran etexilate (Pradaxa®), dalteparin (Fragmin®), enoxaparin (Lovenox®), fondaparinux sodium (Arixtra®), rivaroxaban (Xarelto®), and warfarin sodium (Coumadin®).

Antiplatelet agents are not anticoagulation medications and do not lead to restrictions (unless the underlying medical condition does). Examples of antiplatelet agents include aspirin, combination aspirin–extended-release dipyridamole (Aggrenox®), clopidogrel bisulfate (Plavix®), prasugrel (Effient®), ticagrelor (Brilinta®), and ticlopidine hydrogen chloride (Ticlid®).

Although risk of bleeding from the newer oral anticoagulants is generally less than with warfarin sodium, and antidotes for several are now available, published data to date do not indicate that risk of major bleeding from these medications is less than 1 percent per year, which is the risk level used by NFPA. Table 1 in Lowenstern, et al., provides a comprehensive summary of published data to date.

Research in trauma patients on anticoagulants is limited but notable in the following:

- (1) Kobayashi L., et al., “Novel oral anticoagulants and trauma: The results of a prospective American Association for the Surgery of Trauma Multi-Institutional Trial.”
- (2) Myers S. P., et al., “Management of anticoagulation with rivaroxaban in trauma and acute care surgery: Complications and reversal strategies as compared to warfarin therapy.”

In general, published trauma research includes older patients with more comorbidities and less severe trauma compared to firefighters who are healthier overall but at risk for more severe trauma.

(6) *Certain antihypertensive agents (e.g., beta-blockers, high-dose diuretics, and central agents such as clonidine)*. Beta-blockers, high-dose diuretics, and central agents, such as clonidine, have an unacceptably high risk for dehydration, electrolyte disorders, lethargy, disequilibrium, cardiovascular dysfunction, and alterations in mental status, including vigilance, judgment, and other neurologic functions. Other antihypertensive agents have minimal risk for side effects that could interfere with essential job tasks.

(8) *Inhaled bronchodilators (beta-agonists, anticholinergics; short or long lasting)*.

Inhaled bronchodilators have not been tested for efficacy in a fire environment nor can they be safely administered while wearing respiratory protections such as SCBA.

Leukotriene receptor antagonists should not cause a candidate to be unqualified if used to treat conditions not affecting the lower respiratory system.

(11) *Anti-inflammatory or antirejection medications (e.g., cyclosporin, methotrexate, CellCept® (mycophenolate mofetil), Cytoxan® (cyclophosphamide), or TNF-alpha blockers (commonly referred to as biologics) used for chronic inflammatory disease management*. Antirejection drugs increase the likelihood for infection.

A.13.14.2 It is recommended that members who become pregnant report the pregnancy immediately to the fire department physician.

The following information is intended to help female firefighters make informed decisions regarding their job activities if they are pregnant or considering pregnancy. The majority of pregnant firefighters will be able to continue to work throughout pregnancy, with some reasonable accommodations. They should discuss with their treating physician any individual conditions that might require limitation of activities during pregnancy. (See Annex E.)

The following occupational hazards can have adverse effects during pregnancy:

- (1) Products of combustion, especially carbon monoxide
- (2) Excessive heat (The risk to the fetus created by heat is highest during the first two months of pregnancy.)
- (3) Other toxic chemicals, including prolonged exposure to vehicular exhaust
- (4) Trauma (even simple falls)
- (5) Beginning in the second trimester: Alternating shift work, prolonged standing, and heavy lifting
- (6) Beginning in the second trimester: Noise exposure

Activities that involve or require aerobic fitness, speed, agility, and balance can be adversely affected by body changes during pregnancy, especially in the third trimester.

Personal protective equipment. PPE is not designed to protect the fetus. The PPE fitted pre-pregnancy might not offer the same level of protection during pregnancy and might need to be refitted.

Postdelivery. Return-to-work decisions should be based on an individualized evaluation of the member's status, the requirements of her work assignment, and the type of delivery and its complications.

Lactation. Exposure to toxic substances might result in the substances being present in breast milk.

A.13.15 The following information pertains to the conditions marked with an asterisk in Table 13.15.

(2) *A history of thermal, chemical, or electrical burn injury or other injury with residual functional deficit.* Previous burn injury per se does not interfere with the essential job tasks of firefighting. Extensive burn injury with or without the need for skin grafting can result in skin surfaces that are easily damaged, sensitive to chemical or solvent exposure, or lacking in sweat or sebaceous glands. The individual should be evaluated for heat or cold intolerance, range of motion and motor strength, and ability to wear personal protective clothing and equipment.

A.13.16 The following information pertains to the conditions marked with an asterisk in Table 13.16.

(6) *Other infection.* After acute infection has resolved, the firefighter can return to work if weight, muscle strength, cardiac function, and function of other involved organs have returned to levels required for safe and effective performance of essential job tasks. Concepts used within this document for each of these organ systems should be applied here.

(7) *Highly contagious infections (e.g., active pulmonary tuberculosis, mumps, measles, chicken pox, rubella, MRSA skin infections, SARS, COVID-19).* After active infection has resolved (e.g., sputum AFB or sputum culture negative for 3 successive days) and the firefighter is no longer contagious (usually within 2 weeks of successful treatment), the firefighter can return to work but perform only essential job tasks 1, 2, 3, 4, 5, 7, and 9 if

weight, muscle strength, pulmonary function, and function of other involved organs have returned to acceptable levels for safe performance. Concepts used within this standard for each of these organ systems should be applied here. A positive tuberculin (PPD) skin test or a positive tuberculin blood test without symptoms and with a normal chest radiograph indicates exposure, and latent infection without evidence for active infection does not prevent a firefighter from performing essential job tasks. Alternatively, a positive TB skin test (PPD) can be a false-positive from exposure to atypical mycobacterium or from prior BCG vaccination. The TB blood test does not produce these false positives, but experience with false negatives is limited [MMWR, No. RR-15, December 16, 2005]. If conversion from negative to positive tuberculin test (PPD or blood test) occurred within the last 2 years, there is increased risk for the development of active contagious tuberculosis, which requires either treatment or frequent monitoring for symptoms and chest radiograph changes (annually for at least 2 years or during evaluation of current symptoms). Individuals on prophylactic treatment can perform all essential job tasks without restrictions. Treatment is a personal decision, but in its absence, monitoring with chest radiographs at prescribed intervals is mandatory because development of active disease is a public health hazard.

(8) *Hepatitis and treatment thereof, specifically infectious diseases of the liver caused by viruses including, but not limited to, A, B, C, D, and E.* Hepatitis, when not acute or when chronic but without symptoms and without significant liver dysfunction or other organ system dysfunction, does not prevent the safe and effective performance of essential job tasks during firefighting or EMS work. Hepatitis A, when not acute, is no longer a public health risk. Hepatitis B, C, and so forth, are bloodborne pathogens and are not a public health risk, as standard precautions to prevent the spread of bloodborne infections are a mandatory part of all emergency operations. Treatment to prevent Hepatitis C from progressing to liver insufficiency or failure (i.e., cirrhosis) is now available and FDA approved. Members receiving this treatment need to be regularly evaluated to determine their ability to safely perform their essential job tasks. This combination drug therapy protocol can produce dehydration, fatigue, depression, anemia, thrombocytopenia (i.e., bleeding disorder), and so forth.

(9) *Human immunodeficiency virus (HIV) infection.* HIV without AIDS does not prevent the safe and effective performance of essential job tasks during firefighting or EMS work. HIV is a bloodborne pathogen and is not a public health risk, as standard precautions to prevent the spread of bloodborne infections are a mandatory part of all emergency operations. The firefighter with AIDS but without significant organ dysfunction is able to safely perform essential job tasks after careful evaluation. Treatment to prevent AIDS from occurring when HIV infection occurs or to control the progression of AIDS is available and FDA approved. Members receiving this treatment need to be regularly evaluated to determine their ability to safely perform the essential job tasks on the fireground, during emergency operations, and when wearing protective clothing. This combination drug therapy protocol can produce dehydration, fatigue, depression, anemia, thrombocytopenia (i.e., bleeding disorder), and so forth.

A.13.16(4) Examples of acute or self-limited infectious processes that require temporary work restriction include influenza or upper respiratory tract infection, which can interfere with safe performance of essential job tasks 2 and 3, or acute

dermatitis, which would interfere with safe performance of essential job task 3.

A.13.20 Malignant conditions of any organ system can produce specific organ dysfunction or generalized debilitation. Malignancy or its treatment can result in anemia, malnutrition, pain, and generalized weakness, temporarily or permanently compromising the individual's ability to safely and effectively perform the essential job tasks.

In all cases where an additional opinion from the treating physician is requested, the fire department physician determines whether restrictions are appropriate.

The following information pertains to the conditions marked with an asterisk in Table 13.20.

(1) *Benign tumor.* The individual should be evaluated for space-occupying lesion, treatment, or sequelae affecting ability to safely and effectively perform essential job tasks.

(3) *Central nervous system tumor.* The individual should be evaluated for history or risk of seizure; residual effects on balance, coordination, strength, speech, judgment; and medication requirements.

(4) *Head or neck malignancy.* The individual should be evaluated for the ability to wear SCBA and maintain nutrition and oral hydration.

(5) *Lung cancer.* The individual should be evaluated for residual pulmonary function and medication requirements.

(6) *Gastrointestinal malignancy.* The individual should be evaluated for abnormal bowel or urinary function that would interfere with emergency operations where toilet facilities are unavailable, the ability to maintain nutrition and hydration, and medication requirements.

(8) *Hematologic or lymphatic malignancy (e.g., leukemias, lymphomas).* The individual should be evaluated for anemia, leukopenia, or thrombocytopenia, or residual cardiac, pulmonary, GI, dermatological, or neurological effects of surgery, radiation, or chemotherapy.

A.13.21 Also see Annex G.

Firefighters perform individually and as a team. Firefighters with active, ongoing, or recurrent psychiatric or psychological conditions can have difficulty following orders, communicating information, and working in a coordinated manner with workers, victims, and the public. The firefighter with a personality disorder might not respond appropriately to command structure or adequately control his or her interpersonal behavior. Behavior that undermines command structure, group function, or group cohesion is not safe to the firefighter or others performing essential job tasks. Firefighters are exposed to gruesome tragedy during emergency operations, further exacerbating the stress of the job. Removing oneself from the scene, even temporarily, can significantly impact the success of an emergency operation. Medications used to treat psychiatric or psychological conditions can produce or worsen somnolence, impair coordination, and predispose to heat stress.

The following information pertains to the conditions marked with an asterisk in Table 13.21.

(10) *Substance-use disorder.* Substance-use interferes with cognitive functions, energy, command structure, communication, strength, sensation, gait, coordination, and equilibrium,

and therefore compromises the individual's ability to safely perform the essential job tasks. There is increased risk for auto accidents when driving vehicles or apparatus. Dehydration, arrhythmia, and disequilibrium can be life threatening in a toxic/traumatic/stressful environment. Firefighting requires individuals to perform independently and in coordination with others. Behavior that undermines command structure, group function, or group cohesion during emergency operations is not safe to the firefighter or others at the scene.

A.14.1.1 Although Chapters 14 through 19 are intended primarily for members involved in emergency operations, fire departments are encouraged to apply the components of the health-related fitness program to all employees.

A.14.1.2.2 The intent of this program is to promote health and fitness in a "mandatory, non-punitive" manner. "Mandatory, non-punitive" implies a program with universal participation. However, failure to achieve defined or individual fitness objectives should not be the basis for any employment sanctions, discipline, or other punitive actions.

A.14.2.1 The fire department needs to recognize that its members are its most valuable resource. The occupational safety and health program has provided direction on performing assigned functions in a safe manner. The health-related fitness program allows members to enhance and maintain their health and fitness throughout their tenure with the fire department. Education, one provision of a health-related fitness program, is a necessary component for improving health and fitness throughout the organization. The organization needs to provide the recognition and support to ensure the promotion and success of this program. Health and fitness are critical to maintaining the safety of every member.

Data suggest a positive correlation between the following:

- (1) A proactive approach to health and fitness and a decrease in debilitating occupational injuries
- (2) A reduction in workers' compensation claims and a decrease in acute and chronic health problems of firefighters

Combining a proactive health-related fitness program with an occupational safety and health program provides a fire department with the level of quality needed for its members.

The purpose of the health-related fitness program is consistent with the medical requirements and occupational safety and health standards, which is to improve the health fitness and overall well-being of firefighting personnel. Compliance with the standards of NFPA 1550 has demonstrated that, even in the fire service, benefits will ultimately be manifested in cost savings, decreased sick times, and reduced workers' compensation and disability expenses.

A commitment of time and financial resources is necessary to fulfill requirements of this standard. The fire department should afford individual firefighters the means, the facility, and the time, as part of their work-time function, to pursue the health-related goals. Data show that the initial investment of the fire service on behalf of its most valuable resource, the firefighter, will pay significant dividends in the future.

A.14.5.2 The fire department should provide an adequate facility to improve body mechanics, aerobic capacity, speed and power, muscular strength and endurance, and mobility and

flexibility, where exercise equipment is centrally located. Such a facility can be developed from the following:

- (1) Use of a gym in a commercial facility, high school, university, or other educational institution or private or governmental agency (e.g., military base)
- (2) In-house facility equipped through purchased or donated exercise equipment, which can include equipment obtained from the following:
 - (a) Made in local apprenticeship programs (e.g., welders or pipefitters)
 - (b) Made at and donated by correctional or educational institutions
 - (c) Donated by gyms or rehabilitation facilities
 - (d) Purchased on a shared cost agreement with the governing city, based on a reduced industrial insurance cost for a fitness program

The fire department should maintain equipment owned or leased by the fire department.

A.14.5.2.1 The fire department should allocate time on duty for physical fitness training. Scheduling of this time can vary due to emergency calls, training, and other activities.

A.15.1.2 The fire department can choose to acquire the services of an outside agent to serve as the health and fitness coordinator. This health and fitness coordinator should be trained in mental health or peer support and meet or exceed the training and educational background listed in A.15.2.1. The fire department should ensure that such an outside agent is familiar with the unique stresses present on the fireground.

Appropriate outside agents can be found at local colleges or universities in the exercise science, kinesiology, physical fitness, or fire technology departments. The private sector can also provide qualified personnel to serve as health and fitness coordinators. Such sources include hospital-based fitness programs, medical facilities, or private companies that provide fitness assessment and wellness programs.

A.15.1.3 Examples of subject matter experts for consultation are exercise physiologists, athletic trainers, and representatives of university health and wellness programs and executive wellness programs.

A.15.1.5 The data generated through the health-related fitness program will illustrate the relationship between firefighter fitness and occupational safety and health. Nonidentifying data can be shared between departments to establish this relationship. The health and fitness coordinator should confer with the health and safety officer regarding health-related fitness policies and procedures, fitness safety, accident and injury prevention, health promotion, and injury rehabilitation.

A.15.1.6 Communication between the health and fitness coordinator and the department's health and safety officer will ensure that data collection and other requirements of the occupational safety and health program are maintained.

A.15.2 There are no broadly accepted educational standards for health and fitness personnel in the United States. While it would be an unrealistic and unattainable goal to require that all health and fitness coordinators have a baccalaureate or graduate degree in a related discipline, it is important to note the level of formal training such a degree connotes.

A.15.2.1 A number of professional organizations, including those listed in Table A.15.2.1, provide training and educational experiences as well as certification programs for interested persons. It is in the best interests of fire departments to avail themselves of these professional services as time and resources allow.

The health and fitness coordinator should have a background in functional anatomy, exercise physiology, biomechanics, movement observation and assessment, fitness testing, exercise programming, coaching, and leadership.

A.15.3.2.1 Engaging in additional fitness training alongside academy training can significantly enhance physical performance but also carries the risk of rhabdomyolysis (rhabdo), a condition where damaged muscle tissue releases harmful substances into the bloodstream. Rhabdomyolysis is most common when individuals exert themselves excessively or when the cumulative stress of training does not allow for adequate rest or recovery time. This condition is also most common in conditions that combine heavy muscular work and heat stress. It's crucial for physical fitness trainers and academy staff to balance their training intensity and volume of training, as well as allow and encourage proper nutrition, hydration, and recovery to minimize the risk of rhabdomyolysis. The trainers and staff should provide increased attention to those participants at high risk, including, but not limited to, those who use prescription medication, OTC medications, alcohol, caffeine, and energy drinks and those with personal risk factors such as sickle cell trait. Additional information on rhabdomyolysis can be found at <https://www.cdc.gov/niosh/topics/rhabdo/resources.html>. When symptoms occur, prompt medical evaluation in a non-punitive manner is necessary. The fire department physician should determine when the participant can safely return to duty.

A.15.3.3 A minimal level of certification [IAFF/IAFC Peer Fitness Trainer (PFT)] can be obtained from the International

Table A.15.2.1 Professional Organizations Providing Training

Organization	Training Program
American College of Sports Medicine (ACSM)	Personal Trainer, Health and Fitness Instructor, Exercise Specialist
American Council on Exercise (ACE)	Personal Trainer
International Association of Fire Fighters (IAFF)	Peer Support
International Association of Fire Fighters (IAFF)/ International Association of Fire Chiefs (IAFC)	Fitness-Performance Specialist (FPS), Peer Fitness Trainer (PFT), Wellness-Fitness Ambassador (WFA)
National Strength and Conditioning Association (NSCA)	Certified Strength and Conditioning Specialist (CSCS), Certified Personal Trainer (CPT), or Tactical Strength and Conditioning (TSAC) Facilitator
National Academy of Sports Medicine (NASM)	Personal Trainer

Association of Fire Fighters as recommended by the IAFF/IAFC *Wellness-Fitness Initiative*.

A.16.2.2 This requirement is consistent with this standard regarding postponement of medical evaluation for acute medical problems.

A.16.4 The IAFF in conjunction with the IAFC has developed a *Wellness-Fitness Initiative* for the fire service. The initiative gives a department a template for developing a comprehensive fitness program. (Annex I provides a self-assessment tool for determining fitness levels.) The following examples are from the IAFF/IAFC *Wellness-Fitness Initiative* as well as other fitness assessment protocols, which vary in terms of ease of administration, safety, cost, and predictive value:

- (1) Body composition, including the following:
 - (a) Skinfold (various)
 - (b) Circumference (various)
 - (c) Bioimpedance (BIA)
 - (d) Hydrostatic weighing
 - (e) Body mass index
 - (f) Waist-to-hip ratio
- (2) Aerobic capacity, including the following:
 - (a) 1 mile (1.6 km) walk
 - (b) 1.5 mile (2.4 km) run/walk
 - (c) 12-minute run
 - (d) Step test (various)
 - (e) Stepmill
 - (f) Cycle ergometer (various)
 - (g) Treadmill (various)
- (3) Speed and power, including the following:
 - (a) Vertical jump
 - (b) Broad jump
 - (c) Jump squat
 - (d) Plyometric push-up
 - (e) Plyometric pull-up
 - (f) Medicine ball throw
- (4) Muscular strength and endurance, including the following:
 - (a) Squat (1 rep maximum, percent of body weight)
 - (b) Bench press (1 rep maximum or percent of body weight)
 - (c) Push-ups (maximum repetitions)
 - (d) Inverted row (maximum repetitions)
 - (e) Side plank (maximum time)
- (5) Mobility and flexibility, including the following:
 - (a) Weight bearing lunge (ankle mobility)
 - (b) Straight leg raise (hip mobility)
 - (c) Shoulder reach (shoulder mobility)

A.17.1 Annex H provides further information about each component of the fire department's exercise and fitness training program to assist the health and fitness coordinator in setting up and administering such a program.

A.17.3 The IAFF in conjunction with the IAFC has developed the *Wellness-Fitness Initiative* (WFI) for the fire service. The WFI outlines a step-by-step process to create an implementation plan for any health-related fitness program that includes the following:

- (1) *Establish a team.* Equal representation from both labor and management will help to foster a nonpunitive, coopera-

tive environment and equitable opportunity for all department personnel.

- (2) *Identify the aim(s) of the program.* Specifically, identify the behaviors or outcomes that will be used to measure the degree to which the program is successful.
- (3) *Complete a comprehensive needs assessment to include all of the following:*
 - (a) Identify all key stakeholders. Specifically, identify who stands to influence the success of the program, their level of involvement, and any potential barriers that could influence their participation.
 - (b) Identify and review existing plans, programs, and resources.
 - (c) Identify gaps, needs, regulatory standards, and policies.
 - (d) Identify potential obstacles and facilitators.
 - (e) Identify existing and potential sources of funding.
- (4) *Design the program.* Lay out all program components, a potential timeline for competition, and identify specific roles and responsibilities (and action items) for key stakeholders.
- (5) *Implement the program.* Put plans into action, promote the program among all stakeholders, seek to address potential barriers, and leverage facilitators.

A.18.1 Health education is now the driving force of health promotion and disease prevention. In the fall of 1993, the Centers for Disease Control (CDC) formally added "and Prevention" to its name. At that time the CDC director announced that prevention's time had come in America. Coincident with this, third-party payers had begun to recognize the value of education about prevention and began to reimburse for preventive services and risk-reduction counseling. Organizations that establish health care guidelines in this country, such as the US Preventive Services Task Force and American Academy of Family Physicians, unanimously agree that most clinical evaluation time for the average nonpregnant adult should be spent on counseling. It is in that spirit that this technical committee is promoting health education as a major part of the health-related fitness program.

A.18.1.1 It is understood that the number and type of available resources vary greatly between fire departments. Despite such differences, adequate low-cost resources are universally available to satisfy this standard.

The fire department is encouraged to use an opportunistic team approach in the dissemination of informational materials, fostering, for example, collaboration between the fire department physician, the health and safety officer, and the health and fitness coordinator. Information obtained from the physician could be complemented by that supplied by guest speakers at fire department meetings. The balance of information could be available in the form of pamphlet materials kept in an accessible display case at the firehouse. Most materials are available free of charge through public medical organizations, public health agencies, professional organizations such as the IAFF, NVFC, or IAFC, or private advocacy groups, or can be found on the Internet and downloaded free of charge.

A.18.1.2 Educational materials can be in print or electronic form and be administered in a formal or informal manner. Education materials should address the following topics:

- (1) Behavioral health, alcohol and substance abuse prevention, suicide prevention, PTSD
- (2) Pap smears, annual gynecological exams, colonoscopies, mammograms, and prostate-specific antigen (PSA) tests
- (3) Tobacco cessation programs
- (4) Cancer risks, including skin cancer (the most common form of cancer), colon cancer, prostate cancer, breast cancer, and lung cancer
- (5) Nutrition education, including lipids, weight management, diabetes, metabolic syndrome, and effects of obesity
- (6) Hypertension
- (7) Infectious diseases, including recommendations for the prevention of influenza, hepatitis, tetanus, pneumonia, tuberculosis, varicella (chicken pox), measles, and rubella, as well as immunization recommendations for given age groups
- (8) Sexually transmitted diseases, including recommendations for prevention, diagnosis, and treatment of HIV, hepatitis, herpes, and chlamydia
- (9) Cardiovascular risk reduction
- (10) Sleep hygiene and fatigue management
- (11) Self-care, including safe body mechanics and low back injury prevention
- (12) Reproductive health

A.19.1 The primary purpose for maintaining a health-related fitness program file for each participant is to inform exercise programming decisions and facilitate annual comparisons with previous results. Comparison of new data to previous results will show an individual's progress in maintaining or improving their level of fitness. Consequently, from analysis and comparison of data, an individual's exercise program can be modified. In addition to measuring a participant's progress and providing information for modification of their exercise program, analysis of the organization's set of files, or database, will provide information about organizational progress in developing a health-related fitness program and the need for program modification. Along with providing valuable information about the success of the health-related fitness program, maintenance of the database and its subsequent analysis will provide evidence to justify the cost of the program.

Electronic data processing is often employed to facilitate management of such a database. BSDI has been recognized by the IAFF/IAFC *Wellness-Fitness Initiative* as the publisher of appropriate software for documenting health-related fitness information.

A.19.4 It is recommended that the health-related fitness program file contain demographic information such as age, gender, ethnicity, years of service, and job assignment, as well as information regarding physical capacity, such as aerobic capacity, heart rate recovery, strength and endurance, mobility and flexibility, and control of knees and lower back. To ensure the consistency and continuity of the process, data should be collected on a standard form such as that shown in Figure A.19.4.

A.20.2.1.1.1 This procedure should include the following elements of the rehabilitation process:

- (1) Initiate rehabilitation

- (2) Responsibilities
- (3) Accountability
- (4) Safety
- (5) Release

A.20.2.1.1.2 Figure A.20.2.1.1.2 shows a generic standard operating guideline for rehabilitation that can be adopted for use by a fire department.

A.20.2.1.1.3 Where limited resources strain existing personnel, crews can be rotated to a less physically demanding task (e.g., operating the pump rather than being part of the interior attack) as part of a strategic approach to limiting exertion.

A.20.2.1.4 Recovery from the physical demands of an emergency incident or training activity is more effective when a member or company can return to quarters and reset themselves prior to being made available for another incident or activity. In addition to returning equipment to service, the members should take time for a shower (after exposure to contaminants), get additional rest (mental and physical), and make sure they have hydrated and nourished themselves. In the case of volunteer or recalled members, the post-incident recovery process provides time to observe members for lingering incident physical and mental stressors prior to being released from duty to their homes.

A.20.4.1 Members should follow accepted guidelines for hydration and nutrition. Beverages, foods, and substances that should be avoided include the following:

- (1) Carbonated, high-fructose-content, and high-sugar drinks [exceeding 7 percent carbohydrate (CHO) solution]
- (2) Foods with high fat and/or high protein content
- (3) Alcohol within 8 hours prior to duty
- (4) Excessive fluids
- (5) Tobacco
- (6) Creatine supplements
- (7) Ephedrine
- (8) Beverages exceeding 400 milligrams of caffeine per day
- (9) Energy drinks

Energy drinks, not to be confused with sports drinks, contain ingredients that can significantly raise heart rate and blood pressure and increase the cardiac risk to firefighters, especially when operating at high intensities. Due to the risk of sudden cardiac death, some countries have banned the sale of energy drinks.

A.20.4.2 Physical conditioning is known to enable individuals to operate at a higher core temperature, decrease cardiovascular strain associated with strenuous activity, and improve physical performance. Maintaining good physical conditioning can optimize a member's performance under extreme conditions and facilitate effective rehabilitation.

A recommended way to reduce health risks is through sufficient hydration, diet, limited outdoor physical exercise on hot days, acclimatization, and monitoring of weather conditions to ensure members understand the dangers associated with working in climatic conditions. All members should train to acclimate to appropriate environmental conditions. The process of acclimatization should be done in a manner that builds up the member's ability to exercise or perform under more extreme conditions.

PERSONAL AND DEMOGRAPHIC INFORMATION

Date of submission (mm/dd/yy): _____

Fire department confidential identification code: _____

Firefighter confidential identification code: _____

Ethnicity ☐ African American ☐ Asian ☐ Hispanic ☐ Native American ☐ Filipino ☐ Caucasian ☐ Other

Job assignment: ☐ Emergency response ☐ Nonemergency response

Years of service: _____

Age: _____ Height (inches): _____ Weight (pounds): _____

Gender: ☐ Male ☐ Female ☐ Other

FITNESS ASSESSMENT

Body Composition	Measurements	Observations
1. Body mass index (BMI)	_____	_____
2. Waist circumference (inches)	_____	_____
3. Hip circumference (inches)	_____	_____
4. Waist-to-hip circumference ratio (W/H)	_____	_____

Mobility and Flexibility	Measurements	Observations
5. Shoulder flexion reach (shoulder score)	L: _____ R: _____	_____
6. Shoulder extension reach (shoulder score)	L: _____ R: _____	_____
7. Straight leg raise (hip score)	L: _____ R: _____	_____
8. Weight-bearing lunge (ankle score)	L: _____ R: _____	_____

Speed and Power	Measurements	Observations
9. Vertical jump (inches)	_____	_____

Aerobic Capacity and Recovery	Measurements	Observations
10. Pre-exercise heart rate (bpm)	_____	_____
11. Pre-exercise blood pressure (mmHg)	_____	_____
12. Submaximal treadmill run (time, max HR)	Time: _____ HR: _____	_____
13. Recovery treadmill walk (2-min HR)	_____	_____
14. Post-exercise blood pressure (mmHg)	_____	_____

Muscular Strength and Endurance	Measurements	Observations
15. Maximum push-ups (reps)	_____	_____
16. Maximum inverted rows (reps)	_____	_____
17. Maximum side plank time (seconds)	L: _____ R: _____	_____

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FIGURE A.19.4 Sample Health-Related Fitness Program Form Showing Demographic and Assessment Information.

STANDARD OPERATING PROCEDURE/GUIDELINE FOR REHABILITATION

PURPOSE. To provide guidance on the implementation and use of a rehabilitation process as a requirement of the incident management system (IMS) at the scene of a fire, other emergency, or training exercise. It will ensure that personnel who might be suffering the effects of metabolic heat buildup, dehydration, physical exertion, and/or extreme weather receive evaluation and rehabilitation during emergency operations.

SCOPE. All personnel attending or operating at the scene of a fire/emergency or training exercise.

RULES.

- (1) Rehabilitation shall commence when fire/emergency operations and/or training exercises pose a health and safety risk.
- (2) Rehabilitation shall be established for large-scale incidents, long-duration and/or physically demanding incidents, and extreme temperatures.
- (3) The incident commander shall establish rehabilitation according to the circumstances of the incident. The rehabilitation process shall include the following:
 - (a) Rest
 - (b) Hydration to replace lost body fluids
 - (c) Cooling (passive and/or active)
 - (d) Warming
 - (e) Medical monitoring
 - (f) Emergency medical care if required
 - (g) Relief from extreme climatic conditions (heat, cold, wind, rain)
 - (h) Calorie and electrolyte replacement
 - (i) Accountability
 - (j) Release

RESPONSIBILITIES.

The incident commander shall be responsible for the following:

- (1) Include rehabilitation in incident/event size-up
- (2) Establish a rehabilitation group to reduce adverse physical effects on firefighter while operating during fire/emergencies, training exercises, and extreme weather conditions
- (3) Designate and assign a supervisor to manage rehabilitation
- (4) Ensure sufficient resources are assigned to rehabilitation
- (5) Ensure EMS personnel are available for emergency medical care of firefighter as required

The rehabilitation manager shall be responsible for the following:

- (1) Don the rehabilitation manager vest
- (2) Whenever possible, select a location for rehabilitation with the following site characteristics:
 - (a) Large enough to accommodate the number of personnel expected (including EMS personnel for medical monitoring)
 - (b) Have a separate area for members to remove personal protective equipment
 - (c) Be accessible for an ambulance and EMS personnel should emergency medical care be required
 - (d) Be removed from hazardous atmospheres including apparatus exhaust fumes, smoke, and other toxins
 - (e) Provide shade in summer and protection from inclement weather at other times
 - (f) Have access to a water supply (bottled or running) to provide for hydration and active cooling
 - (g) Be away from spectators and media

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FIGURE A.20.2.1.1.2 Sample Rehabilitation Standard Operating Procedure/Guideline.

STANDARD OPERATING PROCEDURE/GUIDELINE FOR REHABILITATION (continued)

- (3) Ensure personnel in rehabilitation “dress down” by removing their bunker coats, helmets, hoods, and opening their bunker pants to promote cooling
- (4) Provide the required resources for rehabilitation including the following:
 - (a) Potable drinking water for hydration
 - (b) Sports drinks (to replace electrolytes and calories) for long duration incidents (working more than one hour)
 - (c) Active cooling where required
 - (d) Medical monitoring equipment (chairs to rest on, blood pressure cuffs, stethoscopes, checksheets, etc.)
 - (e) Food where required and a means to wash or clean hands and face prior to eating
 - (f) Blankets and warm, dry clothing for winter months
 - (g) Washroom facilities where required
- (5) Time personnel in rehabilitation to ensure they receive at least 10 minutes to 20 minutes of rest
- (6) Ensure personnel rehydrate themselves
- (7) Ensure personnel are provided with a means to be actively cooled where required
- (8) Maintain accountability and remain within rehabilitation at all times
- (9) Document members entering or leaving rehabilitation
- (10) Inform the incident commander, accountability officer (resource status unit), and EMS personnel if a member requires transportation to and treatment at a medical facility
- (11) Serve as a liaison with EMS personnel

Company officers shall be responsible for the following:

- (1) Be familiar with the signs and symptoms of heat stress and cold stress
- (2) Monitor their company members for signs of heat stress and cold stress
- (3) Notify the IC when stressed members require relief, rotation, or reassignment according to conditions
- (4) Provide access to rehabilitation for company members as needed
- (5) Ensure that their company is properly checked in with the rehabilitation manager and accountability officer (resource unit), and that the company remains intact

Crew members shall be responsible for the following:

- (1) Be familiar with the signs and symptoms of heat and cold stress
- (2) Maintain awareness of themselves and company members for signs and symptoms of heat stress and cold stress
- (3) Promptly inform the company officer when members require rehabilitation and/or relief from assigned duties
- (4) Maintain unit integrity

EMS personnel shall be responsible for the following:

- (1) Report to the incident commander and obtain the rehabilitation requirements
- (2) Coordinate with rehabilitation manager
- (3) Identify the EMS personnel requirements
- (4) Check vital signs, monitor for heat stress and signs of medical issues
- (5) Document medical monitoring
- (6) Provide emergency medical care and transportation to medical facilities as required
- (7) Inform the incident commander and the rehabilitation manager when personnel require transportation to and treatment at a medical facility
- (8) Document emergency medical care provided

FIGURE A.20.2.1.1.2 *Continued*

STANDARD OPERATING PROCEDURE/GUIDELINE FOR REHABILITATION (*continued*)**PROCEDURES.**

- (1) All personnel shall maintain hydration on an ongoing basis (preincident, incident, postincident).
- (2) Members shall be sent to rehabilitation as required.
- (3) All members shall be sent to rehabilitation following the use of two 30-minute or 45-minute SCBA cylinders or one 60-minute SCBA cylinder. Shorter times might be considered during extreme environmental conditions.
- (4) Passive cooling shall be employed to reduce firefighter heat stress. This could include moving to a shaded or air-conditioned area, removal of PPE, ingestion of cool fluids, and rest.
- (5) Active cooling shall be employed to reduce firefighter heat stress when passive cooling is ineffective or when a member is experiencing heat-related illness. This could include forearm immersion, misting fans, and cold towels.
- (6) In hot, humid conditions, a minimum of 10 minutes (20 minutes is preferable) of active cooling shall be applied following the use of the second and each subsequent SCBA cylinder.
- (7) Personnel in rehabilitation shall rest for at least 10 minutes to 20 minutes prior to being reassigned or released.
- (8) EMS personnel shall provide medical monitoring and emergency medical care as per medical protocol.
- (9) If a member is demonstrating abnormal vital signs, he or she shall be monitored frequently during rehabilitation.
- (10) Personnel who are weak or fatigued with pale clammy skin, low blood pressure, nausea, headache, or dizziness shall be assessed by EMS personnel.
- (11) Personnel experiencing chest pain, shortness of breath, dizziness, or nausea shall be transported to a medical facility for treatment.
- (12) Personnel transported to a medical facility for treatment shall be accompanied and attended to by a department representative.
- (13) Members should drink water during rehabilitation. After the first hour, a sports drink containing electrolytes should be provided. Soda and caffeinated and carbonated beverages should be avoided.
- (14) Nutritional snacks or meals shall be provided as required during longer duration incidents.
- (15) No tobacco use shall be permitted in or near the rehabilitation area.

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FIGURE A.20.2.1.1.2 *Continued*

A.20.4.3 Members should avoid exhaustive physical activity and training that requires an extensive recovery when emergency response is required.

A.20.4.6 Engaging in physical activity and/or heat exposure carries the risk of rhabdomyolysis (rhabdo), a serious or sometimes fatal condition where damaged muscle tissue releases harmful substances into the bloodstream and may result in permanent disability. Cases of rhabdomyolysis in the fire service are most often associated with members who are engaged in extended intense exercise.

Rhabdomyolysis is most common when individuals exert themselves excessively or when the cumulative stress of training does not allow for adequate rest or recovery time. This condition is also most common in conditions that combine heavy muscular work and heat stress. It's crucial for physical fitness trainers and academy staff to balance their training intensity and volume of training, as well as allow and encourage proper nutrition, hydration, and recovery to minimize the risk of rhabdomyolysis.

The trainers and staff should pay increased attention to those participants at high risk. This includes, but is not limited to, those who use prescription medication, OTC medications, alcohol, caffeine, and energy drinks, as well as those with personal risk factors such as sickle cell trait.

Prompt medical evaluation is necessary when any of the following symptoms occur:

- (1) Muscle pain or ache out of proportion
- (2) Fatigue greater than expected for an activity
- (3) Tea or cola (dark brown) colored urine

Symptoms can be immediate or delayed by several hours to days after activity. A blood test check for serial serum creatine phosphokinase (CK) is required to determine if rhabdomyolysis is present.

Once rhabdomyolysis has been diagnosed and treated, the firefighter can be medically cleared to return to duty.

See the following for additional information:

National Institute for Occupational Safety and Health, "Rhabdomyolysis, Resources Page," [cdc.gov/niosh](https://www.cdc.gov/niosh), last reviewed February 8, 2023, www.cdc.gov/niosh/topics/rhabdo/resources.html

Rhabdomyolysis in Structural Fire Fighters: A Patient Population at Risk, cdc.gov/niosh, DHHS (NIOSH) Publication No. 2018-134 (May 2018). www.cdc.gov/niosh/docs/2018-134/pdfs/2018-134.pdf.

What Structural Fire Fighters Need to Know about Rhabdomyolysis, DHHS (NIOSH) Publication No. 2018-133 (May 2018). www.cdc.gov/niosh/docs/2018-133/pdfs/2018-133.pdf.

Eisenberg, Judith et al. *Evaluation of heat stress, heat strain, and rhabdomyolysis during structural fire fighter training*. HETA No. 2012-0039-3242 (2015). stacks.cdc.gov/view/cdc/52714/cdc_52714_DS1.pdf.

Eisenberg, Judith et al. *Evaluation of rhabdomyolysis and heat stroke in structural firefighter cadets*. HHE Report No. 2018-0154-3361 (2019). stacks.cdc.gov/view/cdc/82755/cdc_82755_DS1.pdf.

A.20.4.7 Research indicates that firefighters are at high risk of sleep deprivation, fatigue, and sleep disorders. Firefighters who grapple with their internal body clock or circadian rhythm due to shift work or other long work hours and who are sleep deprived often struggle with memory, focus impairment, irritability, depression, and relationship/social problems. In turn, these can lead to an increased risk of accidents and injuries. These studies also note that firefighters also face potential health problems, including a higher risk of ulcers, insulin resistance, metabolic syndrome, heart disease, and cancer. Strategies to consider to combat acute and chronic sleep and circadian rhythm disorders include the following:

- (1) Strategic caffeine use
- (2) Taking naps
- (3) Proper sleep hygiene
- (4) Identification and treatment of sleep disorders

A.21.1.1 Preliminary exposure reduction is an essential first step toward minimizing cross-contamination prior to cleaning protective clothing and equipment. Preliminary exposure reduction is an attempt to remove some exterior soiling and contamination from protective clothing and equipment by the end user to minimize the transfer of soil and contaminants away from the incident scene. Whenever possible, preliminary exposure reduction should be conducted as personnel exit the hot zone and before beginning rehabilitation.

While it is possible to conduct dry mitigation without the elements being taken out of service, wet mitigation might require protective elements to be taken out of service. While the selected procedures for preliminary exposure reduction might not result in the elements being taken out of service, a determination by the organization can be made that the elements be isolated and bagged if they are determined to be contaminated and warrant more extensive cleaning.

Some organizations might consider having spare gear available for members or, alternatively, other spare clothing, such as disposable clothing to be worn until the member can shower and change into clean clothing.

Preliminary exposure reduction after the termination of an incident can remove substantial amounts of surface contaminants before they have a chance to set in and can help limit the transfer of contaminants to apparatus, personal vehicles, and stations. Many of the contaminants that can cause damage to visibility markings and other materials and components of ensembles or ensemble elements also can be removed if preliminary exposure reduction is done as soon as possible after exposure to those contaminants.

It is recognized that it is not always practical for organizations to carry out preliminary exposure reduction on scene because of constraints with personnel, on-scene resources, the availability of spare gear, weather, and other operational factors. Nevertheless, it is important that organizations implement some form of preliminary exposure reduction procedures as soon as practically possible, particularly following any event where ensembles or ensemble elements are contaminated.

Use of a portable decontamination shower unit that conforms to the requirements in ANSI/ISEA 113, *American National Standard for Fixed and Portable Decontamination Shower Units*, offers one means for providing wet mitigation as part of preliminary exposure reduction.

A.21.2.5 In the event that personnel are exposed to a no-entry zone, appropriate contamination reduction strategies for the hazards encountered should be utilized.

A.21.2.6 The hot zone includes, but is not limited to, the area of the smoke plume.

A.21.2.7 The warm zone is the portion of the emergency scene where the contaminants might have been transported by the firefighters as they left the hot zone with contamination. The need to wear PPE continues and, in many respects, the warm zone is an equal risk to the responders as the hot zone. Until the contaminants have been removed from the PPE or the contaminated PPE has been removed from the firefighters, the precautions used in the hot zone should continue to be used.

Most incident activities outside of the hot zone take place in the warm zone. Apparatus will often be located in the warm zone, as well.

A.21.2.8 The cold zone represents the area where there are minimal risks for human injury or exposure. Contamination exposure has been mitigated in this area and no further control measures are necessary to protect against that contamination. The cold zone might also be known as the clean zone. Cold zone activities include member rehabilitation, incident debriefing, media interactions, and patient treatment in a public exclusion area.

A.21.3.1 Preliminary exposure reduction is not considered by itself to be cleaning or decontamination of protective clothing and equipment. Rather, it is intended to provide a means for helping to reduce the exposure of firefighters to soils and contaminants that arise from exposures occurring during structural or proximity fires or other emergency response events.

Preliminary exposure reduction is also required to aid in minimizing the transfer of soils and contaminants from the emergency scene to the apparatus, station, and personal vehicles. Other forms of cleaning, such as advanced or specialized cleaning, are required to provide full cleaning of the ensemble or ensemble elements.

The decision to apply preliminary exposure reduction should be based on the following considerations for suspected contamination:

- (1) Is there visible soot on any of the ensemble elements?
- (2) Is there an obvious odor on any of the ensemble elements?
- (3) Did personnel operate in conditions that required the use of an self-contained breathing apparatus (SCBA)?
- (4) Did personnel operate in the presence of burning chemicals, plastics, synthetics, or metals?

In addition to the above, preliminary exposure reduction and/or advanced or specialized cleaning should always be applied if decided by the incident commander or safety officer or when requested by a member.

Where ensembles and ensemble elements have been suspected or found to have contamination from bulk chemicals, asbestos, or other designated hazardous substances, body fluids, other forms of microbial contamination, or products of combustion products from a structural or other fire, the organization should apply the steps shown in Figure A.21.3.1(a) and Figure A.21.3.1(b).

A.21.3.1.1 The decision between dry and wet mitigation will depend on the resources available to the organization and the conditions at the emergency scene or other location. Work by the Illinois Fire Service Institute under an Assistance to Firefighters Grant from the US Department of Homeland Security has shown that wet mitigation techniques are more effective at removing surface contamination as compared to dry mitigation techniques.

Wet mitigation techniques remove a significant amount of products of combustion, whereas dry mitigation techniques only remove a portion of this contamination. Techniques involving blowing air onto ensembles or ensemble elements such as a leaf blower have very low effectiveness and might only redistribute contamination at the emergency scene and create inhalation hazards for unprotected personnel, and thus should be avoided. See Fent, Kenneth W., et al., "Contamination of firefighter personal protective equipment and skin and the effectiveness of decontamination procedures."

The dry mitigation technique should be performed by brushing debris from the exterior of ensembles and ensemble elements with a soft bristle brush prior to removal.

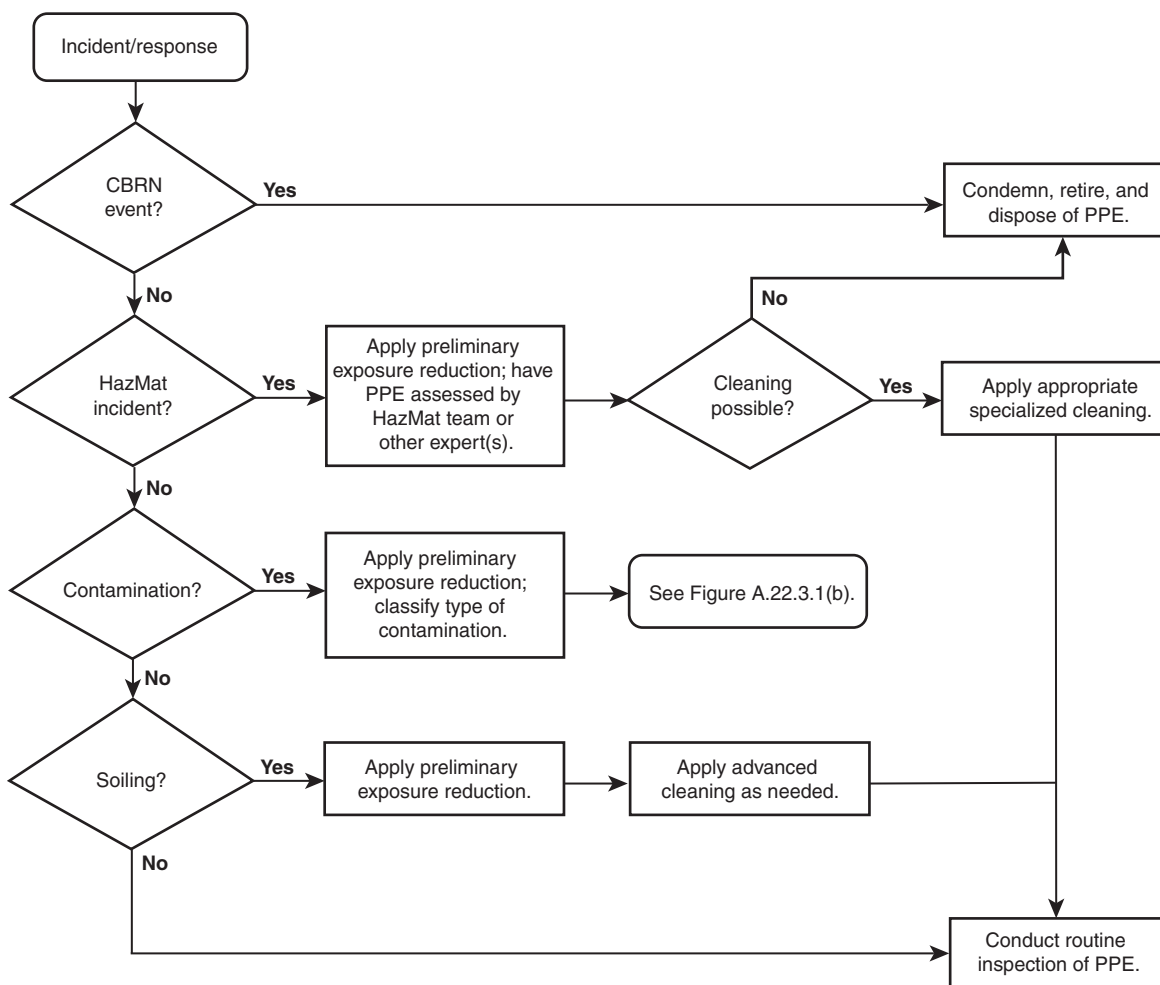
Dry mitigation techniques are best achieved with a soft bristle brush starting at the top of the end user's ensemble and working downward.

The wet mitigation technique should be performed by gently rinsing the exterior of ensembles and ensemble elements using low-pressure and low-volume flow water. A mild detergent can be used to aid in the wet mitigation technique, followed by gentle rinsing. Heavy scrubbing or spraying with high-velocity water jets, such as a power washer, should not be used.

There are several means by which wet mitigation techniques can be carried out. One method is to use a reducer from the apparatus pump panel to supply a small hose line, such as a forestry hose or a garden hose with an adjustable nozzle, at low pressure and low volume. Caution should be used when using ordinary fire hoses and nozzles for this technique where the lowest possible flow rate is used. Most departments have a booster line or trash line that is usually $\frac{3}{4}$ in. or 1 in. in diameter that can be applied at a low pressure (less than 30 psi). Portable decontamination showers that conform to ANSI/ISEA 113, *American National Standard for Fixed and Portable Decontamination Shower Units*, can also be used and can assist where weather, modesty, or other issues can arise.

The process of wet mitigation should start at the top of the user's ensemble and rinse downward. Where necessary, a soft bristle brush can be used to gently scrub the ensemble or ensemble elements during the wet mitigation technique. The important aspects for this technique are that the spray be light, not soak through the clothing, and be able to be applied over the entire firefighter, as the purpose of this mitigation technique is to primarily remove surface contamination. Wet mitigation techniques cannot remove interior layer soiling or contamination.

It is further recommended that a mild detergent be used as an aid in wet mitigation where the surfactant in the detergent is helpful for removing exterior soils. Where a mild detergent is used, it should be followed by gentle rinsing of the ensemble or ensemble elements.



Note: Contaminants shown in relative hierarchy of exposure risk. Multiple forms of contamination might apply. Clean according to highest risk.

FIGURE A.21.3.1(a) Approach for Deciding Handling, Cleaning, and Disposition of Ensemble Elements. [1851:Figure 7.1.1.2(a)]

Organizations performing wet mitigation should apply procedures that take into consideration the runoff of any contaminated rinse water to minimize the spread of contamination to the environment.

If used in combination, dry mitigation should precede wet mitigation.

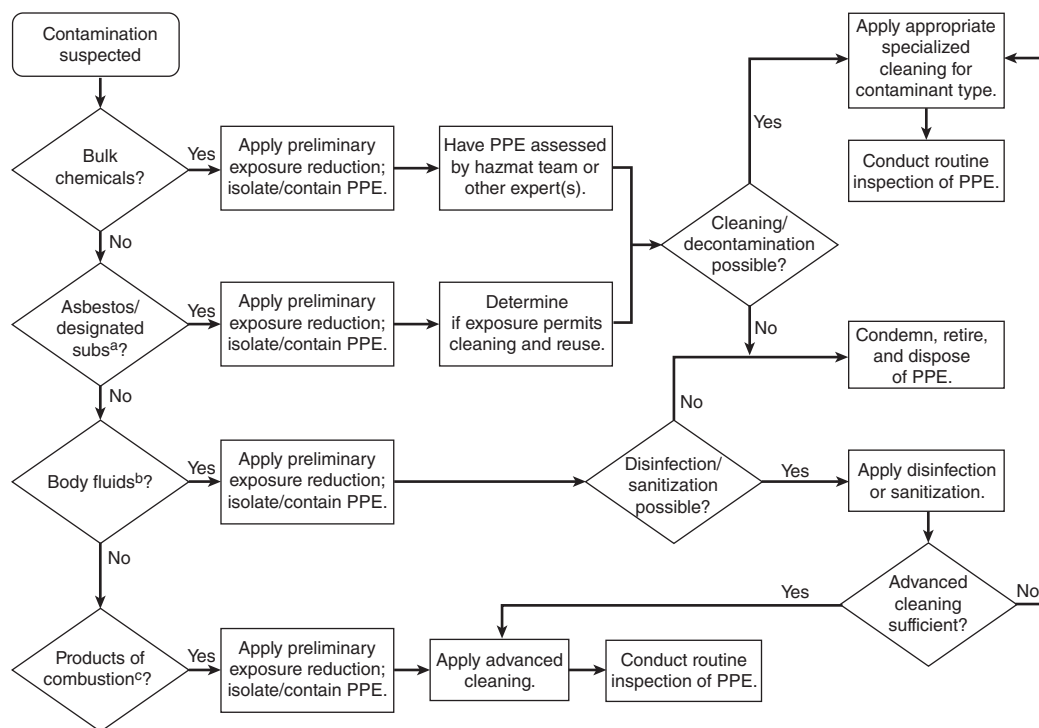
Gross decontamination should require personnel being decontaminated to remain in full PPE with face piece donned and breathing on air. Personnel performing decontamination should be in appropriate PPE to support personnel in the operational area. Such PPE can include nitrile gloves, eye protection, and fit-tested P100 mask at a minimum for particulate inhalation protection.

During preliminary exposure reduction, the use of a brush or any other abrasive cleaning devices on radiant reflective outer shells and other components of proximity firefighting protective ensembles and ensemble elements should not be permitted.

A.21.3.2 The purpose of remaining on air is to minimize the end user's exposure to products of combustion from the ensemble or ensemble elements following contaminant exposure during a structural fire and to avoid breathing in any particulates that can be dislodged from the ensemble or ensemble elements during dry mitigation.

A.21.3.6 Ensembles or ensemble elements, even when bagged, should not be transported in the passenger areas of apparatus or personal vehicles. There is a risk of contamination to the inside of the vehicle due to the possible presence of contaminants on the outside of the container.

The removal of ensembles or ensemble elements at the scene might require additional clothing to be present, particularly under inclement or cold weather conditions. Portable facilities might be required for end users to change. Portable decontamination showers conforming to ANSI/ISEA 113, *American National Standard for Fixed and Portable Decontamination Shower Units*, can be set up at the scene in a relatively short period of time and require limited resources for protection from weather and modesty for firefighters. In addition, it is



Notes:

^aAnd other designated substances

^bIncludes other microbial contamination

^cIncludes any significant structural fire exposure

FIGURE A.21.3.1(b) Approach for Addressing Specific Types of Contamination. [1851:Figure 7.1.1.2(b)]

recommended that personnel use soap and water or disposable wet wipes if soap and water are not available to clean portions of their face and skin when it has been directly exposed to contaminants, change into a clean station/work uniform, and take a shower as soon as possible.

For isolation of ensembles and ensemble elements, airtight protective containers or bags should be used to minimize cross-contamination. Examples include disposable, heavy-duty polyethylene bags, or sealable plastic cases, which are cleanable. If a plastic bag is used, it is recommended that the bag be clear to ensure that the contents of the bag can be readily identified.

If the protective ensemble or ensemble elements are wet, the protective ensemble or ensemble elements must be removed as soon as possible following transport from the fire or other emergency scene since ensembles and ensemble elements that remain wet under closed conditions can result in the growth of damaging mold and mildew. It is further important that, following their transport, protective ensembles and ensemble elements be stored under conditions where they can dry until appropriate cleaning procedures can be conducted as specified in Chapter 7 of NFPA 1851.

The manufacturer's guidelines for the proper cleaning of face shields, flip-downs or goggles should be followed. Most manufacturers list specific products that will clean these components without causing damage. For example, repeatedly using ammonia-based window cleaner will eventually cause fogging that will decrease visibility.

A.21.4.1 Personal hygiene tasks should occur as soon as possible after the operating member exits the hot zone. After the fire, members who operated in the hot zone should immediately remove soot from their hands, head, and neck using soap and water or skin cleansing wipes, if available. Washing should occur during air cylinder changes and in rehabilitation areas between operational periods whenever possible. Personal hygiene steps should be employed prior to entering the rehabilitation area and the consumption of fluids and/or food. Drinking and eating is permissible outside the area where smoke and contamination can occur after operating personnel have conducted a preliminary exposure reduction of contaminated gear and performed personal hygiene steps.

A.22.1.1.1 Crew based (self-rehab) may occur in either the warm zone or cold (clean) zone. Preliminary exposure reduction and on-scene personal hygiene should occur before crew based (self-rehab).

A.22.1.1.2 Rehabilitation operations should consider the scope of the incident, including the following:

- (1) *Time.* Extended use of turnout gear and extended exposure to weather conditions.
- (2) *Complexity.* Crime scenes, standoffs, search operations, mass gatherings/public events, and so forth.
- (3) *Intensity.* Mental and/or physical stress on a member, such as major extrications, actual fire attack, radiant heat load, or interior search and rescue.

Rehabilitation operations should consider hot weather conditions, including the following:

- (1) Temperature (*see Table A.22.1.1.2*)
- (2) Relative humidity (*see Table A.22.1.1.2*)
- (3) Direct sunlight

Rehabilitation operations should consider cold weather conditions, including the following:

- (1) Temperature
- (2) Wind speed
- (3) Moisture

The National Weather Service (NWS) implemented a new Wind Chill Temperature (WCT) index during the 2001–2002 winter season (*see Figure A.22.1.1.2*). The reason for the change was to improve the previous index used by the NWS and the Meteorological Service of Canada (MSC), which was based on the 1945 Siple and Passel index. Most of the changes in the new index are at temperatures below 5°F (–12°C).

The new WCT index makes use of advances in meteorology, biometeorology, and computer modeling to provide a more

accurate, more useful formula for calculating the dangers of winter winds and freezing temperatures. In addition, clinical trials have been conducted and the results of those trials have been used to verify and improve the accuracy of the new formula.

Specifically, the improvements to the new WCT index are as follows:

- (1) It uses calculated wind speeds at an average height of 5 ft (1.5 m) (typical height of a human face) based on readings from the national standard height of 33 ft (10 m) (typical height of an anemometer).
- (2) It is based on the latest heat transfer theory (i.e., heat loss from the body to its surroundings during cold and breezy/windy days).
- (3) It uses a standard factor for skin tissue and assumes a no-sunlight scenario.

A.22.1.3 This is intended to prevent stoic members with serious medical conditions from refusing medical evaluation and treatment at the incident.

Table A.22.1.1.2 Heat Stress Index

Relative Humidity (Percent)	Air Temperature (°F)										
	70	75	80	85	90	95	100	105	110	115	120
	Apparent Temperature (°F)										
0	64	69	73	78	83	87	91	95	99	103	107
10	65	70	75	80	85	90	95	100	105	111	116
20	66	72	77	82	87	93	99	105	112	120	130
30	67	73	78	84	90	96	104	113	123	135	148
40	68	74	79	86	93	101	110	123	137	151	
50	69	75	81	88	96	107	120	135	150		
60	70	76	82	90	100	114	132	149			
70	70	77	85	93	106	124	144				
80	71	78	86	97	113	136	157				
90	71	79	88	102	122	150	170				
100	72	80	91	108	133	166					
Apparent Temperature (°F)				Danger Category				Injury Threat			
Below 80				None				Little or no danger under normal circumstances			
80–90				Caution				Fatigue possible if exposure is prolonged and there is physical activity			
91–105				Extreme Caution				Heat cramps and heat exhaustion possible if exposure is prolonged and there is physical activity			
106–130				Danger				Heat cramps or exhaustion likely and heatstroke possible if exposure is prolonged and there is physical activity			
Above 130				Extreme Danger				Heatstroke imminent!			

Note: Add 10°F when protective clothing is worn and add 10°F when in direct sunlight.

Source: US Fire Administration, FA-114, *Emergency Incident Rehabilitation*.

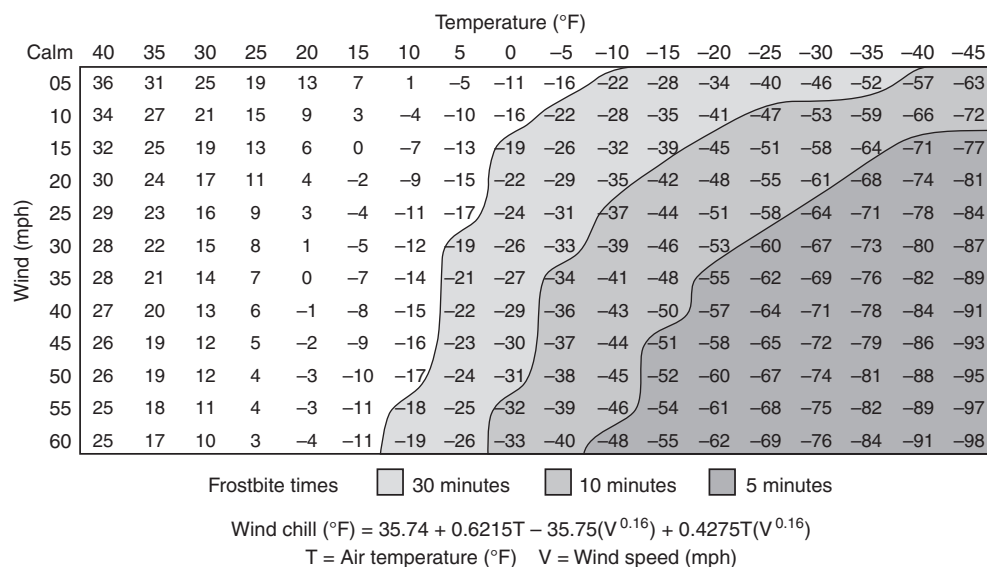


FIGURE A.22.1.1.2 National Weather Service Wind Chill Temperature (WCT) Index. (Courtesy of National Weather Service.)

A.22.1.4 Ideally, members should be provided with rehabilitation or be released from their assignments following the use of a single SCBA cylinder or a 20-minute work cycle.

A.22.1.4.2 Where limited resources strain existing personnel, crews can be rotated to a less physically demanding task (e.g., operating the pump rather than being part of the interior attack) as part of a strategic approach to limiting exertion.

A.22.3.2 These fluids should be available on apparatus where spare SCBA cylinders are located so that members can replace fluids while changing SCBA cylinders. If the duration of the incident is likely to exceed 1 hour, sports drinks should be considered.

A.22.4.3 Rehabilitation resources could include, but are not limited to, the following:

- (1) Portable shelters
- (2) Fans/blowers
- (3) Blankets
- (4) Portable heaters
- (5) Dry clothing
- (6) Lighting
- (7) Electrical generating equipment
- (8) Misting and cooling equipment
- (9) Rehabilitation area designation marking equipment
- (10) Chairs
- (11) Beverage-serving equipment
- (12) Exposure protective garments for rehabilitation staff
- (13) Personnel washing equipment (basins, soap, water, towels)
- (14) Cups (hot or cold according to the beverage)
- (15) Potable water
- (16) Large clock
- (17) Traffic cones
- (18) Fireline tape
- (19) Log book, forms, and writing utensils
- (20) Paper towels
- (21) Sanitary facilities (portable toilets)

(22) Food (including appropriate serving devices and equipment)

(23) Trash receptacles

A.22.4.4.1(1) These symptoms could be indicative of serious medical issues including, but not limited to, cardiac events and carbon monoxide poisoning. These members should undergo immediate medical assessment.

Carbon monoxide (CO) is a colorless, odorless gas present in every fire. Symptoms of CO poisoning are nonspecific and easy to miss. Any firefighter exposed to CO or presenting with headache, nausea, shortness of breath, or gastrointestinal symptoms at an incident where CO is present should be assessed for carbon monoxide poisoning.

Carbon monoxide readily attaches to hemoglobin in the bloodstream and is measured as a percentage of carboxyhemoglobin saturation (COHb). At an incident scene, carbon monoxide can be measured with a portable exhaled breath CO monitor designed to measure carboxyhemoglobin or a CO-oximeter (a pulse oximeter designed to measure carboxyhemoglobin). Nonsmokers' COHb levels are normally 0 percent to 5 percent and smokers' are normally 5 percent to 10 percent.

A.22.5.2 Monitoring the color and volume of urine output is a good indicator of hydration levels. See the Occupational Safety and Health Administration's Heat Illness Prevention Campaign at www.osha.gov/heat/more-resources.

A.22.6.1 Rehabilitation shelters (where a rehabilitation area could be established) could include the following:

- (1) Nearby garage, building lobby, or other structure
- (2) Large tree, overhang, and so forth for shade
- (3) Open area in which a rehabilitation area can be created using tarps, fans, and so forth
- (4) Tents or other portable structures
- (5) Several floors below a fire in a high-rise building
- (6) School bus or municipal bus
- (7) Cabs of fire apparatus or any enclosed areas of emergency vehicles at the scene

- (8) Retired fire apparatus or surplus government vehicle that has been renovated as a rehabilitation unit that can respond by request or be dispatched during certain weather conditions
- (9) Specially designed rehabilitation apparatus

A.22.6.2 Relocating the rehabilitation area during the incident should be considered in response to prevailing weather conditions.

A.22.6.7 Examples of geographic names are north rehabilitation, south rehabilitation, first floor rehabilitation, and 12th floor rehabilitation.

A.22.7.1.1 Time frames should be adjusted depending on work or environmental conditions.

A.22.8.1 Members could be passively cooled if ambient conditions are favorable [temperature < 75°F (< 24°C) and low humidity] and if the majority of turnout gear is removed. On hot and humid days, favorable conditions can be created through the use of an air-conditioned vehicle or a structure. To be most effective, passive cooling should be conducted with the turnout coat, helmet, and flash hood removed. The turnout pants should be opened and, if possible, pushed down to the knees while seated. See Hostler, et al., “Comparison of Active Cooling Devices with Passive Cooling for Rehabilitation of Firefighters Performing Exercise in Thermal Protective Clothing: A Report from the Fireground Rehab Evaluation (FIRE) Trial” and Colburn, et al., “A Comparison of Cooling Techniques in Firefighters After a Live Burn Evolution.”

However, under hot and humid environmental conditions additional cooling might be necessary. Scientific studies have demonstrated the effectiveness of using active cooling to quickly and safely lower a member's core temperature. Both forearm immersion and misting fans have been found to be effective. Misting fans might not provide adequate cooling in a humid environment where they are less effective, and personnel wet by mists might become more susceptible to steam burns if they are sent back into a fire environment with wet clothes, and so forth.

Forearm immersion, where the hands and forearms are immersed in cool water, has been found to be more effective than misting fans in hot and humid areas to reduce a member's body core temperature. See McLellan and Selkirk, “The Management of Heat Stress for the Firefighter.” The vascularity of blood vessels close to the skin of the arms and hands acts as an excellent means of heat transfer.

A.22.8.3 During emergency incidents and training exercises, the goal should be to match the volume of fluid intake with the volume of sweat output. Humans can easily exceed a sweat rate of 64 oz (2 L) per hour in hot and humid conditions. See Sawka and Pandolf, “Effects of Body Water Loss on Physiological Function and Exercise Performance.” It is important to remember that firefighting gear interferes with heat dissipation and traps moisture next to the skin; hence, as soon as firefighters don their gear the skin experiences a hot and humid environment and sweating begins. Furthermore, sweating continues even after a firefighter stops working and enters rehabilitation.

Nausea and loss of thirst can be early signs of dehydration and heat stress. Therefore, all members should demonstrate the ability to consume some fluids. If members cannot demonstrate the ability to take in some fluid, they should be medically evaluated.

It is important to consider all of this fluid loss through sweat when trying to match sweat loss with fluid intake. Firefighters can easily lose 32 oz (1 L) of water in less than 20 minutes of strenuous firefighting activity. See Smith and Petruzzello, “Selected Physiological and Psychological Responses to Live-Fire Drills in Different Configurations of Firefighting Gear.”

Dehydration has several detrimental effects on the body, including the following:

- (1) Impairment of the body's ability to maintain core temperature
- (2) Decreased strength
- (3) Shortened endurance time
- (4) Decreased blood volume, which increases cardiovascular strain

A 15 percent reduction in plasma volume and a 40 percent reduction in stroke volume have been reported following less than 20 minutes of strenuous firefighting activity. See Smith, et al., “Effects of Strenuous Live-Fire Firefighting Drills on Hematological, Blood Chemistry, and Psychological Measures” and Smith, Petruzzello, and Manning, “The Effect of Strenuous Live-Fire Drills on Cardiovascular and Psychological Responses of Recruit Firefighters.”

The gastric emptying capacity of an exhausted, warm, and dehydrated firefighter is likely about 32 oz (1 L) per hour. Forcing large amounts of fluids in a period of as little as 20 minutes during rehabilitation could overwhelm the stomach's ability to handle such fluid and result in nausea and vomiting due to too great a volume of fluid being forced upon the upper GI system.

A.22.8.3.1 Overhydration (drinking too much, too fast) during operations can cause gastric discomfort or gastric distention, which can cause vomiting. During high-intensity, long-duration activity (longer than 1 hour), the following precautions are recommended:

- (1) Ingest 30 g/hr to 60 g/hr of carbohydrates.
- (2) Drink 8 oz (¼ L) of sports drink containing approximately 15 g of carbohydrates.
- (3) Consume other readily available carbohydrate sources, such as fruit and meal replacement bars.

In rare instances, overhydration can lead to serious health problems. Drinking too much water can lead to a condition known as hyponatremia (sometimes called water intoxication).

Members who are fighting wildland fires should carry fluids and foods that can be easily transported and maintained (energy bars, fruit, sports drinks, and water bottles).

A.22.8.4 When determining if carbohydrate and electrolyte replacements are needed, factors such as longer duration or heavy exertion events, time since last meal, and individual conditions should be considered.

A.22.9 The rehabilitation manager and company officers should monitor members who are at risk of suffering adverse health or safety effects and alert EMS personnel when appropriate. The fire department physician or appropriate medical authority should establish medical protocols and procedures with parameters regarding the following:

- (1) Immediate transport to an emergency medical facility
- (2) Close monitoring and treatment in rehabilitation
- (3) Release from rehabilitation

Currently, there are no studies that quantify vital sign measurements with the length of rehabilitation or with the need to direct members to a treatment area. Visual signs and symptoms remain the best method to evaluate members in the rehabilitation area.

The following information on vital signs can help the fire department physician or appropriate medical authority establish the parameters of medical monitoring.

A.22.9.3.2 Possible effects of CO exposure on persons depend on individual susceptibility, as shown in Table A.22.9.3.2.

CO produces the following effects on exposed people, with variations based on individual susceptibility.

A.22.9.4(1) These symptoms could be indicative of serious medical issues including, but not limited to, cardiac events and carbon monoxide poisoning. These members should undergo immediate medical assessment.

Carbon monoxide is a colorless, odorless gas present in every fire. Symptoms of CO poisoning are nonspecific and easy to miss. Any firefighter exposed to CO or presenting with headache, nausea, shortness of breath, or gastrointestinal symptoms at an incident where CO is present should be assessed for carbon monoxide poisoning. Carbon monoxide readily attaches to hemoglobin in the bloodstream and is measured as a percentage of carboxyhemoglobin saturation (COHb). At an incident scene, carbon monoxide can be measured with a portable exhaled breath CO monitor or a CO-oximeter (a pulse oximeter designed to measure carboxyhemoglobin). Nonsmokers' COHb levels are normally 0 percent–5 percent and, smokers' are normally 5 percent–10 percent.

A.22.9.4(5) Members should know who they are, where they are, and so forth. Disoriented members might be suffering from carbon monoxide poisoning, heat stress, or cardiac insufficiency.

Table A.22.9.3.2 Possible Effects of CO Exposure

CO Blood Level (COHb)	Symptoms
5% to 14%	Asymptomatic or mild symptoms
15% to 29%	Headache, nausea/vomiting, shortness of breath, chest pain, loss of judgment
30% to 40%	Dizziness, weakness, vision problems, confusion, increased heart rate, increased breathing rate
>40%	Arrhythmias, seizures, coma, death

A.22.11.1 Data collection systems can be impacted by Health Insurance Portability and Accountability Act (HIPAA) regulations, as well as various state laws. The sources from which the information is collected, the type of information retained, and the manner in which it is stored are factors that might determine what requirements apply. Procedures can vary from department to department and, consequently, no single answer might be applicable. Legal advice regarding the department's data collection system can be very helpful.

A.23.2.1(2) Resource limitations might necessitate that a company remains available for high priority runs prior to completing post-incident recovery.

A.23.2.2 Fire departments should have resources to provide members with clean PPE following a fire or other incident where gear can become contaminated. Issuing a second set of personal protective clothing or using an exchange system can help crews return to incident response status quicker than waiting for all the gear to be appropriately decontaminated.

A.23.3 Saunas can cause dehydration and heat stress. Data supporting detoxification through sweating are very limited. A recent review summarized 24 articles that examined metal levels in sweat. However, although the authors conclude that sweating should receive additional consideration for toxic element detoxification, they noted that much of the data they reviewed was old and that research was needed to establish safe, effective therapeutic protocols. Additionally, they did not select their studies based on quality. Small participant numbers were common and variation in collection and measurement methods make comparisons difficult.

A research project entitled the “Blood, Urine, and Sweat (BUS) Study” analyzed these three fluids for approximately 120 chemicals. The authors reported that some toxic elements were present in sweat but not serum in some participants. As noted above, that might have been due to smaller volumes resulting in more concentrated, easier to measure chemical levels in sweat. The authors also noted loss of required trace minerals into sweat. They specifically mentioned firefighters as a group “who by the nature of their occupations are exposed to toxic elements, may be advised to regularly undertake induced sweating.” The authors noted that “Further research is required, however, to determine whether induced sweating on the day of exposure is beneficial or detrimental because enhanced circulation to the skin associated with sauna may stimulate greater absorption of toxicants on the skin.” Importantly, this was a small study that included only 20 participants.

Firefighters are concerned about reducing health risks from their occupational chemical exposures. However, there are a number of reasons why the use of saunas after fire suppression activities is not recommended:

- (1) The science on sauna use is still too limited to determine whether this increases excretion of chemicals in a significant way. Most chemicals are not stored long term in the body and are excreted normally.
- (2) Sauna use immediately after fire suppression activities has the potential to increase absorption. Chemicals on the skin could evaporate and be inhaled. The heat in the sauna increases blood flow to the skin, which also has the potential to increase absorption across the skin including any contaminants on the skin.

- (3) Fire suppression can cause heat stress and heat illnesses. Increased body temperature results in sweating and fluid loss, which can cause serum electrolyte changes and dehydration. The lower blood volume from dehydration causes less blood to be pumped with each heartbeat. These effects contribute to the well-documented increased risk of heart attack during and in the hours immediately after firefighting. Use of saunas after firefighting can increase the potential for dehydration, heat-related illnesses, and heart and kidney disorders. Just walking on a treadmill in turn-out gear increases body temperature.

In summary, at the present time, there is insufficient medical evidence to support a recommendation for use of saunas to remove toxicants from the body after firefighting, and the potential adverse health effects outweigh potential benefits.

A.23.3.3.1 The machine should have an empty tub cleaning cycle done prior to using the machine for other nonexposed items.

A.23.4.2 Green zones include living, kitchen, dormitory, and office areas.

A.23.4.3 Cleaning and decontamination of apparatus and equipment should occur prior to post-incident personal hygiene.

A.23.5.2.1 Consideration should be given to providing peer intervention prior to releasing the affected members to return home.

A.23.6.2 Possible inhalation, dermal, or ocular exposure hazards include fire smoke, products of combustion, chemical vapors, diesel exhaust, burning synthetics, bed bugs, vermin, biological hazards, asbestos, perfluorooctanoic acid (PFOA), heavy metals, black mold, hazardous materials, radiation, infectious disease, unknown vapors or mists, etc.

Toxic substances and harmful physical agents can include the following:

- (1) Metals and dusts, such as lead, cadmium, and silica
- (2) Biological agents, such as bacteria, viruses, and fungi
- (3) Physical stress, such as noise, heat, cold, vibration, repetitive motion, and ionizing and non-ionizing radiation

Biological agent is a term used to describe microorganisms that are biological in nature and origin to which exposure in sufficient quantities and duration may result in illness or injury to human health. Biological agents include bacteria, viruses, fungi, and parasites, or parts thereof or products they generate. Reporting exposures to common agents, such as a cold or common influenza, is not required.

Chemical agent is a term used to describe all chemical elements and compounds in a natural state or in a processed state and their byproducts, the exposure to which, in sufficient quantities and duration, may result in illness or injury to human health.

Physical agent is a term used to describe energies, the exposures to which, in sufficient quantities and duration, may result in illness or injury to human health. Physical agents include noise, ionizing or non-ionizing radiation, extremes in temperature and pressure, vibration, and electric and magnetic fields.

A.23.6.3.1 Exposures include direct dermal, respiratory, or ocular exposure to a toxic substance or harmful biological, chemical, or physical agent.

A personal exposure report should collect responder-specific information about the potential exposure and activities undertaken during the response. A personal exposure reporting system, such as the National Fire Operations Reporting System (NFORS), should be utilized.

The NFORS exposure tracking module serves as a personal database providing a detailed history of work and exposures in a private, encrypted, and secure online environment.

With the mobile app, any firefighter, paramedic, or officer can access and use the exposure tracker. The NFORS exposure tracking module is available as an app in the Google Play Store and the Apple App Store.

A.23.7.1 This is required in OSHA 3110; *Access to Medical and Exposure Records* (<https://www.osha.gov/Publications/osh3110.pdf>).

Annex B Sample Policy Statements (NFPA 1581)

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 this standard.

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.
- Encourage participation in member assistance and behavioral health 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 (NFPA 1581)

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 work-site 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 Guide for Fire Department Administrators (NFPA 1582)

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

D.1 Legal Considerations in Applying the Standard. The consideration of an application or continued employment of an individual based on medical or physical performance evaluations involves a determination that is not without legal implications. To this end, prior to making an adverse employment decision based on the current standard, the authority with jurisdiction might wish to consult with legal counsel.

D.1.1 Legal Protections for Individuals with Handicaps or Disabilities. The Rehabilitation Act of 1973, as amended, 29 U.S.C. § 791 et seq., and implementing regulations prohibit discrimination against those with handicaps or disabilities under any program receiving financial assistance from the federal government. The Americans with Disabilities Act (ADA) of 1990, 42 U.S.C. § 12101 et seq., also prohibits employment discrimination by certain private employers against individuals with disabilities. In addition, many states have enacted legislation prohibiting discrimination against those with handicaps or disabilities. Generally speaking, these laws prevent the exclusion, denial of benefits, refusal to hire or promote, or other discriminatory conduct against an individual based on a handicap or disability, where the individual involved can, with or without reasonable accommodation, perform the essential functions of the job without creating undue hardship on the employer or program involved.

Beginning in 1999, the United States Supreme Court has issued a series of decisions limiting the scope of the ADA. As a result, persons with certain kinds of impairments that are mitigated by corrective measures such as medication for high blood pressure or eyeglasses for myopia are not “disabled” under the ADA. See *Sutton v. United Airlines, Inc.*, 527 US 471 (1999); *Murphy v. United Parcel Service, Inc.*, 118 S. Ct. 2133 (1999); and *Albertsons, Inc. v. Kirkingburg*, 527 US 555 (1999). More recently the Supreme Court held that an impairment is not a disability covered by the ADA unless it severely restricts a person from doing activities that are of central importance to most people’s daily lives. See *Toyota Motor Mfg., Kentucky, Inc. v. Williams*, 534 US 184 (2002). These cases significantly limit the persons who can claim the protections of the federal ADA, but do not, by any means, eliminate the ADA as an important consideration in fire service–related employment decisions. Moreover, it should be borne in mind that separate disability protections exist under laws of many states, and some of these laws have been interpreted to afford greater protections than that afforded by the ADA. See, for example, *Dahill v. Boston Department of Police*, 434 Mass. 233 (2001), where the Supreme Judicial Court of Massachusetts ruled that a corrective device to alleviate a disability is not relevant in determining whether someone is disabled under the state’s disability law.

The disability discrimination laws, therefore, continue to be an important part of the legal framework that governs employment-related decisions. Although this standard has been developed with this in mind, these laws can, depending on the jurisdiction and the circumstances, affect the degree to which the authority having jurisdiction can implement the standard in an individual case. Users of this standard should be aware that, while courts, in assessing disability discrimination claims, are likely to give considerable weight to the provisions of a nationally recognized standard such as this standard [see, for example, *Miller v. Sioux Gateway Fire Department*, 497 N.W.2d 838 (1993)], reliance on the standard alone might not be sufficient to withstand a challenge to an adverse employment decision.

D.1.2 Reasonable Accommodations for Individuals with Disabilities. Federal civil rights law in the United States requires an employer to provide reasonable accommodation, when requested or if a disability is obvious, to qualified individuals with disabilities who are employees or applicants for employment, except when such accommodation would cause an undue hardship.

Reasonable accommodation is, in general, any change or adjustment to a job or work environment that permits a qualified applicant or employee with a disability to participate in the job application process, to perform the essential functions of a job, or to enjoy benefits and privileges of employment equal to those enjoyed by employees without disabilities.

Determination of a reasonable accommodation must be conducted on a case-by-case basis because the nature and extent of a disabling condition and the requirements of the job will vary. The principal test in selecting a particular type of accommodation is that of effectiveness — whether the accommodation will enable the person with a disability to perform the essential functions of the job. It need not be the best accommodation or the accommodation the individual with a disability would prefer, although primary consideration should be given to the preference of the individual involved. However, an employer has discretion to choose between effective accommodations.

When an employee with a disability is unable to perform the employee’s present job even with the provision of a reasonable accommodation, an employer must consider reassigning the employee to an existing position that the employee can perform with or without a reasonable accommodation. The requirement to consider reassignment applies only to employees and not to applicants.

Example. If an employee has a disability that prevents the employee from wearing respiratory protection, and assuming there is no reasonable accommodation that would allow the employee to perform safely and effectively the essential functions of the job that require wearing respiratory protection, the department must consider reassigning the employee to an existing position that the employee can perform with or without a reasonable accommodation. The reassignment to a different position that the employee can perform with or without the accommodation is the reasonable accommodation provided to the employee. For a similarly situated candidate, if there is no reasonable accommodation that would allow the candidate to perform safely and effectively the essential functions of the job that require wearing respiratory protection, the candidate would not be qualified for hire and the department is not required to offer reassignment to the candidate.

Undue hardship means significant difficulty or expense and focuses on the resources and circumstances of the employer in relation to the cost or difficulty of providing a specific accommodation. Undue hardship refers not only to financial difficulty, but to reasonable accommodations that are unduly extensive, substantial, or disruptive or that would fundamentally alter the nature or operation of the business. An employer is also not required to eliminate an essential function when considering a reasonable accommodation. An employer must assess on an individualized basis whether a particular reasonable accommodation would cause undue hardship. Where a requested accommodation would result in undue hardship, the employer must offer an alternative accommodation if one is available absent undue hardship.

Finally, the ADA allows for qualification standards that screen out, tend to screen out, or otherwise deny a job or benefit to an individual with a disability, if the qualification standards have been shown to be job-related and consistent with business necessity and such performance cannot be accomplished by reasonable accommodation. Qualification standards can include a requirement that an individual shall not pose a direct threat to the health or safety of other individuals in the workplace.

Direct threat means a significant risk of substantial harm to the health or safety of the individual or others that cannot be eliminated or reduced by reasonable accommodation. The determination that an individual poses a direct threat must be based on an individualized assessment of the individual’s present ability to safely perform the essential functions of the job. This assessment must be based on a reasonable medical judgment that relies on the most current medical knowledge and the best available objective evidence. In determining whether an individual would pose a direct threat, the factors to be considered include the following:

- (1) The duration of the risk
- (2) The nature and severity of the potential harm
- (3) The likelihood that the potential harm will occur
- (4) The imminence of the potential harm

For more information, see the following resources from the EEOC:

- (1) *The ADA: Your Responsibilities as an Employer*, <https://www.eeoc.gov/publications/ada-your-responsibilities-employer>.
- (2) *Enforcement Guidance on Reasonable Accommodation and Undue Hardship under the ADA*, <https://www.eeoc.gov/laws/guidance/enforcement-guidance-reasonable-accommodation-and-undue-hardship-under-ada>.

D.1.3 Legal Protections for Individuals Who Are Members of Protected Classes. Title VII of the Civil Rights Act of 1964, as amended, 42 U.S.C. § 2000e, and implementing regulations by the Equal Employment Opportunity Commission (EEOC) prohibit discrimination in employment on the basis of race, sex, color, religion, or national origin (i.e., protected classes). Under Title VII, an “employer” is defined, generally, to mean a person with “15 or more employees for each working day in each of 20 or more calendar weeks in the current or preceding calendar year” (42 U.S.C. § 2000e). Several federal jurisdictions have held that unpaid volunteers are not considered to be “employees” under Title VII.

The Age Discrimination in Employment Act (ADEA), 29 U.S.C. § 621 et seq., forbids age discrimination against people aged 40 or older. It does not protect workers under the age of 40, although some states have laws that also protect younger workers from age discrimination. It is not illegal for an employer or other covered entity to favor an older worker over a younger one, even if both workers are age 40 or older. Other federal civil rights laws might prohibit employment discrimination against individuals based on other protected bases not discussed in this section, such as pregnancy and genetic information.

Additionally, many states, cities, and localities have adopted similar legislation. Generally, physical performance or other requirements that result in “adverse impact” on members of a protected class (e.g., on the basis of gender) are required to be validated through a study in accordance with EEOC guidelines, if such requirements are to be relied on in making employment decisions. Under EEOC guidelines, a study validating employment standards in one jurisdiction can be transportable to another jurisdiction (and therefore used in lieu of conducting a separate study). However, specific preconditions must be met in this regard, and the authority having jurisdiction should seek the advice of counsel before relying on a transported validation study.

Employers should ensure that employment tests and selection procedures are properly validated for the positions and purposes for which they are used. The test or selection procedure must be job-related and its results appropriate for the employer’s purpose. To ensure that a test or selection procedure remains predictive of success in a job, employers should keep abreast of changes in job requirements and update the test specifications or selection procedures accordingly.

Courts have recognized that physiological differences between men and women impact their relative abilities to demonstrate the same levels of physical fitness. In other words, equally fit men and women demonstrate their fitness differently. An employer does not violate Title VII when it uses physical fitness standards that distinguish between the sexes on the basis of their physiological differences but impose an equal burden of compliance on both men and women, requiring the

same level of physical fitness of each. [*See Bauer v. Lynch*, 812 F.3d 40 (4th Cir. 2016).] Similarly, age-normed physical fitness standards might be permissible.

For more information see the following guidance from the EEOC:

- (1) Laws Enforced by EEOC, www.eeoc.gov/statutes/laws-enforced-eeoc
- (2) Age Discrimination, www.eeoc.gov/age-discrimination
- (3) Employment Tests and Selection Procedures, www.eeoc.gov/laws/guidance/employment-tests-and-selection-procedures

D.1.3.1 Pregnancy and Reproduction. Federal regulations, as well as many court decisions, including the US Supreme Court’s decision in *International Union, et al. v. Johnson Controls, Inc.*, 499 US 187, (111 S. Ct. 1196 (1991)), have interpreted the requirements of Title VII with respect to pregnancy and reproduction. The AHJ should seek the advice of counsel in resolving specific questions concerning these requirements as well as other requirements that can be imposed by state or local laws.

D.2 Determining Essential Job Tasks. The medical requirements in this edition of the standard were revised based on the essential job tasks contained in Chapter 10. It is recognized that some firefighting functions and tasks can vary from location to location due to differences in department size, functional and organizational differences, geography, level of urbanization, equipment used, and other factors. Therefore, it is the responsibility of each individual fire department to document, through job analysis, the essential job functions that are performed in the local jurisdiction.

There are a wide variety of job analytic techniques available to document the essential functions of the job of a firefighter. However, at a minimum, any method used should be current, in writing, and meet the provisions of the EEOC regulations [29 CFR 1630.2(n)(3)]. Job descriptions should focus on critical and important work behaviors and specific tasks and functions. The frequency and/or duration of task performance and the consequences of failure to safely perform the task should be specified. The working conditions and environmental hazards in which the work is performed should be described.

The job description should be made available to the fire department physician for use during the preplacement medical examination for the individual determination of the medical suitability of individuals.

D.3 Choosing a Fire Department Physician. Several factors should be considered in choosing a fire department physician. There are relatively few physicians with formal residency training and certification in occupational medicine. The fire department physician should be qualified to provide professional expertise in the areas of occupational safety and health as these areas relate to emergency services. For the purpose of conducting medical evaluations, the fire department physician should understand the physiological and psychological demands placed on firefighters as well as the environmental conditions under which firefighters have to perform.

Knowledge of occupational medicine and experience with occupational health programs are essential for physicians not formally trained in occupational medicine.

The physician must be committed to meeting the requirements of the program, including appropriate record keeping.

The physician's willingness to work with the department to continually improve the program is also important. Finally, the physician's concern and interest in the program and in the individuals in the program are vital.

The following are some of the many options for obtaining physician services:

- (1) Physicians can be paid on a service basis or through a contractual arrangement.
- (2) For volunteer departments, local physicians might be willing to volunteer their services for the program, with other arrangements for payment of laboratory testing, x-rays, and so forth.
- (3) Some departments might use a local health care facility for medical care. However, in that case, the department should have one individual physician responsible for the program, record keeping, and so forth.
- (4) A military reserve or a National Guard unit can be used.

D.4 Coordinating the Medical Evaluation Program. An individual from within the department should be assigned the responsibility for managing the health and fitness program, including the coordination and scheduling of evaluations and examinations. This person should also act as liaison between the department and the physician to make sure that each has the information necessary for decisions about placement, scheduling appointments, and so forth.

D.5 Confidentiality. Confidentiality of all medical data is critical to the success of the program. Individuals need to feel assured that the information provided to the physician will not be inappropriately shared. No fire department supervisor or manager should have access to medical records without the express written consent of the individual. There are occasions, however, when specific medical information is needed to make a decision about placement, return to work, and so forth, and a fire department manager should have more medical information for decision making. In that situation, written medical consent should be obtained from the individual to release the specific information necessary for that decision.

Budgetary constraints can affect the medical program. Therefore, it is important that components of the program be prioritized such that essential elements are not lost. With additional funding, other programs or testing can be added to enhance the program.

Annex E Maternal and Child Health Considerations (NFPA 1582)

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

E.1 Introduction.

E.1.1 Due to the legal issues associated with pregnancy and employment (see Section E.2), this annex is intended to serve as guidance for the fire department physician in advising the pregnant firefighter of the risks associated with performing essential job functions and enabling her in decision-making.

E.1.2 The majority of pregnant firefighters will be able to continue to work throughout pregnancy, with some accommodations. Firefighters and their treating physicians should be aware that firefighting has been found to be related to an increased risk of miscarriage and preterm labor. A point will likely come during the pregnancy when the physical changes to

the body of the pregnant firefighter and concerns about exposure will impair her ability to perform some of the essential job tasks at which time appropriate alternative job assignments will need to be offered.

E.2 Legal Framework.

E.2.1 This document does not constitute legal advice. Before developing a pregnancy policy or before restricting or suspending a pregnant firefighter against her will, fire physicians and the AHJ should seek competent legal advice.

E.2.2 The Pregnancy Discrimination Act of 1978 states that discrimination on the basis of pregnancy or childbirth constitutes unlawful sex discrimination under Title VII of the Civil Rights Act of 1964 [1]. Women who are pregnant or have related conditions must be treated in the same manner as other applicants or employees with similar abilities or limitations. An employer may not force a pregnant employee to take disability leave if she is able to work and cannot remove her from her duty assignment if she is able and willing to perform it. The Pregnancy Discrimination Act applies to most employers that have 15 or more employees.

E.2.3 The US Supreme Court ruled in 1991 that an employer may not exclude pregnant women from hazardous jobs [2]. Therefore, assuming the pregnant firefighter is willing and able to perform her essential job tasks, fire agencies should give options to pregnant firefighters, but ultimately it is up to the individual firefighters to decide, in collaboration with their personal physicians, whether to accept a light duty assignment or other reasonable changes in their job assignments.

E.3 The pregnant firefighter can be exposed to the following hazards associated with adverse outcomes to the pregnancy or damage to the fetus:

- (1) Physical hazards, including heat, trauma, radiation, and noise.
- (2) Chemical hazards, including exposure to carbon monoxide, other products of combustion (e.g., hydrogen cyanide, acrolein, formaldehyde, benzene, acetaldehyde, formic acid), heavy metals, diesel fumes, and organic solvents.
- (3) Biological hazards. As first responders, firefighters are at a higher risk of exposure to infectious agents. There is evidence to suggest that pregnancy alters immune response and, therefore, could increase the risk for a woman to become infected when exposed during certain times of the pregnancy. In addition, with some agents (e.g., novel H1N1 influenza, SARS-CoV-2) the risk of complications is higher during pregnancy. Pregnant firefighters should be aware of these risks and follow good hygiene principles.

E.4 Physical Hazards.

E.4.1 Trauma.

E.4.1.1 The uterus extends out of the protection of the pelvis after 13 weeks and is therefore more susceptible to direct trauma (to the uterus or the fetus) after that gestational point [3].

E.4.1.2 Fetal mortality due to nonuterine trauma is increased during the first 23 weeks, possibly due to higher susceptibility to maternal hypotension during the first and second trimesters [4, 5].

E.4.1.3 With blunt trauma, the leading causes of fetal death are maternal shock, abruption, and uterine rupture [3]. Direct fetal injury from blunt trauma is rare [5].

E.4.1.4 Following are fetal mortality rates due to maternal trauma [3]:

- (1) Overall with major trauma: 40 percent to 65 percent [4, 5, 6]
- (2) Overall with minor trauma: 1 percent to 5 percent [3, 5]
- (3) In case of maternal pelvic fracture: 25 percent to 35 percent [5, 7]
- (4) Gunshot wound to abdomen: 30 percent to 50 percent [5]

E.4.1.5 Long-term outcomes after trauma, besides fetal loss, include higher risk of preterm labor and placental bleeding [5]. The risks of preterm labor and low birth weight were found to be nearly double in a series of patients discharged from a trauma center [8].

E.4.1.6 Pregnant firefighters should be encouraged to wear seat belts. Proper seat belt positioning during pregnancy should be taught (lap belt under the abdomen and shoulder harness between the breasts); improper placement can result in uterine rupture [3, 5]. Seat belt use significantly reduced fetal mortality (fivefold reduction) in a series of cases of pregnant patients injured in motor vehicle accidents [9].

E.4.1.7 Standard personal protective equipment is not designed to protect the fetus. The personal protective equipment fitted pre-pregnancy might not offer the same level of protection during pregnancy.

E.4.2 Noise. Noise exposure during pregnancy has been associated, in human studies, with several adverse outcomes, including miscarriage [10, 11], intrauterine growth retardation [11, 12, 13], preterm delivery [11, 14], hearing loss in babies and children [15, 16], and hypertension in pregnancy [11]. In a review of 10 studies on pregnancy and noise, most studies did not achieve statistical significance in showing negative effect of noise [17]. The safe threshold of noise exposure during pregnancy is unknown [18]. (*See E.11.1.*)

E.4.3 Shift Work. Alternating shift work and night work have been associated with preterm birth [24, 25], miscarriage [26] and lower birth weight [25, 27]. Existing research is controversial. (*See E.11.2.*)

E.4.4 Heat. In animal studies, an increase in maternal core temperature over 1.5°C has been shown to be teratogenic [30]. Core temperature has been shown to be up to 39°C in training [31, 32]. Hyperthermia creates the highest risk during the first two months of pregnancy [33, 34]. Sports Medicine Australia recommends a pregnant woman “avoid exercise in hot conditions” [33]. Exercising in a warm environment should be limited, and adequate hydration should be maintained with physical activity. Maternal hyperthermia is associated with neural-tube defects during early pregnancy in humans [35]. Maternal dehydration can lead to pregnancy complications like neural-tube defects, low amniotic fluid, inadequate milk production, premature labor, and birth defects [36].

E.4.5 Physical Activity. Prolonged working hours, heavy lifting, prolonged standing, and heavy physical workload have been associated with preterm birth, lower birth weight, and pre-eclampsia [14, 28]. Heavy lifting also has been found to increase risk for diastasis recti abdominis (DRA). Throughout

the pregnancy and after, specific attention should be paid to core strength and pelvic floor stability. (*See E.11.3.*)

E.4.6 Radiation. Firefighters assigned to patient transport via aircraft or other high-altitude aviation could encounter radiation exposure of significance to a fetus [37, 38]. (*See E.11.4.*)

E.5 Chemical Hazards.

E.5.1 Carbon Monoxide. Carbon monoxide exposure during pregnancy is associated with miscarriage, malformations, mental retardation, and low birth weight [32, 40, 41].

E.5.2 Products of Combustion. Other chemicals toxic to the fetus that are found in products of combustion include benzene, acrolein, formaldehyde, hydrogen cyanide, acetaldehyde, chloroform, and formic acid [32, 40, 41]. Both fire suppression and overhaul phases can expose firefighters to toxic chemicals [42].

E.5.3 Exposure to Lead and Other Metals. Lead exposure during pregnancy is associated with serious materno-fetal complications, including miscarriage, premature rupture of membranes, pre-eclampsia, hypertension, and neurobehavioral effects in infants and children [43, 44, 45]. Even at low levels, lead exposure has been associated with preterm delivery; congenital abnormalities [46]; and decreased birth weight, length, and head circumference [47]. Current research suggests that there is no safe lead exposure threshold to children, infants, and fetuses [45, 48, 49]. (*See E.11.5.*)

E.5.4 Exposure to Organic Solvents. Some organic solvents, like xylene, might be harmful to the fetus [18].

E.5.5 Other Chemicals. Clandestine drug laboratories and hazardous-material scenes should be avoided. Clandestine drug laboratories can expose firefighters to a variety of toxic chemicals, some of which are potentially injurious to the fetus [51]. Extensive exposure to exhaust fumes might be dangerous because of exposure to carbon monoxide, benzene, and other organic solvents from motor vehicles. In the United States, gas used for regular road traffic does not contain benzene. In developing countries that use leaded gasoline, lead exposure can be a significant problem for firefighters exposed to exhaust fumes [54].

E.6 Medical Issues. The American College of Obstetricians and Gynecologists has published a list of medical contraindications to exercise during pregnancy [55] [Exercise during pregnancy and the postpartum period. ACOG Committee Opinion No. 267.]. This list should be referenced when considering recommending work accommodation to pregnant firefighters who are suffering from specific complications.

E.7 Risks by Trimesters. Table E.7 lists risks by trimester and during lactation.

E.8 Recommended Activity Modifications During Pregnancy.

E.8.1 The following activities are not recommended during the entire pregnancy:

- (1) Exposure to excessive heat
- (2) Hazmat assignment, exposure to products of combustion or toxic chemicals
- (3) Use of encapsulating protective gear
- (4) Exposure to ionizing radiation [18, 37]
- (5) Exposure to prolonged vehicular exhaust or high-volume vehicular traffic (*see E.8.1.1*)

- (6) Aviation (including helicopter) unit assignment [18, 37, 38, 39]

E.8.1.1 Recommendations by Trimester. Following are recommendations by trimester:

- (1) First trimester:
 - (a) Modified, nonhazardous duty should be assigned if requested by the firefighter in consultation with her personal (treating) physician.
 - (b) The fire physician should ensure that the firefighter and her treating physician are aware of risks created by the job assignment.
 - (c) All recommendations stated in E.8.1 should be followed.
- (2) Second trimester:
 - (a) An accommodation for maternity uniform should be provided, if needed.
 - (b) The following assignments should be avoided:
 - i. Assignments with shift work
 - ii. Heavy lifting and prolonged standing
 - (c) All recommendations stated in E.8.1 should be followed.
- (3) Third trimester:
 - (a) The firefighter should be taken off hazardous duties if she is unable to perform the required job functions due to issues with balance, speed, or agility. She should be given a modified duty assignment.
 - (b) An accommodation for maternity uniform should be provided, if needed.
 - (c) The following assignments should be avoided:
 - i. Assignments with shift work
 - ii. Heavy lifting and prolonged standing
 - (d) All recommendations stated in E.8.1 should be followed.

E.9 Post-Delivery: Return to Work.

E.9.1 Because of different types of deliveries and associated complications, return-to-work decisions should be based upon an individualized evaluation of the firefighter's current status and the requirements of her work assignment. (*See E.11.6.*)

E.9.2 Once the firefighter requests to return to full duty with the consent of her treating health care provider, all restrictions for patrol duty and training should be lifted, unless other medical issues are present.

E.9.3 The physician should consider various issues such as the following [57]:

- (1) Delivery trauma and mode of delivery
- (2) C-section healing (*See E.11.7.*)
- (3) Diastasis recti abdominis (DRA)
- (4) Physical deconditioning, fatigue, and lack of sleep
- (5) Musculoskeletal conditions (e.g., back pain, carpal tunnel syndrome, tendonitis)
- (6) Pregnancy-related issues
 - (a) Hypertension
 - (b) Eclampsia
 - (c) Gestational diabetes
 - (d) Post-partum depression
 - (e) Post-partum thyroiditis
 - (f) Deep venous thrombosis
 - (g) Anemia
 - (h) Other complications

E.10 Post-Delivery: Lactation.

E.10.1 Firefighters who are breastfeeding should avoid unprotected exposure to toxic levels of heavy metals and other chemicals. Preliminary research suggests women should limit exposure to fires due to contamination of breast milk. The Patient Protection and Affordable Care Act ("Affordable Care Act") amended section 7 of the Fair Labor Standards Act ("FLSA") to require employers to provide reasonable break time for an employee to express breast milk for her nursing child for one year after the child's birth, each time such firefighter has need to express the milk. Employers are also required to provide a place, other than a bathroom, that is shielded from view and free from intrusion from coworkers and the public, which may be used by an employee to express breast milk and should provide a separate area to store expressed breast milk. Further information can be found on the US Department of Labor website.

E.11 Notes.

E.11.1 Intrauterine measurements showed that the fetus was not significantly protected against loud noises [19]. One study in human volunteers found a maximal intrauterine noise attenuation of 10 dB at 4000 Hz [20]. In a study of ewes, the noise attenuation was 20 dB at 4000 Hz, but low-frequency sounds less than 250 Hz were 2 to 5 times greater inside the uterus [21]. The sound of a siren can reach up to 110 dB inside the cab of an emergency vehicle [22, 23]. The Navy and Marine Corps Public Health Center makes the following recommendations:

"1. The ACGIH [American Conference of Governmental Industrial Hygienists] 115 dBC TWA [time weighted average] and peak 155 dBC noise notations should be observed as exclusion criteria starting at 20 weeks gestation. Excluding pregnant

Table E.7 Risks by Trimester and During Lactation

	First Trimester	Second Trimester	Third Trimester	Lactation
Trauma	The risk of direct fetal trauma is mitigated due to the location of uterus, which is a pelvic organ in the first trimester.	The risk of direct fetal trauma is increased due to the intra-abdominal position after 13 weeks.	The risk of direct fetal trauma is increased due to the intra-abdominal position after 13 weeks.	No additional risk.
Chemicals	Avoid exposure to heavy metals, hydrocarbons, carbon monoxide.	Avoid exposure to heavy metals, hydrocarbons, carbon monoxide.	Avoid exposure to heavy metals, hydrocarbons, carbon monoxide.	Avoid exposure to heavy metals, hydrocarbons, carbon monoxide.
Other risks	Heat, noise, radiation, shift work, infections.	Heat, noise, radiation, shift work, infections.	Heat, noise, radiation, shift work, infections.	No additional risk.

women from discharging firearms after 20 weeks gestation would be consistent with those criteria.

2. Pregnant workers should be vigilant in wearing hearing protectors whenever environmental noise exceeds 84 dBA, to minimize potentially unhealthy maternal cardiovascular and endocrine effects on the growing fetus.

3. Extended exposures (more than 12 minutes) above 104 dBA should be avoided after 20 weeks gestation, even with the use of maternal hearing protection.

4. Impact/impulse noise exposure sufficient to require personal hearing protection should be avoided" [18].

E.11.2 In a review of studies on pregnancy and shift work, 8 out of 12 studies showed a significant (but usually small) adverse effect of alternating shift work on pregnancy [17]. In a meta-analysis of 17 studies of shift work during pregnancy, the authors found a significant but small (relative risk 1.2) effect of shift work on preterm delivery; but no association between shift work and birth weight [28]. In a meta-analysis of 4 studies of pregnancy among nurses, shift work was significantly associated with a slightly increased risk of miscarriage [29]. An in-depth review of health disorders among shift workers summarized the findings of the effects of shift work while pregnant and reported a strong association between shift work and miscarriage, low birth weight, and preterm birth [58].

E.11.3 In a meta-analysis of 53 studies of occupational exposures (prolonged working hours, shift work, lifting, standing and heavy physical workload) during pregnancy, the authors found a significant but small effect of long working hours (beyond 40 hours a week) on preterm birth; and a significant but small effect of prolonged standing (more than 3 hours day) on preterm birth. The influence of these occupational exposures on pre-eclampsia is less clear [28].

E.11.4 Aviation-related (including helicopters) potential hazards for the fetus include vibration, noise, jet fuel, and altitude [18, 39].

E.11.5 Inorganic lead is absorbed by inhalation and ingestion. Blood absorption of inhaled lead is 30-40 percent, and blood absorption of ingested lead is 5-15 percent. Lead is then mostly stored in bones. The half-life of lead is 1 to 3 months in blood and soft tissues and 10 to 25 years in bones. Lead crosses the placenta and is transmitted from the mother to the fetus. Lead is excreted mainly through the kidneys and gastrointestinal tract. Lead is also excreted in breast milk [44, 45, 50].

E.11.6 Sports Medicine Australia recommends waiting for up to 6 weeks after delivery before performing intense physical exercises [56].

E.11.7 In a series of 100 patients with complications after a C-section, the most common complications were endomyometritis (63 patients), wound infection (32 patients), wound hematoma (22 patients) and postpartum hemorrhage (12 patients). Wound dehiscence was seen in 4 patients. All complications were seen within 10 days of the surgery [59]. Sports Medicine Australia recommends waiting for 6 weeks after C-section to resume exercising [56].

E.12 Pregnancy References.

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