

Carcass Management Course

Health, Safety, & PPE Module



**United States
Department of
Agriculture**



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Overview

Welcome to the Health, Safety, and Personal Protection Equipment Module of the online Carcass Management Course. The purpose of this module is to introduce guidance for implementing health and safety measures during carcass management activities. In an animal disease emergency, the primary focus is responder safety while performing tasks. While completing this module, you may encounter references to Emergency Management Tools, Secure Transport, and to Biosecurity, which are broadly covered in their own separate training modules. These modules are found in the Introduction Modules, beginning with the Orientation Module.

Effective management of animal carcasses and associated materials is a critical component of a successful response during an animal health emergency. Carcass management measures contain, treat, or destroy contaminated or potentially contaminated materials in order to:

- Prevent spread of a disease outbreak to protect the nation's agricultural industry
- Protect the environment by preventing carcass waste products from contaminating soil, water, and air
- Protect decaying carcasses from insects and scavengers which can transport pathogens to other locations
- Safeguard public health by removing potentially contaminated food products from the human food supply
- Safeguard animal health by removing potentially contaminated feed from the animal feed supply

Objectives

This module presents information in three different lessons:

- Introduction
- Planning
- Operations

Upon completing this module, you should be able to:

- Recognize hazards associated with carcass management
- Understand organizational and personnel responsibilities associated with hazard management
- Describe the underlying principles in a job hazard assessment
- Understand health and safety hazards, contamination sources, and potential routes of exposure
- List the types of hazard management measures
- Recognize personal protective equipment (PPE) and how it protects against hazards

Introduction Lesson Overview

Agricultural emergency responders are needed in situations that threaten animal health, such as the natural occurrence or intentional introduction of a highly contagious foreign animal disease, or the contamination of food animals with chemical or radiological agents. Initially, the risk to human health and/or the difficulty of preventing the spread of contaminants to other animals or people is unknown.

- Responders must take the appropriate precautions to protect themselves from exposure to harmful agents
- Responders must ensure that they do not spread the hazard to other people or animals
- Personal protective equipment (PPE) refers to special clothing and equipment that places a barrier between an individual and a hazard

Figure 1. Members of a Carcass Management Team



Introduction Lesson Contents

This lesson is divided into the following sections:

- Roles & Responsibilities – Identifies the personnel and their roles in promulgating and enforcing health and safety measures
- Regulations – Discusses the rules and regulations which govern work health and safety standards
- Health & Safety Training – Covers the requirements and topics for training personnel engaged in emergency deployment or response activities
- Personnel Safety Briefings – Includes a discussion on the importance of safety briefings and the topics that should be included
- Personal Protective Equipment (PPE) – Provides information on the proper selection and use of PPE to protect the responders from potentially harmful hazards and prevent the spread of disease agents

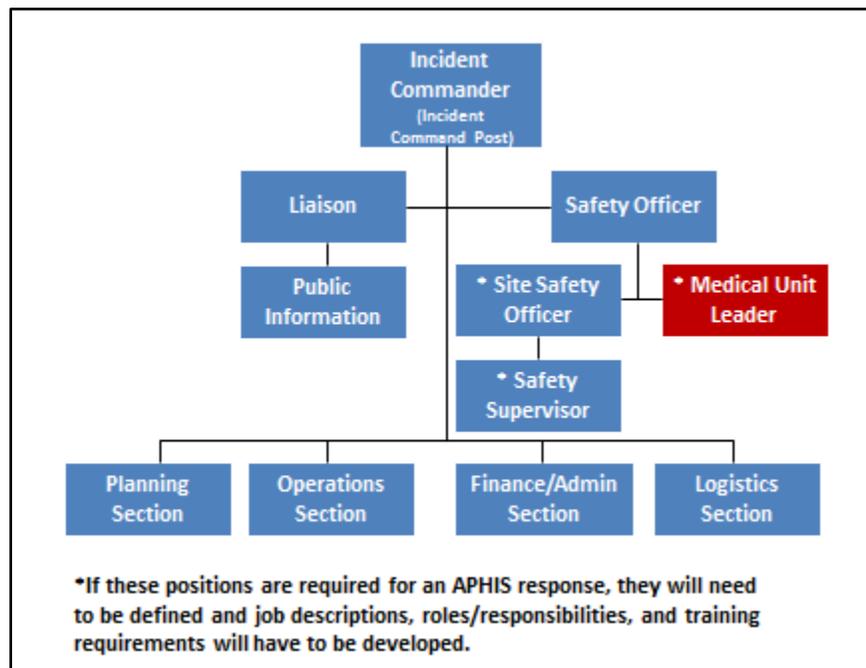
Roles & Responsibilities

The roles of health and safety response personnel vary depending on the incident and may evolve during the incident. The number of personnel and the organizational structure are dependent on the size and complexity of the incident. Large-scale incidents may involve multiple premises and may cover large areas.

- The Incident Commander (IC) assigns a Safety Officer (SO) as soon as possible
- The IC initially manages all the premises until he or she delegates the role to an SO at the Incident Command Post (ICP), or if multiple sites are involved, Site Safety Officers at each site
- The SO(s) will develop overall incident and site-specific HASPs as required.
- All roles and responsibilities are assigned to available and trained safety personnel as needed

Refer to the appropriate FADPreP document for additional information.

Figure 2. Health and Safety Command Structure.



Roles and Responsibilities (cont.)

The APHIS SO is responsible for ensuring the health and safety of the responders who are APHIS employees. The general contractor on a site has a due diligence responsibility to the subcontractors to ensure that they have safety program and are adhering to it. The SO has the authority to stop an operation to correct safety or health hazards and does the following:

- Operates out of the ICP advising the IC
- Oversees development of the Health and Safety Plan (HASP)
- Identifies hazards which may occur during the response and seeks ways to minimize them
- Assesses the need for PPE and assures proper use, cleaning and maintenance
- Provides communication pertaining to health and safety matters
- Performs inspections and ensures safe work procedures are followed
- Provides training and prepares reports

The SO is assisted by the Site Safety Officer and Safety Supervisors (if these positions are deemed necessary by the IC), who manage efforts at individual premises ensuring safety procedures; conducting safety training; and reporting unsafe conditions and injuries. These positions may be delegated the responsibility to stop an operation to correct safety or health hazards.

The Operations Section manages field operations and works closely with the SO to ensure safe working conditions. The Logistics Section provides services and support and may include a Medical Unit which develops a medical plan and provides first aid.

Work Supervisors are also responsible for ensuring safety procedures are followed. Finally, Responders are responsible for following safe work procedures, using the prescribed PPE, reporting unsafe conditions and actions observed, and reporting all injuries to their supervisors.

Regulations

The Occupational Safety and Health Act ([OSH Act of 1970](#)) states “each employer shall furnish to each of his employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.”

The OSH Act is codified as regulations in [29 CFR 1960](#), which covers basic program elements for federal employees. The law requires that the employer provide a place of employment "which is free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees". Other requirements include:

- Operate a Health and Safety Program
- Designate a Health and Safety Manager
- Comply with applicable federal health and safety standards
- Promptly abate unsafe or unhealthy work environments
- Conduct periodic hazard recognition inspections by trained personnel
- Promptly respond to employee reports of unsafe or hazardous work conditions
- Provide health and safety training for all personnel

Regulations (cont.)

Additional OSHA General Industry Regulations:

- 1910.120 is specifically for Hazardous Waste and Emergency Response Operations
- 1910.132 is specifically General Requirements, under Subpart I, Personal Protective Equipment
- 1910.134 is Respiratory Protection
- 1019.1030 is Bloodborne Pathogens, which would apply ONLY in very specific situations

Those involved in controlling and eradicating avian influenza in U.S. poultry may wish to review the Centers for Disease Control and Prevention [Interim Guidance Documents](#):

- Interim Recommendations for Persons with Possible Exposure to Avian Influenza During Outbreaks Among Poultry in the United States
- Interim Guidance for Protection of Persons Involved in U.S. Avian Influenza Outbreak Disease Control and Eradication Activities

Figure 3. Carcass Management Team Wearing PPE



Health and Safety Training

The OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) Standard, [29 CFR 1910.120](#), calls for all personnel involved in an emergency deployment to be trained on specific items pertinent to health and safety.

Training requirements for workplace safety can be found in OSHA's publication, [Training Requirements in OSHA Standards](#).

- Each employee must receive training before beginning work at the site
- Personnel must be trained on site-specific procedures and the job hazards/risks specific to their tasks
- The safety officer decides the type of training needed for the various personnel involved in the deployment or response

All responders working on a deployment should receive the following training:

- Hazard communication
- How to report an injury
- Emergency communication
- Evacuation procedure
- Shelter in place
- HAZWOPER
- Relevant sections of this HASP (such as medical monitoring)

Other required training may include:

- Proper and safe use of tools and equipment
- Recognizing permit-required confined spaces
- Using PPE (inspection, donning, doffing, and disposal)
- Using fire extinguishers
- Defensive driving
- Material handling
- Job task training

Personnel Safety Briefings

Pre-entry briefings must be held before initiating any emergency response activity. The SO holds safety briefings daily, even if the work does not change. Safety briefings might include the following:

- A reminder of the importance of safety
- A review of the past day's injuries and incidents
- Any procedure changes and accompanying safety procedure changes
- Any changes to the command or supervisory structure
- Any relevant safety-related issues and cautions

All new incoming SOs should be thoroughly briefed by the outgoing officer. Incoming safety officer briefings should include the following:

- How objectives will be accomplished (site activities, operational sequence, and individual task assignments)
- Personnel roles, responsibilities, and work schedule
- General hazards and how to avoid them during work
- Review of proper donning and doffing of PPE
- Site specific or unique hazards
- Proper mixing techniques for cleaning and decontamination solutions
- Emergency procedures for workers injured on site
- Extreme temperature monitoring (heat stress, frost bite)
- Emergency donning and doffing for injured workers, and explain how a worker will be transported to seek medical attention

Personal Protective Equipment

Responding to an emergency animal disease outbreak can present many risks to human health, the environment and other animals. When it is not feasible to render the working environment completely safe by containing, reducing or eliminating a potentially hazardous agent, it is necessary to protect the responder by using PPE.

PPE has two important purposes:

- Protect the responder from potentially harmful hazards
- Prevent the spread of disease agents between animals or locations

The proper selection and use of PPE serves as a biosecurity tool to help isolate a pathogen, protecting the responder, the animals, and the public. PPE must be used, decontaminated, and disposed of properly to serve these purposes. These purposes must be taken into consideration when selecting PPE for a disease emergency.

Figure 4. Examples of PPE



Protection Levels

OSHA classifies PPE into four different levels, depending on the degree of protection. Level C is adequate protection in most animal disease situations, but the Safety Officer will make the final determination. General description and discussion of the levels of protection and protective gear are found in the [OSHA website](#).

Additional USDA APHIS guidance on selection of PPE for HPAI activities is available in this publication, [Interim Recommendations on PPE for Selected Activities](#).

- Level A – Greatest level of skin, respiratory, and eye protection featuring a totally encompassing suit
- Level B – Highest level of respiratory protection with the same level of skin protection as level C
- Level C – Includes dermal protection, such as chemical or biological resistant clothing and air purifying respiratory protection. Used when the concentration and type of airborne substances are known and the criteria for using air-purifying respirators are met.
- Level D – Lowest level of protection used for nuisance contamination. Has no respiratory protection and minimal skin protection

Figure 5. PPE Protection Levels



Eye and Face Protection

Eye/face protection should be worn in accordance with the health and safety plan to prevent materials such as manure, dust, mud, and contaminated biological tissue from entering the eyes, nose, and mouth. Types of eye/face protection include safety glasses, goggles, or full face shields which may reduce exposure from aerosols, dust, and manual contact.

- Goggles protect a responder's eyes from fluids splashed during cleaning and disinfection activities
- Face shields provide greater protection when conducting field autopsies, overseeing composting operations, collecting tissue samples, and during cleaning and disinfection, if fluids are caustic or irritating to the skin
- Note, neither face shields nor goggles provide eye protection from flying particles. Refer to [29 CFR 1910.133](#) for additional information.

Selection of appropriate PPE should be based on a risk assessment. A higher level of eye and face protection may be required for zoonotic diseases depending on transmissibility of the disease agent.

Figure 6. Goggles and Face Shield



Respiratory Protection

A respirator is a personal protective device that is worn on the face, covers at least the nose and mouth, and is used to reduce the wearer's risk of inhaling hazardous airborne particles (including dust and infectious agents), gases, or vapors. Types of respiratory protection range from simple dust masks to powered air-purifying respirators or self-contained breathing apparatuses. A self-contained breathing apparatus supplies clean, non-contaminated air through its own air supply for use in high-risk environments.

- Respirators either purify the air or supply fresh air
- Medical clearance, involving a medical evaluation, is required before a respirator can be used
- Fit testing is required for those respirators that form a tight seal against the face
- OSHA requires employers to have a written respiratory protection program
- A job hazard analysis will determine specifically which type of respiratory protection personnel must use

Figure 7. Examples of Face Masks



Air Purifying Respirators

An air-purifying respirator removes contaminants from ambient air prior to inhalation, using filters and/or cartridges. Three types are described below:

- Particulate filtering face piece respirators – sometimes referred to as disposable respirators because the entire respirator is discarded when it becomes unsuitable for further use
- Elastomeric respirators – sometimes referred to as reusable respirators because the face piece is cleaned and reused but the filter and/or cartridges are discarded and replaced when they become unsuitable
- Powered air-purifying respirators – a battery-powered blower moves the air flow through the filters

Figure 8. Air Purifying Respirator



Dermal Protection

PPE minimizes skin exposure to protect the responder while preventing the spread of disease. Long sleeves and long pants should be worn in the field and aprons or coveralls can be worn to provide additional protection. All outerwear must be appropriately cleaned and disinfected, or properly disposed of, before leaving the contaminated area.

- Coveralls – A protective outer layer of clothing that is worn over appropriate undergarments as an initial form of dermal protection. Clean, washable, and reusable long-sleeved one-piece cloth coveralls are most commonly used but higher risk situations may require a less permeable, disposable, long-sleeved one-piece Tyvek® or similar coverall. One of the more protective materials may be needed when there is a splash hazard, particularly of injurious or corrosive liquids.
- Apron – A full-length, waterproof, cut-resistant garment worn in front of one's clothes and tied at the back. Often worn during field autopsies or when collecting and cutting tissues that may be contaminated with a disease agent of high zoonotic risk.

Some situations may require more specific garments. Brightly colored, high-visibility vests should be worn when working around vehicles and traffic, such as a quarantine checkpoint. A cooling vest may be used under the coveralls during warm weather and insulated underclothing may be required during cold weather operations.

Hand Protection

Hand protection includes disposable gloves or gloves that can be disinfected. Standard disposable latex gloves are recommended for clinical use in the field; however, the SO should be consulted for specific guidance. Other types may be substituted under certain conditions and for those with latex allergies:

- Nitrile gloves – Protect against solvents, chemicals, fats, and petroleum products while providing excellent resistance to cuts, snags, punctures, and abrasions
- Polyvinyl chloride (PVC) gloves – Resist degradation, penetration, and permeation to chemical agents. PVC gloves can be worn as outerwear protection in more hazardous environments, including cleaning and disinfection activities.
- Butyl rubber gloves – Protect against chemicals such as acids, ketones, esters, bases, alcohols, amines, and amides
- Neoprene gloves – Provide resistance to heat, punctures, chemicals, acids, solvents, and grease
- General purpose gloves – Useful when performing activities that do not involve contact with contaminated material
- Kevlar®, Surgipath® – Used when performing autopsies and cutting tissue specimens in the field. Should be worn over waterproof gloves.
- Cotton inner gloves – May be worn to absorb perspiration

Hands must be washed or sanitized each time gloves are removed or replaced.

Figure 9. Types of Gloves



Head and Hearing Protection

Head and hearing protection is recommended when working around heavy machinery, equipment, supply areas, or loud noises.

Head protection may include:

- Hard hat
- Hood
- Disposable head cover/hair bonnet

Hearing protection includes:

- Ear muffs
- Disposable ear plugs
- Reusable ear plugs

When hearing protection is required to protect responders from hazardous noise levels, a baseline audiogram should be in place and a Hearing Conservation program should be managed to provide early detection of job-related hearing loss ([29 CFR 1910.95](#)). Consider possible job function impairment, effectiveness, cost, and biosecurity risks when choosing proper head and hearing protection.

Foot Protection

Foot protection for field use should include rugged impermeable boots made of rubber or waterproof plastic material with shallow treads that can be disinfected or discarded.

- High pull-on boots worn over stocking feet are preferable to overshoes or over boots
- Safety boots with steel toes and midsoles provide extra protection from puncture wounds and crushing
- Boots must fit well and be comfortable
- For operations involving avian influenza, secure coverall legs over the boots with duct tape (or similar), leaving enough excess fabric around the knees to allow full mobility

Figure 10. Foot Protection



Planning Lesson Overview

This lesson contains information to help you plan for Health and Safety measures which must be instituted during a response to an animal health emergency. Planning is essential to ensure that the carcass management task is carried out safely. Moreover, proper planning protects the workers, the general public, and the environment.

Important considerations include:

- Preparing a site specific health and safety plan
- Using a job hazard analysis to identify risks associated with the job tasks
- Deciding on the actions necessary to ensure responder safety during a response

Planning Lesson Contents

This lesson presents information related to the following topics:

- Health and Safety Plan (HASP) – Defines policies, practices, and procedures for safe and healthful working conditions
- Job Hazard Analysis – Identifies hazards and risks associated with job tasks by focusing on the worker, the task, the tools, and the work environment
- Hazard Assessment – Matches the type and degree of risk with the selection of a given protective measure

Health and Safety Plan

APHIS has safety professionals, within the Emergency Management, Safety and Security Division (EMSSD) and Veterinary Services program, which can help response teams develop a site-specific health and safety plan (HASP), for an outbreak emergency response. Refer to the APHIS [EMSSD](#) website for more information.

HASP Facts:

- The HASP is prepared to meet regulatory requirements
- The primary goal is to define policies and procedures outlining safe and healthful working conditions for personnel and the public during field activities
- The HASP encompasses most health and safety procedures that may be needed in a particular investigation/response
- All personnel performing field activities should be required to read and understand the HASP and follow the policies and procedures
- A copy should be maintained in all vehicles assigned to the field team
- The HASP is developed for specific conditions, purposes, and personnel and must be amended if conditions change

Job Hazard Analysis

A job hazard analysis (JHA) identifies hazards associated with job tasks before they occur. It focuses on the relationship between the worker, the task, the tools, and the work environment. Ideally, after hazards are identified, steps are taken to eliminate or reduce them to an acceptable level of risk.

For a JHA to be effective, management must demonstrate its commitment to health and safety by promptly correcting any uncontrolled hazards identified. It is important that management and employees collaborate in the process of identifying and correcting hazards because employees are on the worksite every day and most familiar with potential hazards. Important steps include:

- Plan the work
- Identify and evaluate the hazards
- Control the hazards
- Implement the work
- Provide feedback (for work plan revision)

If responders are involved in many different or complex processes, professional help conducting a JHA may be needed. Review the OSHA 3071, 2001 (Revised) [Job Hazard Analysis](#) booklet for further guidance.

APHIS employees may visit the [APHIS intranet site](#) for additional guidance.

Hazard Assessment

Once the hazards are identified through the JHA, measures to protect personnel from those hazards must be implemented. Measures may include:

- Administrative controls (don't allow personnel to enter the hazardous area)
- Engineering controls (e.g., mechanical ventilation to remove airborne hazards)
- Personal Protective Equipment

It is necessary to properly match the type and degree of risk with the selection of a given protective measure. The first step in making this match is to conduct a thorough risk assessment. An effective risk assessment establishes:

- Composition, magnitude of hazard
- Length of time PPE will perform at known level of protection
- Exertion level, extent of physical work to be performed while wearing PPE

Based on the information provided by the risk assessment, the Incident Commander and/or Safety Officer can make informed decisions and take the appropriate actions to ensure responder safety during a response.

The negative consequences of providing PPE unsuited to the hazards of a given work environment may include

- Enhanced risk of spreading the disease
- Impaired job performance
- Risk of responder injury, illness, or death

Operations Lesson Overview

This lesson contains general procedures in preparing for safe practices during an emergency animal response. The following topics will be briefly addressed:

- Site security and control measures
- Handling farm animals, including infected poultry
- Hazard controls and establishing work zones
- Use of PPE, including donning, wearing, cleaning, disinfecting, and doffing
- Health issues, including personal hygiene and mental health

Operations Lesson Contents

This material in this lesson is presented in a step-wise manner that provides detailed instructions and key steps based on the criteria and measures instituted during recent U.S. animal disease outbreak responses.

- Site Security and Control Measures – Discusses security procedures, such as controlling all entrances and exits
- Protecting HPAI Responders – Provides policy and guidance based the APHIS Directive 6800.1 for APHIS employee engaged in the HPAI response
- Handling Infected Animals – Details procedures and steps to avoid spread of infectious agents after working with infected animals
- Hazard Controls and Work Zones – Reviews programs and engineering measures to prevent, reduce, or eliminate exposure to a hazard
- Using PPE – Describes the procedures for the donning, safe wearing, heat stress monitoring, and removal of PPE by the user
- Health Issues – Prescribes personal hygiene procedures to ensure health of workers and addresses the mental health aspects of response activities
- Equipment Disposal, Cleaning & Disinfection – Briefly describes safe handling of potentially infected materials

Site Security & Control Measures

All response personnel must follow the security procedures established by the command staff. The security team must be alerted to any suspicious activities observed during field operations. The incident commander may assign the security officer as a member of the command staff or as a member of the operations staff. To maintain security while conducting field operations the security officer must:

- Control all entrances and exits
- Establish a personnel identification system
- Enforce entry and exit requirements
- Use temporary fencing if needed
- Assess the security threat potential to all buildings, dwellings, and sites occupied by APHIS personnel

Protecting HPAI Responders

The APHIS Directive, “Ensuring the Protection of Employees Involved in Highly Pathogenic Avian Influenza (HPAI) Control and Eradication Activities,” establishes policy and guidance to ensure the safety of employees engaged in highly pathogenic avian influenza (HPAI) response [APHIS Directive 6800.1](#) specifies the following:

- All persons who have been in contact or possible contact with HPAI must wash their hands frequently with soap and water for at least 15–20 seconds
- All workers involved in environmental cleaning and disinfection, culling, transport, of HPAI virus-infected poultry must not eat, drink, or smoke while performing these duties and must be provided with appropriate PPE
- Workers that have potentially been exposed to HPAI must monitor their health for fever, respiratory symptoms, and/or eye infections for one week after last exposure. Self-Observation instructions for demobilizing bird flu responders can be obtained at the [CDC website](#).
- Individuals who become ill should seek prompt medical care and notify the health care provider’s office or clinic about exposure to HPAI
- Ill persons must practice good respiratory and hand hygiene to lower the risk of transmission of the virus to others
- Patients or health care providers must report possible human cases of HPAI to their local or State Department of Health

Handling Infected Animals

Some animal diseases such as Foot-and-Mouth Disease (FMD) and Classical Swine Fever (CSF) are not a threat to public health, but humans can serve as a source of exposure for susceptible animals through contaminated skin, clothing, footwear, and other fomites.

- All persons who have been in contact or possible contact with infectious agents must wash their hands frequently with soap and water
- All workers involved in environmental cleaning and disinfection, culling, transport, or carcass management of infected animals must not eat, drink, smoke, or visit the toilet while performing these duties and must be provided with appropriate PPE
- PPE items must be properly discarded or disinfected according to outbreak-response guidelines:
 - All APHIS employees involved in animal disease control and eradication activities will shower completely (including a shampoo and expectoration) at the end of the activity or work shift
 - No item of clothing (including shoes and underwear) worn during FMD or CSF control and eradication activities can be worn home or to any public places outside of the infected/exposed area
 - Proper doffing of PPE should only be done in the decontamination zone

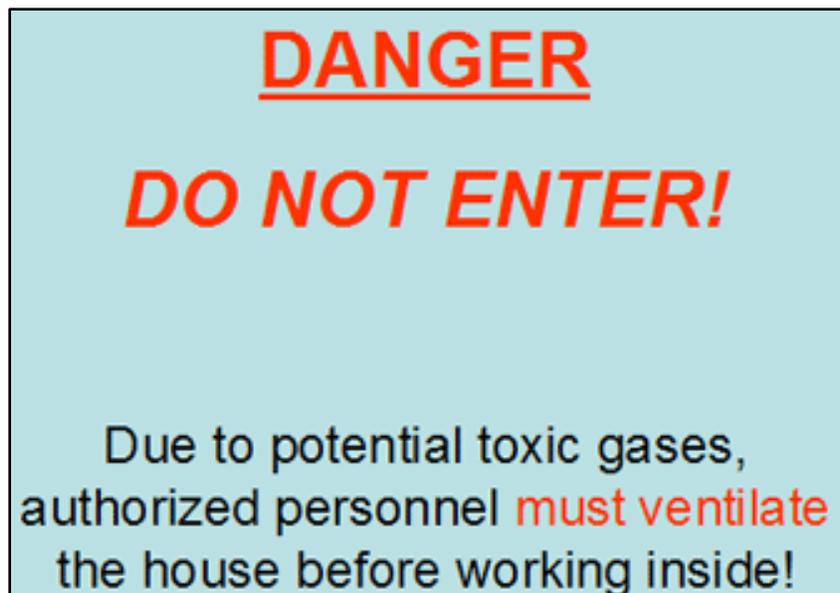
Hazard Controls

It is essential to prevent, reduce, or eliminate the responder's exposure to a hazard, and not rely only on PPE. OSHA requires the use of PPE to reduce employee exposure to hazards when engineering and administrative controls or work practices are not feasible or effective in reducing these exposures to acceptable levels.

PPE is not a first line of defense, so other steps to eliminate hazards must be taken. These include:

- Engineering controls
 - Contain or remove a hazard through isolation, enclosure, ventilation, and substitution to prevent or reduce responder exposure
- Administrative controls and work practices
 - Regulate exposure to hazards through enforced policies and directives
 - Responder training about reducing hazard exposure and awareness of personnel roles in a hazardous situation

Figure 11. Example of a Hazard Warning Sign



Work Zones

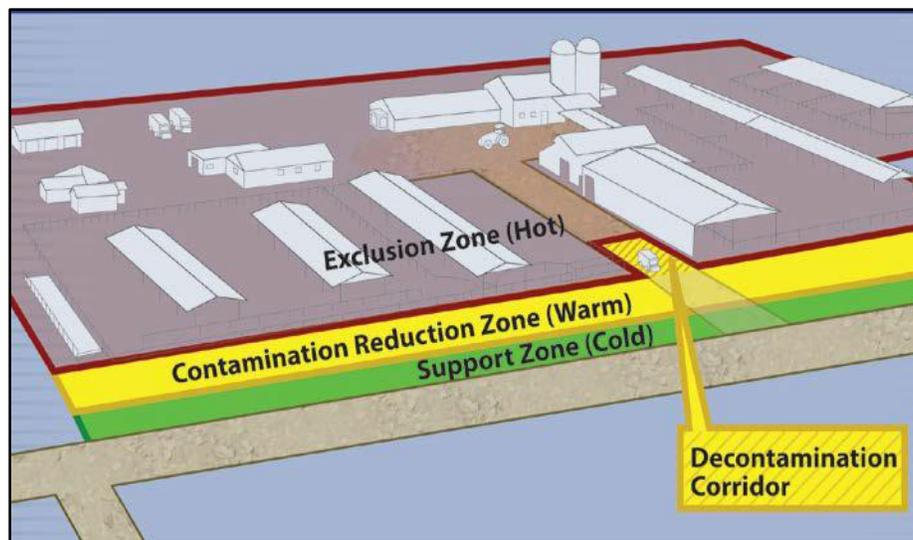
It is important that a site perimeter, work zones, a Decontamination/Contamination Reduction Corridor, and access control points are established to:

- Reduce the accidental spread of hazardous substances by workers or equipment
- Confine work activities to the appropriate areas
- Facilitate the location and evacuation of personnel in case of emergency

The three major work zones are as follows:

- Exclusion (Hot) Zone – Area where contamination is present
- Contaminated Reduction (Warm) Zone – Transition area between the contaminated and uncontaminated area
- Support (Cold) Zone – Uncontaminated area, an appropriate location for the command post and where PPE donning takes place

Figure 12. Major Work Zones



Donning PPE Guidelines

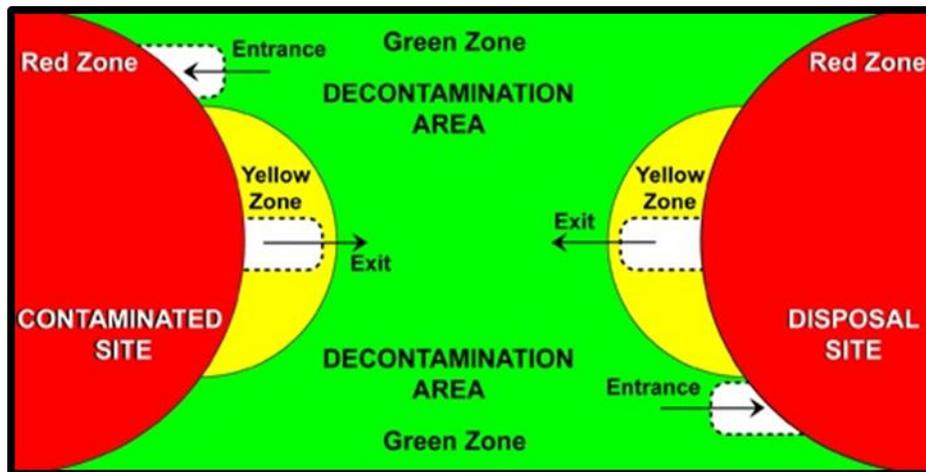
Donning is the procedure of assembling PPE on the user. Check all PPE for damage before donning. Responders should only wear and use PPE for which they have been trained. For respirators, responders must also be medically cleared and fit tested prior to use.

In a changing room or other place in the Cold Zone - Support Zone (SZ) lay out PPE.

Preparing to Don Level C PPE

- Measure and cut a supply of chemical-resistant tape long enough to fit around ankles/top of boots, wrists, and over zipper and crotch
- Cut several extra pieces in case one of the pieces accidentally bunches against itself and becomes unusable
- Put tabs on chemical-resistant tape to assist with removal
- Perform a communications check
- Remove the Tyvek® coveralls or similar protective suit from the cellophane wrapping and inspect for tears, rips, or other imperfections, and then unzip it

Figure 13. Decontamination Areas & Zones



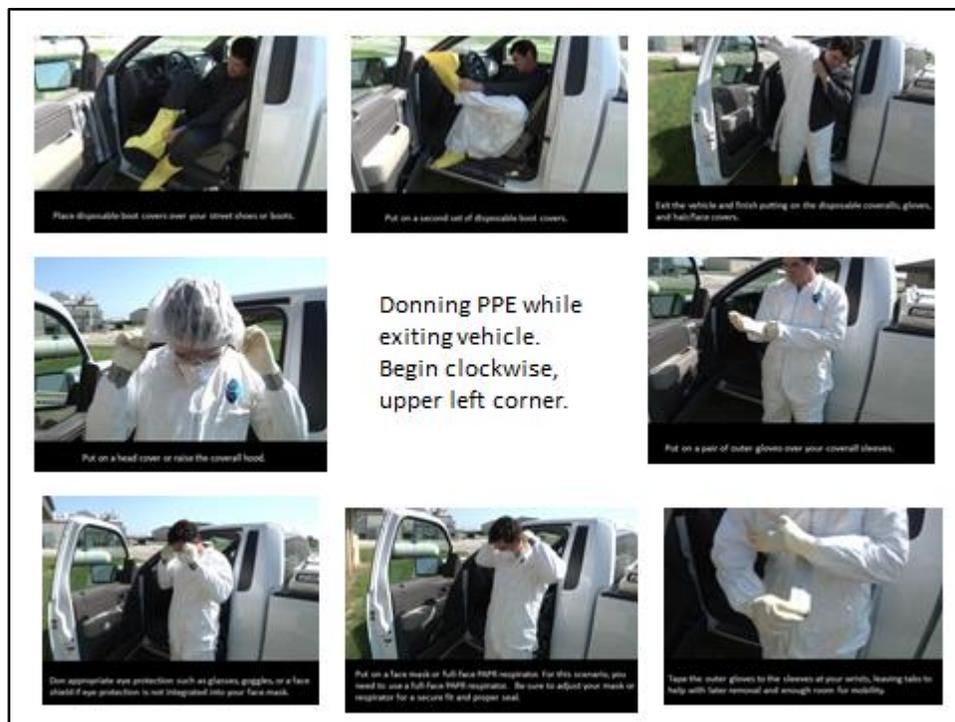
Donning PPE Guidelines (cont.)

Donning Level C PPE

Level C protection is adequate for most biological exposures that could potentially occur in an animal health emergency.

- Educational material on [Donning PPE](#) has been developed by the Center for Food Security and Public Health at Iowa State University
- Refer to Appendix A in the [NAHEMS Guidelines: Personal Protective Equipment](#) for additional detailed information

Figure 14. Example of Donning PPE



Safety While Wearing PPE

Safe and effective donning, doffing, and wearing of Level C or greater PPE require assistance, and the “buddy system” should always be used. Wearing PPE can create responder hazards such as physical and psychological stress, and impaired vision, movement, and communication.

Heat and cold stress can be a serious risk and should be addressed by administrative measures such as:

- Limited work shifts
- Rotations in and out of PPE
- Rest periods, during which fluids are consumed

Responders must be aware of their physical abilities and overall health when engaged in activities requiring PPE. Responders must undergo medical clearance and medical monitoring by a licensed health care provider to ensure they are physically suited to wear respiratory protection while working in an infected environment.

Heat Stress

Personnel need to be aware of the symptoms of heat stress/illness, particularly in high temperatures and when wearing PPE.

Early symptoms of heat illness:

- Profuse sweating
- Fatigue, thirst
- Muscle cramping

Late symptoms of heat exhaustion:

- Headache, dizziness & light-headedness
- Weakness, nausea & vomiting
- Cool, moist skin, dark urine

Symptoms of heatstroke:

- Fever over 104°F, with dry, hot and red skin
- Irrational behavior, extreme confusion
- Rapid, shallow breathing and rapid, weak pulse
- Seizures, unconsciousness

Equipment Disposal, Cleaning and Disinfection

Following the handling of potentially infected materials, it is important that all PPE be properly disposed or cleaned and disinfected. Important actions include:

- Removing and placing all disposable equipment in designated containers. Disposable PPE should be removed without touching contaminated outer surfaces.
- Remove gloves last. Pull them inside out and dispose in proper containers.
- Cleaning and disinfecting reusable equipment and PPE with authorized cleaning and disinfecting agents
 - Cleaning is the physical removal of organic material (i.e., manure, blood, feed, and animal tissue). It is important to remove these organic materials before the disinfection process. Residual organic material can harbor disease agents and reduce disinfectant effectiveness.
 - Disinfection is the killing of disease agents by direct exposure to chemical or physical agents
 - Following cleaning and disinfection return all reusable PPE to storage

If decontamination trailers are used, clearly marked containers should be provided for contaminated reusable clothing as well as for contaminated disposable items.

Figure 15. Decontaminating Footwear



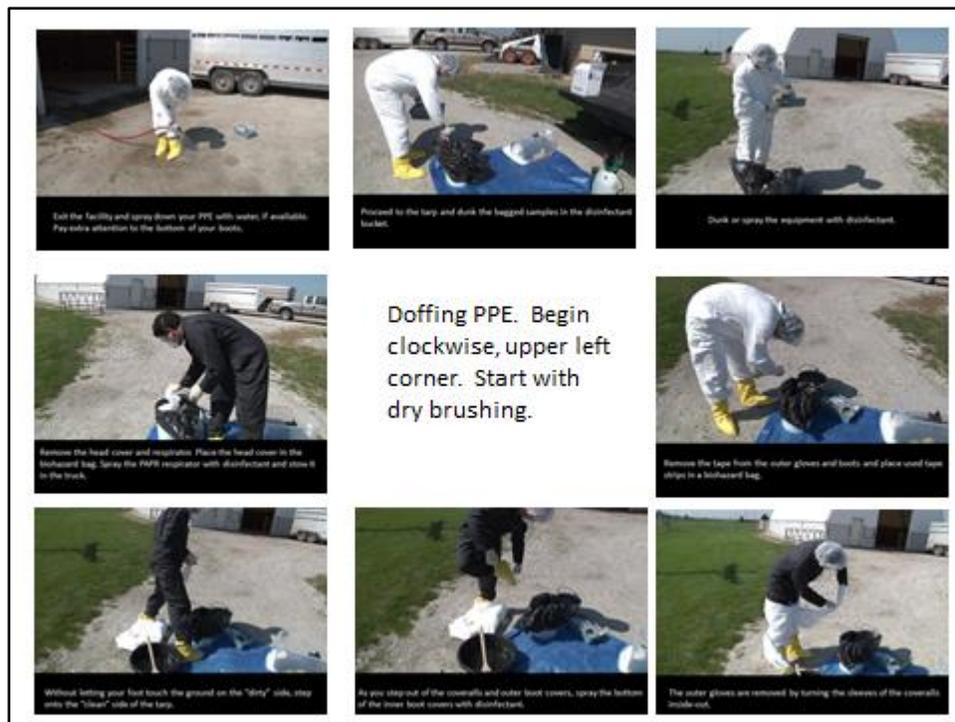
Doffing PPE Guidelines

Doffing is the procedure for removing PPE. Attention should be paid to the donning sequence to allow doffing to occur without cross contamination and pathogen spread. The outerwear needs to be decontaminated and removed, or disposed of in such a way that prevents exposure of the responder's skin and inner clothes to any pathogen.

Doffing Level C PPE

1. Begin doffing in the Hot Zone - Exclusion Zone (EZ) by dry brushing off exterior of PPE.
2. Enter the Decontamination Corridor and continue the decontamination procedure to allow for safe doffing. Appropriate decontamination is performed on a responder's PPE as well as equipment before returning to the Cold Zone – Support Zone (SZ).
3. Remove all chemical-resistant tape from the coveralls, including gloves, boots, and zipper (and face piece, if applied). Dispose of tape in provided containers.

Figure 16. Example of Doffing PPE (Click on Image to Enlarge It)



Doffing PPE Guidelines (cont.)

4. Unzip the protective coveralls.
5. Remove the outer gloves.
6. Reach inside the hood and roll it back, touching only the inside of the coveralls.
This step is easiest with the assistance of a team member.
7. Pull the protective coveralls off the shoulders (turning the suit inside out) to ensure any residual contamination is kept away from the body.
8. Sitting on a stool, remove boots and place them in a designated container.
9. Peel the protective coveralls down from head to toe and step out of the coveralls
10. Dispose of coveralls in a provided container.
11. Remove scrub suit, disposable underwear, and socks and place in a designated container.
12. Remove the respirator and inner gloves. Place the respirator in a designated container. Dispose of gloves in a provided container.
13. Take a complete shower, including a shampoo, and change to freshly laundered clothing.

Refer to Appendix A in the [NAHEMS Guidelines: Personal Protective Equipment](#) for additional detailed information.

Personal Hygiene

Personal hygiene procedures must be followed to ensure the zoonotic disease agents are not contracted by workers and further transported from the infected site.

- No clothing worn in the livestock or poultry facility should be worn home
 - Clothing should be laundered separately in detergent and hot water
 - Shoes do not have to be discarded if they are inside boots that are disinfected or covered by disposable shoe covers that remain intact
- Do not touch face, mouth or nose with gloves or before disinfecting hands
- Gloves should be worn while removing other protective clothing and removed last
 - Remove gloves by turning them inside out
 - Immediately wash hands after removing gloves
- Following work activities or end of shift, thoroughly shower and wash hair with soap and warm water
- Put on clean clothes and shoes

Mental Health

It is critical to take into account the toll that an animal health emergency can take on mental health. The effects of depopulation efforts can significantly affect the health of responders, livestock and poultry owners, and others impacted by the outbreak and response efforts.

- Personnel should receive training on how to effectively deal with the stress of mass animal mortalities and be aware of mental health counselors available
- Physical, as well as mental and emotional, stress can occur before, during, and after participation in mass carcass management efforts
- If evidence of undue stress is observed, report it to the incident command post, refer the individual to a mental health counselor, and, if possible, shift him or her to less traumatic roles in the carcass management effort
- Encourage responders to take frequent breaks, eat nutritious meals and drink plenty of water, get adequate sleep, and engage in leisure activities that provide opportunities for detachment and stress relief

The Department of Health and Human Services, Centers for Disease Control and Prevention (CDC), has developed resources specifically for emergency and disaster responders, planners, health professionals, and the general public. For further information, refer to [Coping with a Disaster or Traumatic Event](#).

Summary

Congratulations! You have completed the Health, Safety, & PPE Module of the Introduction Modules. In this module, you have learned to:

- Recognize hazards associated with carcass management
- Understand organizational and personnel responsibilities associated with hazard management
- Describe the underlying principles in a job hazard assessment
- Understand health and safety hazards, contamination sources, and potential routes of exposure
- List the types of hazard management measures
- Recognize the different types of PPE and how they protect against hazards

Please click [here](#) to download the certificate of completion for this module. You can enter your name on the certificate and save or print it for your records. Proceed to Home Page to begin the next module, Biosecurity.