



# DEPARTMENT OF FIRE SERVICES

## Hazardous Materials



Guidelines for Potential Infectious Disease Response  
Version 1.2 November 4, 2014

# FORWARD

The appearance of Ebola on American soil has added yet another, new and complex challenge to our mission of providing emergency services to the public, while protecting those who serve. While expert advice has sought to provide advice on expected behavior, safeguards and presentations of Ebola, the disease has not cooperated, generating great concern among the public, medical personnel and responders. The Commonwealth of Massachusetts has convened several working groups to develop standard recommendations, training and solutions in order that consensus approaches that have been researched and validated to the extent possible can be provided to all responders. The following presentation is the current version of recommended methods for personal protection, donning, and decontamination and doffing of personal protective equipment for highly infectious diseases. Importantly, these are recommendations, not mandates. Use of these recommendations is a local option and should be incorporated into local, regional and organizational standard operating practices such that there is no ambiguity or conflict. These recommendations are subject to revision and update as new information, equipment, methods and experiences become available. Thus, this presentation should be revisited often. The following presentation is a collaborative effort of the Massachusetts Department of Fire Services, the Boston Fire Department, the Massachusetts Emergency Management Agency, the Massachusetts Department of Public Health, Office of Emergency Medical Services, Boston EMS, Massport Fire Department, the Massachusetts State Police, and various local services. We gratefully acknowledge the spirit of cooperation and the dedication to duty that was exhibited in bringing about this consensus approach.

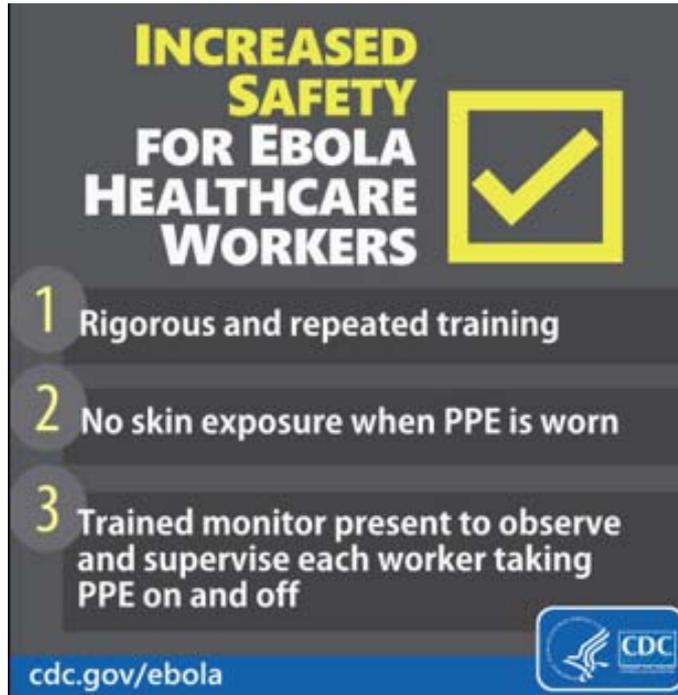
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State Fire Marshal

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DEPARTMENT OF FIRE SERVICES  
Hazardous Materials

# CDC Recommendations for Healthcare Workers



**INCREASED SAFETY FOR EBOLA HEALTHCARE WORKERS**

- 1 Rigorous and repeated training
- 2 No skin exposure when PPE is worn
- 3 Trained monitor present to observe and supervise each worker taking PPE on and off

[cdc.gov/ebola](http://cdc.gov/ebola)

- Centered on three principles
- Developed to decrease ambiguity
- Reflects the experience of the successful treatment of patients at Emory University Hospital, Nebraska Medical Center and the National Institutes of Health Clinical Center



# Recommendations for EMS and Medical First Responders, Including Firefighters and Law Enforcement Personnel

- Address scene safety:
  - if PSAP call takers advise that the patient is suspected of having Ebola, EMS personnel should put on the PPE appropriate for suspected cases of Ebola before entering the scene
  - keep the patient separated from other persons as much as possible
  - use caution when approaching a patient with Ebola. Illness can cause delirium, with erratic behavior that can place EMS personnel at risk of infection, e.g., flailing or staggering



# Recommendations for EMS and Medical First Responders, Including Firefighters and Law Enforcement Personnel

- All patients should be assessed for symptoms of Ebola i.e. fever of greater than 38.0 degrees Celsius or 100.4 degrees Fahrenheit, and additional symptoms such as:
  - severe headache
  - muscle pain
  - vomiting
  - diarrhea
  - abdominal pain
  - unexplained hemorrhage



# Recommendations for EMS and Medical First Responders, Including Firefighters and Law Enforcement Personnel

- If the patient has symptoms of Ebola, then ask the patient about risk factors within the past 3 weeks before the onset of symptoms, including:
  - contact with blood or body fluids of a patient known to have or suspected to have Ebola
  - residence in—or travel to— a country where an Ebola outbreak is occurring
  - direct handling of bats or non-human primates from disease-endemic areas



# Recommendations for EMS and Medical First Responders, Including Firefighters and Law Enforcement Personnel

- Based on the presence of symptoms and risk factors, put on or continue to wear appropriate PPE and follow the scene safety guidelines for suspected case of Ebola
- If there are no risk factors, proceed with normal EMS care



# Personnel Protective Equipment (PPE) Guidelines

- CDC Respiratory Protection Guidelines
  - N95 respirator with full face shield (minimal standard)
- Higher Level of Respiratory Protection Available
  - hooded powered air purifying respirator
  - full face air purifying respirator (APR) or full face powered air purifying respirator (PAPR) with HEPA or CBRN cartridge
- Personal Protective Equipment garment should meet the requirements of one or more of the following standards:  
Non-permeable coverall with hood/head covering that meets the one of the following standards:
  - *American Society of Testing and Materials (ASTM) F1671*
  - *NFPA 1999-2013*
  - *Splash protection standards of NFPA 1992-2013*
  - *CBRN protective ensembles certified to Class 2, Class 3 or Class 4 of NFPA 1994-2012*
- Protective Glove Guidelines
  - inner nitrile gloves
  - chemically resistant, unlined, outer nitrile gloves



# Equipment List (PPE) with CDC Respiratory Recommendations

- NFPA 1992, non-permeable, Liquid/Splash Protective Hooded Coveralls
- Respirator
  - N95 respirator with full face shield (minimal standard)
- Yellow latex hazmat boot covers
- Inner nitrile gloves, latex-free, powder-free, disposable medical exam, ambidextrous, 6-10 ml (1-2 pair)
- Green outer nitrile gloves, 22 ml
- Chem Tape



# Equipment List (Decontamination Station)

- Plastic Bags-self decon (minimal 40 gallon)
- Plastic Bags for mask and inner gloves
- Spray Bottles, opaque, 16 oz.
- Decon solution
  - EPA approved disinfectant
- Zip ties (optional)
- Equipment Donning checklist
- Equipment Decon checklist
- Equipment Doffing checklist
- Bench/chairs



# PPE Donning Procedures



- Put medical gloves on
- Get into NFPA 1992, non-permeable coveralls



# PPE Donning Procedures



- Assure the sleeves of the suit overlap the first pair of medical gloves
- Have assistant seal up the suit. Add a buddy tab to the zipper pull



# PPE Donning Procedures



- Have assistant put on booties (consider making a small cut in the back top portion of the bootie to help facilitate donning and doffing). If the suit has integrated booties, do not tape the boots to the suit. Also consider appropriate footwear for the terrain.



# PPE Donning Procedures



- Put on second pair of medical gloves. The second pair of medical gloves will be over the outer suit and taped to the suit with Chem tape.



# PPE Donning Procedures



- Tape wrist cuffs with tabbed tape overlapping the second pair of medical gloves (use Chem tape. Duct tape used only for demonstration purposes). Be careful to not tape so tightly as to prevent removing the hand through the glove and sleeve during doffing.



# PPE Donning Procedures

- Put on final outer gloves. Do not tape the final layer of gloves to the suit.



# N95 Respirator CDC Recommended Ensemble

- N95 Respirator

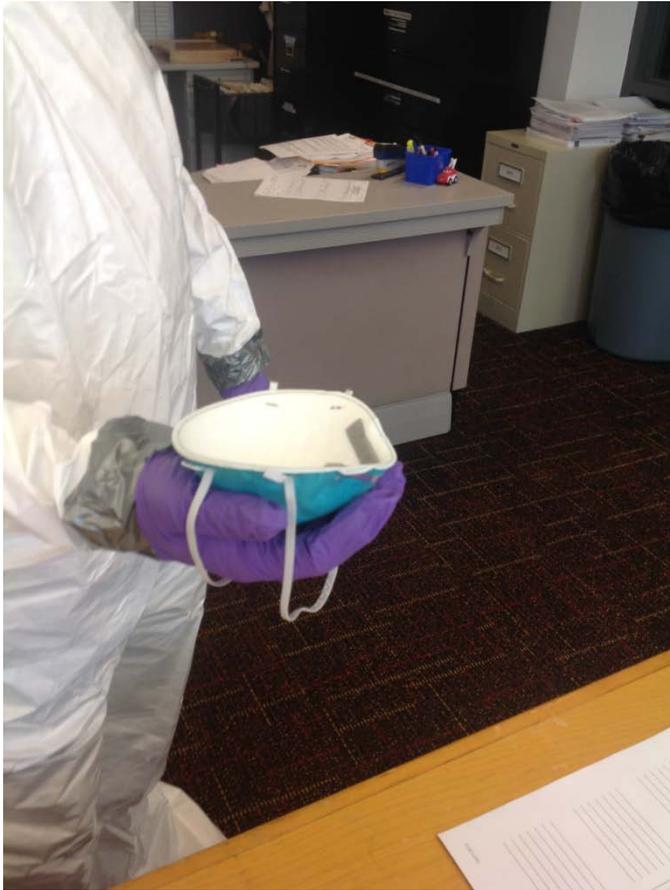


# Face Shield -CDC Recommended Ensemble

- Full Face Shield



# Donning of the N95 Respirator



- Cup the respirator in your hand with the nosepiece at your fingertips, allowing the headbands to hang freely below hands.



# Donning of the N95 Respirator



- Position the respirator under your chin with the nosepiece up.



# Donning of the N95 Respirator



- Pull the top strap over your head so it rests high on the back of the head.



# Donning of the N95 Respirator



- Pull the bottom strap over your head and position it around the neck below the ears.



# Donning of the N95 Respirator



- Using two hands, mold the nosepiece to the shape of your nose by pushing inward while moving fingertips down both sides of the nosepiece. Pinching the nosepiece using one hand may result in less effective fit and performance.



# N95 Respirator Effectiveness

- Respirators are only effective when the seal around your nose and mouth is tight. If you cannot achieve proper fit, do not enter the isolation or treatment area. Consult your supervisor.
- A respirator cannot be worn by healthcare workers with facial hair that comes between the sealing surface of the mask and face. Bearded healthcare workers should contact their organization Health and Safety Officer to obtain information on alternative respiratory protection.



# Fit Check the N95



- Face Fit Check-To check fit, place both hands completely over the respirator and exhale. If air leaks around your nose, readjust the nose piece. If air leaks at respirator edges, adjust the straps back along the sides of your head. Recheck.



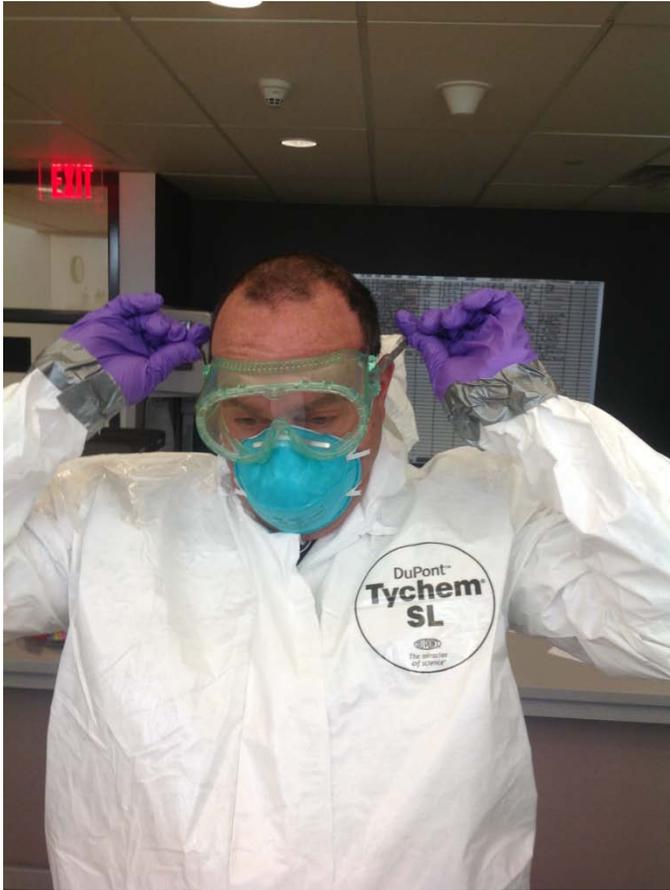
# Don Non-Vented Goggles



- Place goggles over eyes and nose of N95 respirator.



# Don Non-Vented Goggles



- Adjust head band for comfort by pulling straps on either side of head.



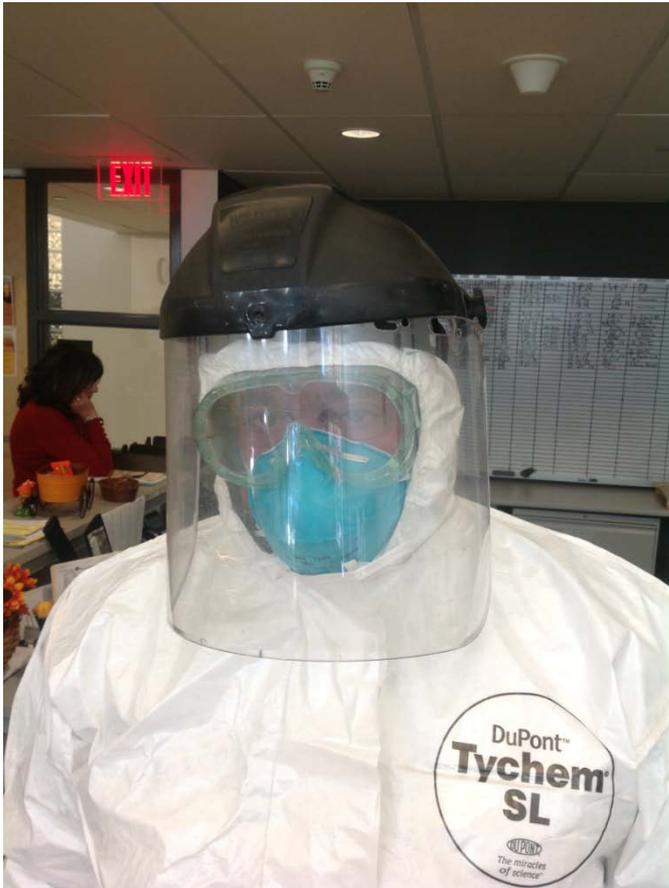
# Hood



- Pull hood over head and adjust around goggles and N95 respirator, leaving as little skin uncovered as possible. Pull zipper up and tape using Chem tape (see slide #32) to assure there is no exposed skin under the chin and around the neck.



# Face Shield



- Don full face shield and adjust straps for comfort.



# PPE Donning Procedures – Full Face Air Purifying Respirator Option



- Don a full face piece with a rated filter (N95, P100 HEPA charcoal, e.g. CBRN filter or comparable air respirator).



# PPE Donning Procedures – Full Face Air Purifying Respirator Option



- Pull hood over your head after the face piece is fully donned



# PPE Donning Procedures – Full Face Air Purifying Respirator Option



- Seal the area beneath your chin (the open neck area) with tabbed tape to cover any skin exposure. Taping around the face piece and the suit is not required. (use Chem tape. Duct tape used only for demonstration purposes).



# PPE Doffing Procedures

Note: Doffing is likely to occur at a location other than donning. Appropriate logistics should be assured to prepare for doffing at the receiving hospital.



# Equipment List - Doffing

- Plastic Bags-self decon (minimal 40 gallon)
- Plastic Bags for mask and inner gloves
- Spray Bottles, opaque, 16 oz.
- Decon solution
  - EPA approved disinfectant
- Zip ties (optional)
- Equipment Donning checklist
- Equipment Decon checklist
- Equipment Doffing checklist
- Bench/chairs



# Decon/Doffing in a Bag Procedures



- Upon completion of their tasks, each responder will proceed to the designated decon area. Stand with both feet in a decon bag, facing each other, close enough to assist one another
- Each member removes outer gloves and drops them in their respective decon bag, using the first discarded glove to remove the other outer glove



# Decon/Doffing in a Bag Procedures



- Each member will have a small spray bottle of decon solution. One at a time, each member will spray the other from head to toe with the decon solution, directing the member to make a full turn to insure total coverage with the decon solution. Move slowly and be sure to stay within your bag. \*Do not spray the liquid solution into the filters of the respirator cartridge\*



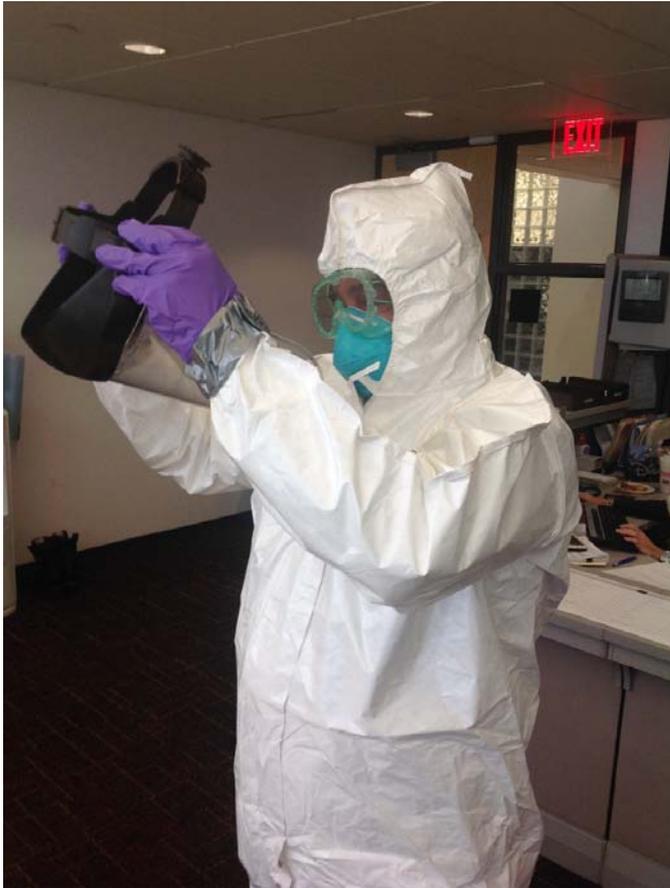
# Decon/Doffing in a Bag Procedures



- When complete, each member drops the bottle into their respective decon bag
- There is a wait time at this point dependent on the required contact time of the decon solution utilized
- Once the wait time is over, each member can start doffing his own PPE. While removing the PPE, try to do so in as gently a manner as possible to minimize aerosolization



# Doffing Respiratory Protection - CDC Recommended Ensemble



- Remove the face shield and place it into the decon bag.
- Partner should remove your hood, paying close attention to rolling the hood off from the front to back, without touching the inside of the suit. (See slide # 40-42 for detail view)



# Decon/Doffing in a Bag Procedures - – Full Face Air Purifying Respirator Option



- Start with neck tape. Locate the tabbed end of the tape to remove.
- Using the tabbed zipper pull, unzip the front of the suit slowly to ensure the suit doesn't rip.



# Decon/Doffing in a Bag Procedures – Either Respiratory Protection



- Remove the hood, paying close attention to rolling the hood off from the front to back, without touching the inside of the suit. Each responder should assist the other.



# Decon/Doffing in a Bag Procedures – Either Respiratory Protection



- Grasp the top of the hood with your gloved hand and push your fist into the middle seam of the hood to turn it inside out
- Specific care must be taken to only touching the outside of the suit



# Decon/Doffing in a Bag Procedures – Either Respirator



- The hood is turned in on itself while the assistant continues to position hands touching the outside of the hood. This ensures that the inside of the hood (clean side) remains in contact with the team member's skin.



# Decon/Doffing in a Bag Procedures – Either Respirator



- Each responder can remove his own suit without touching the inside with a contaminated glove. Go slow!
- Pull arms out of suit, assuring that taped nitrile gloves remain attached to inner suit



# Decon/Doffing in a Bag Procedures – Either Respirator



- Responders can sit down on the bench/chair, assuring the bottom of their suit and their feet (with bootie covers) remain in the bag



# Decon/Doffing in a Bag Procedures – Either Respirator



- Very carefully use your feet, one foot pushing on the heel of the other, to kick off your booties within the bag. Roll the remainder of the suit off into your bag, taking care not to touch the outside of the suit



# Decon/Doffing in a Bag Procedures – Either Respirator



- While still seated, lift your feet and swing your body totally clear from the decon bag. At this point, responders should still have one pair of inner medical gloves on (the very first pair you put on) and his/her full face piece with the filter cartridge, canister still attached



# Decon/Doffing in a Bag Procedures – Either Respirator



- With your gloved hand, roll the side of the bag over, touching only the outside of the bag folding one side over the other



# Decon/Doffing in a Bag Procedures – Either Respirator



- While in the full face piece with connected canister and that last pair of medical gloves on, gather up the neck of the decon bag securing it with tape or a zip tie, provided by the clean supervisor. Take care not to “fluff” the bag up with air



# Doffing Respiratory Protection - CDC Recommended Ensemble



- With two hands, pull goggles away from the face, then over the head. Dispose of in decon bag.
- With eyes closed and while holding your breath, grasp N95 respirator with both hands and pull away from the face and over the head. Dispose of N95 in decon bag. Continue doffing equipment as described in earlier slides.



# Decon/Doffing in a Bag Procedures – APR Option



- Remove your full face piece with canister attached, dropping it into a smaller separate plastic bag with your medical gloves still on



# Decon/Doffing in a Bag Procedures – Either Respirator



- Finally, remove the last pair of medical gloves, dropping them into the same smaller bag as the face piece and canister. Fold the side of the bag over in the same manner you did the first bag, then gather up the neck and securing it with tape or a zip tie. All bagged PPE will be isolated until the lab results are reported.

