

Why we use Body Substance Isolation Precautions INSTRUCTOR GUIDE

This month's drill was prepared by
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Time Required: 3 Hours

Teaching/Learning Materials: Easel pad/board, markers/chalk, optional LCD and laptop for PowerPoint slides

References:

- Brady Emergency Care, 11th ed. (2008), Chapter 2;
- Brady First Responder 8th ed. (2008), Chapter 2;
- Brady IFSTA Fire Service Emergency Care (1999), Chapter 3;
- Mosby JEMS Elsevier EMT Prehospital Care 4th ed. (2010), Chapter 2;
- IFSTA Essentials of Fire Fighting and Fire Department Operations 5th ed. (2008) Ch. 21.
- Centers for Disease Control and Prevention. Retrieved March, 2010 at http://www.cdc.gov/ncidod/dhgp/by_universal_precautions.html
- Journal of American Dental Association. Retrieved March, 2010 at <http://www.jada.ada.org/cgi/content/full/134/5/569#T3>
- Federal Drug Administration. Retrieved March, 2010 at <http://www.fda.gov/MedicalDevices/ProductsandMedicalProcedures/MedicalToolsandSupplies/Personal/ProtectiveEquipment/default.htm>
- David Geffen School of Medicine at UCLA. Retrieved March, 2010 at <http://www.medstudent.ucla.edu/offices/sao/clinical/univprec.cfm>
- University of Michigan Health System. Retrieved March, 2010 at http://www.med.umich.edu/1libr/aha/aha_unipre_crs.htm
- County of Dare, North Carolina Emergency Medical Services Department of Public Safety. Retrieved March 2010 at <http://www.darenc.com/depts/EMS/Bloodborne/page21.htm>
- CDC. Guidelines for Isolation Precautions in Hospitals Hospital Infection Control Advisory Committee. Retrieved March 2010 at <http://wonder.cdc.gov/wonder/prevguid/p0000419/p0000419.asp#head002006000000000>

Motivation: Body Substance Isolation (BSI) and Personal Protective Equipment (PPE) are commonly used and familiar, but when should we take precautions and for what patients? BSI evolved from other types of precautions that were originally designed for in-hospital use. EMS personnel may transport patients from home-to-hospital or from hospital-to-hospital; therefore, they should be aware of in-hospital precautions, as well as the BSI and PPE they are familiar with. This lesson will review BSI, PPE, and other precautions to reinforce their importance and ensure the understanding and use of health and safety precautions.

Student Performance Objective: Given information, resources, and opportunity for discussion and practice, at the completion of this session EMTs will be able to list and describe BSI, PPE, and other precautions and demonstrate proper donning, doffing, and disposing of PPE.

EMTs will follow acceptable Maryland medical practice and Maryland Medical Protocols for Emergency Medical Providers.

Enabling Objectives

- List and describe types of protective precautions.
- Define BSI precautions and explain their purpose, importance, and requirements.
- List personal protective equipment and describe its purpose.
- Demonstrate the techniques for donning, doffing, and disposing of PPE based on scenarios.

Overview:

- Types of Protective Precautions
- BSI Precautions
- Personal Protective Equipment

- Donning, Doffing, and Disposing of PPE

I. Types of Protective Precautions

A. Isolation precautions

1. Developed as in-hospital isolation infection control guidelines in 1975
2. Disease specific, in-hospital precautions to prevent spread of infectious agents from an infected patient to other persons
 - a. ***In-hospital precautions:*** Patient in a private room
 - b. ***Provider precautions:*** Protective barriers (masks, gowns, gloves), wash hands, special disposal/handling of contaminated articles
3. Includes Standard Precautions and Transmission-Based Precautions (discussed later)

B. Universal precautions (UP)

1. CDC 1987 (replaced CDC 1983 Guidelines for Isolation Precautions)
2. In-hospital practices to prevent transmission of ***bloodborne*** diseases
3. Emphasized that ***visible*** blood required barrier protection
4. ***Does not*** address disease-specific isolation precautions for nonbloodborne infections in nonhospital facilities
5. ***Precautions:*** Gloves, gowns, masks, protective eyewear when contact with blood or body secretions containing blood ***is anticipated*** (not all the time as with BSI)
 - a. ***Applies to*** blood, body fluids containing visible blood, semen, vaginal secretions
 - b. ***Applies to*** tissues and specific body fluids: cerebrospinal, synovial, pleural, peritoneal, pericardial, amniotic
 - c. ***Does not apply to*** feces, nasal secretions, sputum, sweat, tears, urine, vomitus unless they contain visible blood
 - d. ***Does not apply to*** saliva except when visibly contaminated with blood or in the dental setting (blood contamination of saliva is predictable)

C. Body Substance Isolation (BSI)

1. Developed by nurses and colleagues in large hospitals (Marguerite M. Jackson, RN, M.S., director of the epidemiology unit, University of California Medical Center, San Diego; Patricia Lynch, RN, B.S.N., epidemiology department at Harborview Medical Center, Seattle, 1987)
2. Assumed ***all*** moist body substances were potentially infectious (not just blood, as in UP); wear gloves for ***anticipated*** contact with these substances.
3. Purpose: Reduce transmission of infectious material from any moist body substance regardless of presumed infection status
 - a. Blood: HIV, HBV
 - b. Feces: shigella (contagious bacterial infection causing diarrhea), salmonella (food poisoning caused by unsafe handling of contaminated meats, poultry, fish, vegetables; unpasteurized dairy and juice products); escherichia-coli (e-coli) from unsanitary food handling conditions
 - c. Urine—e-coli
 - d. Sputum: tubercle bacilli (tuberculosis) or resistant staphylococcus aureus (bacteria that causes infections)
 - e. Saliva (small and large airborne droplets): common cold and flu, upper respiratory infection, meningitis, mono, Epstein-Barr virus, cold sores, Hepatitis B, polio

- f. Wound seepages/excretions
- g. Other body fluids

4. Precautions

- a. Gloves when anticipating contact with moist body substances while caring for **all** patients
- b. Immunization against infectious diseases transmitted by airborne or droplet (discussed later)
 - 1) Measles
 - 2) Mumps
 - 3) Rubella
 - 4) Varicella (chickenpox)
- c. Other appropriate barriers, e.g., gowns, masks, eye protection based on type of infection as needed

D. Standard precautions

- 1. CDC 1996 for in-hospital health care workers
- 2. Incorporated major features of both UP and BSI
 - a. UP: gloves, gowns, masks, protective eyewear to reduce risk of transmission of bloodborne pathogens
 - b. BSI: gloves (and immunizations) to reduce risk of pathogens from moist body substances
- 3. Applied to all patients regardless of diagnosis or presumed infection status
 - a. Blood, all body fluids, secretions and excretions *except sweat*, regardless of whether or not they contain blood
 - b. Nonintact skin
 - c. Mucous membranes

4. Precautions

- a. Consider every person infectious
- b. Wash hands
- c. Wear gloves
- d. Wear other body protection: masks, goggles, face masks, gowns
- e. Handle soiled linen with gloves; dispose of in biohazard waste containers/bags
- f. Handle patient care equipment with gloves; clean reusable equipment
- g. Routinely clean and disinfect equipment
- h. Do not recap needles, remove from syringes or bending, breaking by hand; dispose of in sharps container
- i. Use face/mouthpieces or resuscitation bags for patient resuscitation

E. Transmission-based precautions (also include BSI precautions)

- 1. Airborne transmission
 - a. **Small** particle evaporated droplets or dust containing droplets that remain suspended for a long time
 - b. Droplets or dust containing droplets are dispersed by air currents
 - c. Inhaled by or deposited on susceptible host
 - d. Include measles (virus), varicella (virus), Legionella (bacteria), tuberculosis (bacteria)

- e. **Precautions**
 - 1) **Respiratory protection:** High efficiency filter mask
 - 2) **Patient transport:** Place a mask on the patient.
 - 3) **Environmental control:** Equipment cleaning, disinfection, sterilization
- 2. Droplet transmission
 - a. **Large** droplet contact with conjunctiva or oral/nasal mucosa
 - b. Droplets generated during coughing, sneezing, talking
 - c. Requires close contact
 - 1) Large droplets do not stay suspended for long
 - 2) Large droplets travel short distance (possibly to 3 feet)
 - d. **Precautions**
 - 1) **Respiratory protection:** Wear a mask when within 3 feet of patient
 - 2) **Protective eyewear** especially with possibility of splashing, talking, sneezing (within 3 feet)
 - 3) **Patient transport:** Place a mask on the patient.
 - 4) **Environmental control:** Equipment cleaning, disinfection, sterilization.
- 3. Contact transmission
 - a. Direct contact: Skin-to-skin contact and physical transfer
 - b. Touching hands, face, other body parts
 - 1) Provider-to-patient contact
 - 2) Patient-to-patient or patient-to-other person contact
 - c. Indirect contact: Skin-to-object contact
 - 1) Patient's contaminated hand touches object
 - 2) Provider touches contaminated object
 - d. **Precautions**
 - 1) Wash hands
 - 2) Use gloves
 - 3) Wear a gown
 - 4) Clean and disinfect patient care/contact items
 - a) After patient use/touch
 - b) Before using on or with another patient or use disposable items
 - 5) Dispose of all patient contact items in appropriate bags/containers (e.g., red medical waste/biohazard containers/bags, sharps containers)

II. **BSI Precautions**

A. Definition

- 1. A method of infection control
- 2. Equipment and procedures that protect providers and patients from blood and body fluids, including airborne droplets

B. Purpose

- 1. Provides patients and providers protection because it is impossible to identify that either group has an infectious disease just by looking at them
- 2. Prevents exposure to blood, body fluid, and respiratory pathogens

C. Need/importance

- 1. Patient's full medical history is not always available or forthcoming

2. Protects providers from patients and patients from providers
 3. Expands principles of UP beyond bloodborne disease to include all moist body substances
 4. Presumes all body substances carry infectious agents
 5. Protects providers from both bloodborne **and** airborne pathogens
- D. Requirements
1. Must meet Occupational Safety and Health Administration (OSHA) guidelines
 2. Employer responsibilities
 - a. Must develop written exposure control plan
 - b. Must provide training, immunizations, and personal protective equipment (PPE)
 - c. Must have policy for exposure to infectious substances
 - 1) Baseline testing and periodic follow-up
 - 2) Plus federal legislation allows provider notification of patient infection
 3. Employee responsibilities
 - a. Participate in training
 - b. Follow exposure control plan

III. Personal Protective Equipment (PPE):

- A. Purpose
1. Match the exposure hazard for proper protection
 2. Protect emergency services personnel
 - a. From sharp, pointed, jagged objects
 - b. From objects that may fall on your head or feet
 - c. From body substances and includes BSI precautions: Gloves and other appropriate barriers (gowns, masks, eye protection), and immunization
- B. Hand washing: after patient contact when gloves are removed
1. Soap and warm water: lather and scrub vigorously for 20 seconds (CDC guidelines)
 2. Alcohol-based hand sanitizers: apply to the palm of one hand and rub hands together; cover all surfaces of hands and fingers until hands are dry (CDC guidelines); not effective if hands are visibly soiled
- C. Gloves
1. Use medical grade vinyl, rubber latex, or synthetic latex nitrile gloves
 2. Change if torn or damaged; wash hands; reglove
 3. Use new gloves for each patient
 4. Dispose of gloves in biohazard waste container/bag
- D. Protective eyewear
1. Protects from splashing, splattering, and spraying fluids/droplets
 2. Types: should cover front and both sides of face
 - a. Goggles: acceptable, but tend to fog
 - b. Safety glasses with side shields
 - c. Combo face shield and mask
- E. Face mask or particulate respirator
1. Surgical mask: Protects from blood or fluid splatter (intubation, suctioning)
 2. N-95 or high efficiency particulate air (HEPA) mask: to protect from small particle droplets, e.g., tuberculosis
- F. Fluid resistant gown: Protects clothing or bare skin from splatter (childbirth, arterial bleeding, multi-trauma)

- G. Pocket face mask, bag-valve-mask: Prevents mouth-to-mouth contact

IV. Donning, Doffing, and Disposing of PPE

- A. Have all participants wash or sanitize hands
- B. Demonstrate and practice donning PPE equipment in proper order
1. Gown
 2. Mask or respirator
 3. Goggles or face shield
 4. Gloves
- C. Demonstrate and practice doffing PPE equipment in proper order
1. Gloves
 2. Goggles or face shield
 3. Gown
 4. Mask or respirator
- D. Demonstrate disposal of PPE equipment
1. Use sharps container or coffee cans for sharps containers
 2. Use red biohazard bags/bins or plastic grocery bags/plastic bins for biohazard containers

Scenarios: Use the following scenarios, or have the group create a few of their own. The scenarios should vary in difficulty and types of illnesses or injuries and exposures (types of poisons), ages of patients, and individuals involved, e.g., parent/child, teacher/child/children; crash/fall victims and helping bystanders; . The participants may like competing to see who is most creative.

1. Your patient is a bed-ridden woman, 72 years old, who had been coughing up bloody sputum for the past hour. The room has an odor of feces, and her daughter tells you the woman has been incontinent with diarrhea for three days and her urine is brown. The daughter has been caring for and cleaning her mother, but there are no indications she used gloves or masks. She called 9-1-1 because the patient became unresponsive.

PPE: Gloves Mask Protective eyewear Gown Pocket face mask/BVM

2. Your patient is a 21-year-old female auto crash victim who managed to go through the windshield because she was not wearing her seatbelt. She has multiple lacerations on her face, hands, arms, torso, and thighs. You also suspect intoxication because of the odor of alcohol on her breath. She says she has to throw up.

PPE: Gloves Mask Protective eyewear Gown Pocket face mask/BVM

3. Your patient is a child who jumped from a tree pretending to be a super hero who could fly. He appears to have a fractured right forearm and fractured right ankle, but there is no apparent external bleeding except from his gums where he knocked out two front teeth.

PPE: Gloves Mask Protective eyewear Gown Pocket face mask/BVM

4. Your patient is a 16-year-old teenager who cut his hand while trying to slice a bagel while staying with his grandparents. The grandparents don't have a car to drive him to the hospital, but they immediately put wads of paper towels on the wound and had him hold pressure and elevate it until you arrived.

PPE: Gloves Mask Protective eyewear Gown Pocket face mask/BVM

5. Your patient is a 5-year-old boy who was bitten in the face by the neighbor's dog. The dog is under the control of the owner, now, and Animal Control has been contacted. The mother is hysterical and is cradling her son in her arms and has blood all over her, but she has tried to clean and control the bleeding with a cold, wet washcloth. The boy's wounds are bleeding mildly. The child is rather calm but cowering in his mother's arms.

PPE: __ Gloves __ Mask __ Protective eyewear__ Gown __Pocket face mask/BVM

Summary:

Student Performance Objective: Given information, resources, and opportunity for discussion and practice, at the completion of this session EMTs will be able to list and describe BSI, PPE, and other precautions and demonstrate proper donning, doffing, and disposing of PPE.

EMTs will follow acceptable Maryland medical practice and Maryland Medical Protocols for Emergency Medical Providers.

Review:

- Types of Protective Precautions
 - List the types of protective precautions
 - Explain why you think it is necessary to know some history of the various protective precautions
 - Explain why you think it is necessary to know in-hospital precautions when you usually just arrive at the ED and drop off patients.
 - Name the three transmission-based precautions
 - Describe the difference between airborne transmission and droplet transmissions and the type of respiratory protection worn for each
- BSI Precautions
 - Define BSI precautions
 - What is the significant purpose of BSI
 - Explain the need for and importance of using BSI
 - List the requirements of a BSI plan/program
- Personal Protective Equipment
 - List the personal protective equipment commonly used in BSI
 - Describe the purpose of each piece of PPE
- Donning, Doffing, and Disposing of PPE
 - List the PPE that was used for each scenario and explain why.